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Conducted by

CHARLES S. SARGENT

Director of the Arnold Arboretum, Professor of Arboriculture in Harvard College, etc.

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The Influence of Mountain Forests.

THE following paragraph appears in a paper recently read by Mr. Henry Gannett, Geographer of the United States Geological Survey, before the Philosophical Society of Washington:

"Although forests have no influence upon precipitation, yet they do exert a certain economic influence. Without increasing rainfall, they, in common with other forms of vegetation, economize that which falls, retaining it somewhat as a reservoir, and preventing its rapid descent into streams. In this way, too, forests tend to reduce the magnitude of floods and to regulate the flow of rivers, thus preventing disaster and improving navigation. This retention of the rainfall is, however, accompanied by a rapid evaporation from the leaf surface of the forest, whereby a considerable proportion of the rainfall returns to the atmosphere without reaching the earth. On this account it is urged, and I think with reason, that in our arid region, which is dependent for irrigation upon its streams, it is advisable to cut away as rapidly as possible all the forests, especially upon the mountains, where most of the rain falls, in order that as much of the precipitation as possible may be collected in the streams. This will cause, not a decrease in the annual flow of the streams, as commonly supposed, but an increase, coupled with a greater concentration of the flow in the spring months, and result in rendering fertile a greater area of the arid region. It may be added that the forests in the arid region are thus disappearing with commendable rapidity."

There are two reasons why Mr. Gannett's sweeping denial of the value of mountain forests cannot be accepted. In the first place, the fact is still to be demonstrated that the evaporation from the leaves of trees exceeds in volume the evaporation from the unprotected surface of the ground stripped of the same trees, the evaporation, of course, increasing in proportion to the dryness of the atmosphere. The truth of Mr. Gannett's statement can only be proved by measuring the total annual flow of two streams with water-sheds of similar extent and contour, and influenced by precisely similar climatic conditions, one cleared and

the other forest-covered. Such a record, we believe, has never been kept. But until such a method is adopted to demonstrate the soundness of his views, it is prudent to hold to the well-established fact that the evaporation from the surface of cleared land largely exceeds that from ground covered with forests.

The increased flow of streams, during the early spring months, must be stored in artificial reservoirs, constructed at no great distance from their sources, if the clearing of the mountain sides is to result "in rendering more fertile a greater area of the arid region," or the flow of water, whether it is increased or diminished by the destruction of the forests, will have passed away before it is needed for purposes of irrigation. Artificial reservoirs for the storage, for subsequent use, of the spring flow of rivers in mountain regions, can be made, under some circumstances, valuable adjuncts to the natural reservoirs existing in forest-covered water-sheds. But there are two serious objections to them. Water stored in this way is subject to enormous evaporation, which increases in proportion as it is most needed—a fact which may be expected to seriously affect the value of any system of irrigation in our arid western territories, based solely upon the use of artificial reservoirs. The danger, too, that such reservoirs, however solidly they are constructed, may be carried away during periods of exceptional floods, is very great; and the danger increases with the spring flow of the river, which, as Mr. Gannett points out, is concentrated at that season in proportion as the water-shed is deprived of its natural covering. An artificial reservoir at the head of a stream is always a danger and a menace to the people living below it; and while such reservoirs will no doubt have to be built in several places if the arid west is ever to be redeemed by irrigation in any comprehensive way, it will be simply folly to throw away, by allowing the forests to be destroyed, the opportunity of reducing this danger to a minimum.

The Yosemite Valley.

THE press of California is at last thoroughly aroused to the importance of reorganizing the Board of Yosemite Commissioners, who, if all the stories told about them are true, are about as undesirable a body of officials as can be found in California or any other state.

The territory in which the valley is situated was conveyed several years ago by the National Government to the State of California to be held as a public park, that its natural features might be preserved for the use and enjoyment of the people of the United States. The character of the Yosemite scenery is bold and striking; and its value for those purposes for which the park was created may be increased or diminished in proportion as the minor natural features of this scenery are maintained or destroyed. It was clearly the duty of the Commissioners to preserve the natural scenery of the valley intrusted in their care; but instead of doing this, they have leased out all its level parts to a firm of contractors for a nominal price, and have allowed them to convert it into a hay farm, and to acquire a monopoly of all the forage sold in the valley. No visitor can now enter the valley on horseback or in a carriage without being compelled to pay an exorbitant tax to these contractors in the shape of the price demanded for the feed for his animals, while all visitors are subjected to unauthorized extortions imposed by the Commissioners or by their agents. The noble Black Oaks and Pines which once dotted the park-like valley or lined the banks of the Merced, where it flowed through charming natural meadows, have been cut down or trimmed up in order to increase the area of arable land; and the wild flowers, the natural grasses, the clumps of wild Roses and other native shrubs have all been grubbed up.

The valley is everywhere intersected by barbed-wire fences, closing the paths which lead across its undulated surface and shutting up many of the best points of view of

the surrounding mountains. All freedom of enjoyment is ended, and all sense of naturalness destroyed. The grandeur of the mountains and the beauty of the mountain torrents the Commissioners have not yet been able to destroy, but the value of these even is lessened when seen across fields bounded by barbed-wire fences and torn up by a patent gang-plow. If in all the length and breadth of this land there was one spot which should have been held sacred to the wild beauty of nature—one spot which should not have been marred for sordid ends—it was the Yosemite Valley. It belongs to the Nation, and there is no intelligent American who does not rejoice that such a marvel of nature exists within the limits of his country. The people of the Pacific States are not more interested in its preservation in all the integrity of its beauty than are the inhabitants on this side of the continent, and the cry of warning and of protest raised by the press of California will be echoed from one end of the land to the other.

We begin this week the publication of a series of elementary articles upon Vegetable Physiology with special reference to the plants of the garden and the forest, from the pen of Professor George L. Goodale, Fisher Professor of Natural History in Harvard College, and a distinguished teacher of botany. They are written with the view of bringing the important subject of plant life within reach of all persons of ordinary intelligence and cultivation—business men who take pride in their gardens, professional growers of plants, pupils in high schools, and all the great class of readers who are interested more or less directly in plants, and who want to know something more about them than can be found in ordinary horticultural publications. A most suggestive and interesting fact brought out at the meeting of the American florists, held in this city last summer, was the expression of a belief by some of the most intelligent and progressive members of the Association, that even from a practical point of view some knowledge of botany is necessary to plant growers who aim to get the most out of their business. It is only those men whose practice is based upon a sound knowledge of Vegetable Physiology who are uniformly successful as cultivators. It is for this reason that we have asked our associate to prepare a series of papers which will cover the whole subject, and will make, when finished, an indispensable manual for all cultivators.

The Gardens of the Petit-Trianon.

IT is strange that so few Americans go to the gardens about the Petit-Trianon when they visit Versailles. After having walked all over the main palace and the gardens the day is far spent, and they are weary of sight-seeing. But what a relief it is, after the great masterpiece of Le Nôtre—the formal, clipped trees, the straight alleys and the architectural gardens—to find in the Petit-Trianon a piece of natural-looking country, large, well-formed trees and quiet scenery—a garden laid out in what used to be called, and is still, in France, the “English” style. And it is especially interesting to Americans on account of the large number of our native trees there, some of which are the original specimens sent over by the elder Michaux, and planted there nearly one hundred years ago.

In 1774 Louis XVI. presented the Petit-Trianon to Marie Antoinette, and at once, under her direction, began the formation of the “English Garden.” Of the many plans which were offered that of the Comte de Caranman was finally adopted, but was afterwards slightly modified by an architect named Mique, who had the carrying out of the work. The general design is very simple. A brook, starting from the highest point, winds about through the lawn in rather a needless manner, and three principal groups of trees are so placed as to form agreeable vistas. Such is the appearance from the windows of the

château, but on going a little further into the grounds there is a very pretty piece of water, with several picturesque buildings on the opposite shore. (See illustration, page 7.) Near by are several fine deciduous Cypressess (*Taxodium distichum*) growing on the very edge of the water, and sending up their curious knees, not only in the water itself, but in the grass, and even in a neighboring walk. And not far away are to be seen two or three magnificent White Pines, one of which must be fully 100 feet high and measuring ten and a half feet in circumference at five feet from the ground. But the most remarkable American trees there, besides those already mentioned, are the Cedars (*Juniperus Virginiana*), some thirty feet high, and developed into picturesque forms, with the lower branches resting on the ground. A long list could be made of the different kinds of American trees there; but a few may be named to show the great variety in the plantations. Among the Pines of our country, besides the White Pines, already mentioned, are: *P. inops*, *P. Tæda*, *P. insignis*, *P. ponderosa*, *P. Lambertiana* and *P. Coulteri*; among the Spruces, *Picea nigra* and *P. alba*; among the Firs, *Abies balsamea* and *A. nobilis*, and to these must be added the Hemlock, both the Sequoias, the Douglas Fir and the Larch (*Larix Americana*). The Oaks are well represented by fine specimens of the Red, Willow, Scarlet, White and Burr Oaks, with Birches, Hornbeams, Beeches, Elms, Liquidambars, Sour Gums, Cottonwoods, Lindens, Maples, Hickories, Magnolias, Tulip Trees and Catalpas.

Many of these trees at the time of the formation of the gardens were extremely rare or quite unknown in France.

On the site of what used to be the botanic garden, where some of the earliest experiments in the naturalization of foreign plants were made in France, is now a pretty flower-garden, which contains a good collection of American plants—Rhododendrons, Azaleas, Andromedas, Kalmias and Magnolias. Two fine Gingko trees, one of which is about forty feet high, stand here, and are, I believe, the oldest in France, having been planted about 1789. A fine cut-leaved Beech, a curious but handsome Weeping Sophora and a splendid Pyramidal Oak make up the more remarkable specimens in this part of the grounds.

Paris.

H. S. Codman.

Notes from a South Carolina Naturalist.—I.

THE following wayside notes of Pines, and other trees and plants, were made in October upon my return home from a day's ride to the Savannah River:

Our Carolina “low country,” with its sandy lands, its forests of Pine and swamps of Cypress, may seem tame and uninteresting to strangers, but to those of us whose home it has always been, it possesses a certain charm, especially during this delightful autumn season.

The river bluff fronts southward, and one looks across the marshes to the various islands which stretch out at last to Dawfuskie and the ocean. The growth along the river is mostly of Live Oak and Hickory, and only a few Palmettoes, once so plentiful here, are to be seen; and it is to be feared that this beautiful Palm, which is still being cut along the whole of our sea-coast to build the wharves of Charleston, will eventually be destroyed, and our historic tree be thus lost to us.

Besides the Live Oak, there are handsome trees of Water Oak (*Q. laurifolia*), perhaps the most beautiful of all of our Oaks; also of *Q. aquatica*, *Q. falcata*, *Q. alba*, *Q. obtusiloba* and *Q. Catesbæi*. *Ilex Cassene* is, of course, everywhere, its berries now reddening under the influence of the fall weather. The autumn show is not as brilliant as in past seasons, owing to the long and terrible drought of the summer and the late downpouring of rain, which have partly destroyed the harvest of Rice and Cotton. Yet the Yellow Gerardia is to be seen in all its glory, even though we fail to find in the damp lands the purple-flowered species (*G. purpurea*), which usually covers whole acres in extent, and gives such a charm to the landscape.

Along the sandy bluff-side I find *Liatris elegans*, with its tall purple spikes, some of them most deeply colored. Seeing these beautiful plants reminded me of a sight which I have never forgotten. Many years ago, passing through an old sandy field along the river at Montpellier Place, I saw an acre or two of them in full bloom. It was late in the fall, the atmos-

phere crisp and bracing, but in spite of the light frost the plants were in all their perfection of height and color, and I wondered at the great number of large and brilliant butterflies hovering over and alighting on the purple spikes. The thickly crowded purple blooms, the hovering insects, the sparkling river fringed with Live Oak and Palmetto, and overhead the autumn sky—all these producing a sense of exhilaration and happiness, the recollection of which at this day even is most pleasant.

Of Golden-rod I see mostly *Solidago tortifolia* and *S. retrorsa*. We now turn from the river, the road carrying us through a damp, flat Pine-land of Saw Palmetto (*S. serrulata*), and the first Pine to strike the attention of the botanist would probably be *P. Cubensis*, the *P. Elliottii* of Engelm. But the turpentine-chippers and wood-cutters are in the land, and the Pines are either scarred and mutilated for the still, or cut down for timber, and thus it happens that few large and handsome trees are now to be seen. This tree is the earliest of all our Pines to bloom, the deep violet-purple buds showing themselves in December or January, and later discharging their pollen from two to four weeks before the others, according to season and latitude.

The deep violet or rose-purple aments are in color like those of the long-leaved Pine (*P. palustris*), and every year does their exquisite hue surprise and charm us afresh, as does the blue of the Gentian (*G. Elliottii*) in November, or the pale lilac of the Swamp Aster (*A. paludosus*) in October. The leaves of *P. Cubensis* are by twos and threes, and of a deep green color. The female aments are at first erect, but they soon commence to recurve, so that in April or May they are close to the stem. I know not if other Pines, either in our country or elsewhere, ever show this striking peculiarity, but I am sure it is not seen in *P. palustris*, *P. serotina*, *P. glabra*, *P. mitis* or *P. Teda*. The red-brown bark resembles that of *P. palustris*, but, as was remarked long ago by Elliott (*P. Teda*, var. *heterophylla*), it exfoliates in "longer scales." At this date of writing I observe that the cones of our other Pines are still green, save perhaps those of *P. serotina*, which are of a very pale yellow, whereas those of *P. Cubensis* are brown or cinnamon-colored, and are now expanding wide on the approach of cold weather. A little later they will discharge their abundant seeds. A few of the cones are already dropping, but this usually occurs later in the fall or winter, as is the case with *P. palustris*, while the cones of all the rest cling till they drop, in after years, from decay. It is also worthy of remark that these two Pines, which drop their cones earlier, are the only two which run turpentine and whose timber is in all respects excellent. This tree (*P. Cubensis*), so far as I know, is found growing only under the influence of salt water. I find it in damp and flat Pine-lands, or in wet "slashes," often associated with *P. serotina*, also in sandy, and largely, too, in clay lands, while I have seen the young saplings overrunning the driest and sandiest old Cotton-fields. It is, I think, the tallest of our Pines, and the largest which I ever saw was 110 feet in height, and grew not far from me in a Pine-land "slash."

Many years ago I remember seeing just back of the sand hills on Hilton Head beach a few of these trees. They were not remarkable for height, yet from their girth and twisted branches one could imagine that they had stood the storms of centuries, and, for aught we know, had been sighted by Jean Ribault upon his making the harbor, or even by Melendez, when the "dark helm" of the Spaniard "hovered" over the waters of Port Royal!

Even as early as the 28th of September I observed that the cones of a few trees were opening, though I saw no mast falling. But this had not escaped the keen eyes of the jack-daws, for a tree top was black with them, and later the woods will ring with their joyous notes when they are picking the Pine mast from the cones. I hear now the rush of the birds and see their almost friendly rivalry as, with expanded wings, they take every attitude upon the cones, up or down, while the seeds are falling and twirling round and round in the autumn sunshine. Looking at such a picture, listening to the noise and clatter and the sweet exhilarating note of the birds, one craves the hand of Audubon to paint it! Nor is color wanting in the brown cones, the glossy blue-black of the birds and the deep green fans of the Pine!

As we go on we glance at the Pond Pine—the Black Pine of the country folk, the *P. serotina* of Michaux. Dr. Engelm. considered this Pine a variety of the Pitch Pine, *P. rigida*, but I am not sure that this has been accepted by all botanists. I am informed that this latter Pine, *P. rigida*, is invariably found further north in dry and sandy lands. Elliott speaks of a tree which he refers to as *P. rigida* and its being found sparsely in the low country of South Carolina. But this

tree I have never yet met, nor have I ever seen any one who could tell me anything about it. I have often looked for it. Elliott's home was not over twenty-five miles from this place and he speaks of *P. rigida* as "a large tree from 70 to 100 feet in height and two to three in diameter." He says, also: "This tree is not very common in the low country of Carolina, where it generally grows intermingled with trees of other kinds, not forming forests exclusively of Pine." Evidently he had seen it in the low country and it seems strange that it has disappeared. We next meet with *P. palustris* as we get into more sandy land. Although we have sometimes seen this tree in damp or wet places, the old name of *P. palustris* seems inapplicable, for, certainly, its finest forests are in the sandiest land. We have passed the *Eupatorium scabridum* of Elliott, which, after all, seems to be but a variety of *E. rotundifolium*, but the bloom of both has long since been over. Some fine plants, however, of *E. album*, are in bloom now, and *E. aromaticum* only in bud. The road becomes more deep and sandy, and on the roadside hedges are *Aralia spinosa*, and the "French Mulberry," *Callicarpa*. The fruit of this last is beautiful, indeed, but it is esteemed too common for cultivation. Some years ago, near sunset, I was collecting its fruit, but a mocking bird was standing guard on the shrub and most vociferously disputed my taking the purple clusters, flying up and around me with extended wings, as he might do when his nest is assailed in the spring. As I left with my booty he seemed clamorously to pursue me, and even when I was well out of his reach, I still heard his scolding. As I pass along the sandy field of cotton I recall that it was here, on each side of the roadside hedge, that I found, I think, three separate plants of an *Asclepias*, which seemed but a freak of *A. tuberosa*, which last was very abundant in this spot. It has long since utterly disappeared, but good specimens were sent both to Drs. Gray and Engelm., and, I think, also to Mr. Canby.

I append a few notes of this plant, which, at the time, greatly excited my curiosity: Leaves of the calyx linear, curved upwards between the leaves of the corolla, which are linear-lanceolate, and, as usual, reflexed, but of a deep blood-red color. Leaves of the staminal crown of the same deep crimson, spreading and reflexed, deeply cleft and bearing no horn. The gynostegium, therefore (which is greenish yellow), naked. Flowers much smaller, and umbels, also, than in *A. tuberosa*, but extremely brilliant and ornamental. This plant, like *A. tuberosa*, exudes no milk; it is hirsute, and in all other respects, both as to stem and leaf, like *A. tuberosa*. Whether hybrid or monstrosity, I never learned accurately.

Bluffton, S. C.

J. H. Mellechamp.

Foreign Correspondence.

London Letter.

BOOKS.—Several works by eminent botanists and gardeners have been added this year to the literature of the garden. The one likely to prove the most generally useful to the horticulturist is Nicholson's "Dictionary of Gardening," a careful and comprehensive encyclopædia of plants and garden matters generally. It has taken four years to complete it, and already it is quoted by many as the standard authority on garden nomenclature, the editor's well-known carefulness and extensive knowledge being a guarantee of its reliability in this respect. Certainly this work fills a gap which horticulturists generally often had occasion to deplore. Mr. Baker, of Kew, whose sympathy with horticulturists and interest in their work is quite exceptional among botanists, has added another useful work to the many already prepared by him. I refer to his book on the order *Amaryllidaceæ*. It contains descriptions, in good plain English, of all the species and most marked varieties of the genera included in this order, and it is the result of twenty-three years' notes and observations. Here this book is of great value for reference. It ought to be in every gardener's library. Mr. Bolus, an eminent Cape botanist, and certainly the first authority on Cape Orchids, has just published a very valuable book on the Orchids of the Cape Peninsula. Mr. Bolus has studied most of these plants in a living state, and, as he discourses on the conditions under which they grow naturally, much useful information for the cultivator is contained in his book. For with only one or two exceptions the management of Cape Orchids here has not yet been mastered. Veitch's splendid Orchid Manual already comprises *Odontoglossum*, *Cattleya*, *Lælia*, *Dendrobium* and several small genera, and I learn that the number on *Cypripedium* will shortly appear.

GRAMMATOPHYLLUM SPECIOSUM (see GARDEN AND FOREST,

p. 468).—This wonderful Orchid cannot be cultivated with any success in England. It has flowered only once here, I believe, namely, in the collection of the late Mr. John Day, of Tottenham, and that was on a newly imported plant. Mr. Day, who had seen the plant in its native haunts, said it grew on stout branches of trees overhanging rivers, and the plants were always within a foot or so of the surface, so that its roots were in the water. It also requires great heat and bright sunshine. Plants are in cultivation at Kew, but they do not thrive. An Orchid with pseudo-bulbs as thick as a man's wrist, and eight feet or more long, the flower-scape six feet high and one inch in diameter, bearing numerous flowers nearly six inches across, and colored rich yellow with purple spots, is something worth striving for; but these flowers seem unattainable in England.

CATASETUM BUNGEROTHII.—This plant is certain to bring many of the species of this extraordinary genus into popular favor, as it has proved surprisingly beautiful and easy to cultivate. When it was first talked of most Orchid-growers doubted there being a *Catasetum* with such attractive characters as were ascribed to *C. Bungeothii*, but it is immensely popular here now. Mr. Sander has a great number of plants in bloom, showing considerable variety in form and coloring. At Kew this and several other species are in flower. One of these, *C. lanuginosum*, had two supposed distinct varieties of flowers springing from the same pseudo-bulb. Had there been only one of the spikes, this plant would certainly have been called a new species, but the second spike proved that this was only one of the extraordinary freaks to which *Catasetums* are addicted. Dr. Lindley described one of them which bore flowers of three supposed genera on the same spike.

SOPHRONITIS.—A quantity of plants in good condition, of the rose-colored variety of *S. grandiflora*, have lately been imported. It is almost as large-flowered as the best form of the type; the pseudo-bulbs and foliage are brownish, the latter very thick and fleshy; but the only marked difference is that of color, the type having flowers of a brilliant scarlet, whilst in the variety rosea they are bright rose-purple, almost clear red. This form first appeared in a London collection in 1884, when it was figured in *The Garden*. A good example is now flowering at Kew. *S. cernua* is also in bloom here. It is small-flowered, each peduncle bearing several flowers of a cinnamon-red color. Except to complete a collection, this species is not worth cultivating. *S. violacea* is a better plant. It blooms in winter and spring, and lasts a long while; and the flowers are an inch across and violet-purple in color. In the form of its pseudo-bulbs and leaves, too, this species is peculiar and interesting. Of course, all the kinds thrive best when grown in the coolest and moistest Orchid-house.

CALANTHES form the brightest and most graceful picture in our Orchid houses just now. They are everybody's plants. Here they are grown for the conservatory, the two oldest and best, *C. vestita* and *C. Veitchii*, being as easy to grow and as beautiful when in flower as the most popular of decorative plants. But there exist kinds in a few English collections which, when sufficiently multiplied, will be a great acquisition as winter-flowering plants. Such are *C. Burfordiensis*, with crimson and vermilion flowers; *C. Veitchii splendens*, almost as dark in color; *C. Sandhurstiana*, and one or two others. These are seedlings or crosses from *C. vestita* and *C. Veitchii*, which have been raised in the gardens of Sir T. Laurence. *C. veratrifolia*, *C. biloba* and *C. Natalensis* are also flowering here.

There are four particularly bright plants in the green-house just now. The first is *Reinwardtia tetragyna*, a relative of the old *Linum trigynum*, but a much superior plant. Its flowers are borne in large clusters on the ends of the short branches, well grown plants being simply irregular masses of the softest yellow bloom. This plant is not understood well in nurseries, and I have heard it spoken of disparagingly by growers whose plants were a proof of their ignorance of its requirements. These are simple enough. A warm green-house, shade from bright sunshine, plenty of water always and a fair amount of root room, are the conditions which have produced the plants admired now by every one at Kew. *Mesembryanthemum blandum* is practically unknown in horticulture, but it is a handsome and useful winter-flowering plant, nevertheless. It is compact, the branches erect, with bright green, almost terete leaves, two inches long, and flowers, as big as half-crowns, white, full and lasting. Most of the plants of this genus close their flowers, except when the sun shines upon them, but this species is an exception, as its flowers are expanded in all lights. *Sericographis Ghiesbreghtii* makes a delightful little picture in our green-house just now. It is

treated in the same way as the *Reinwardtia*. It grows here to a height of twelve and a half feet, is freely branched, and clothed with axillary and terminal panicles of graceful, tubular, scarlet flowers. A group of well-grown plants when in flower cannot be easily beaten. *Luculia gratissima* completes the quartette, a plant which most people delight to see, but few cultivate with success. Planted in a bed of rich peat in a sunny position in the warm green-house it forms a shrub ten feet high, and every branch is now bearing a huge head of handsome rosy-white flowers, which emit a delicious fragrance, and remain in beauty a month or more.

PRIMULA JAPONICA.—By a little management this fine Primrose may be induced to flower almost at any time. At Kew it is now in beautiful condition in a cool green-house, where it will continue to flower all winter. In the summer it is happy in a sunny border out-of-doors. Plants raised late and kept in pots commence to flower in autumn, and so on. There are many varieties of it, one of the most distinct being pure white, save the blotch of dull yellow on the mouth of the tube. Rose-colored, deep crimson and flaked varieties are also common. This species is hardy enough to take care of itself out-of-doors all winter in England. There are not at present any yellow-flowered varieties known, but in *P. imperialis*, now called *P. prolifera*, we have a species very similar to *P. Japonica* in foliage and inflorescence, differing only in having pure sulphur-yellow flowers. They are not quite as large as those of the Japanese plant, the width of the limb being only half an inch. Some examples now in flower at Kew have peduncles two feet high, bearing four whorls, each three inches apart, and each whorl containing a dozen flowers. Good cultivation, with selection, ought to evolve a first-rate flowering plant out of this Primrose. The form in cultivation is that found in the Himalayas. There is, however, another variety of it in Java, with foliage like dock leaves, and a flower spike five feet high; but so far as is known, this noble Primrose has not yet been introduced.

Several species of *Kniphofia* are flowering out-of-doors here, an unusual occurrence in December. *K. hybrida sarmentosa* is quite gorgeous, even now. It has spikes a yard high, and heads of flowers eight inches long; the color of the upper flowers is bright orange-scarlet, the lower flowers being sulphur yellow. *K. Saundersoni* is also flowering freely. The *Kniphofias* are receiving careful attention from several horticulturists in England, who aim at improving them both in respect to hardiness and flower-color, by means of hybridization and selection. A great number of species and varieties are cultivated at Kew.

W. Watson.

December 6th, 1888.

New or Little Known Plants.

Neillia Torreyi.*

IT is somewhat remarkable that the dwarf Ninebark of the Rocky Mountains, the *Neillia Torreyi*, has not become common and a favorite on lawns and in shrubberies. The larger species, *N. opulifolia*, more popularly known as *Spiraea opulifolia*, with its golden-leaved variety, is in frequent use for hedges and for ornament. The great objection to it is its rampant growth and need of free and frequent cutting in. The *N. Torreyi*, on the contrary, while resembling it very closely in many respects, is rather compact in its habit and is only two or three feet in height. It is a free bloomer and would be perfectly hardy in the coldest winters. The form of the leaves is the same as in the other, but they are smaller and usually more pubescent, sometimes white-tomentose on the lower side. The flowers are in smaller clusters and scarcely more than half as large, and the fruit, which is composed of only one or two tomentose seed vessels, never becomes so inflated and conspicuous, as is the case in the common Ninebark. It would certainly be an ornament to any lawn, and where only a low hedge is needed, it would probably prove very satisfactory. The shrub is not rare in the mountains of Colorado and westward through the Wahsatch, and in some of the ranges of Nevada.

S. W.

[Mr. Faxon's drawing is made from a plant which has flowered during several years in the Arnold Arboretum. It is perfectly hardy, and ripens seeds abundantly.—ED.]

**NEILLIA TORREYI*, Watson, Proc. Amer. Acad., ii, 136.—Our two species that are referred to *Neillia* have been separated from that Asiatic genus by Dr. Maximowicz, of St. Petersburg, and constitute his genus *Physocarpus*.

Cultural Department.

Forcing Fruits and Vegetables Under Glass.

THE gardens of the country home of Mr. Pierre Lorillard, at Jobstown, New Jersey, have long been famous for the fruits and vegetables forced in the green-houses there. These gardens contain an unbroken range of glass over 900 feet in length, which is divided into many compartments to suit the different crops grown in them. The houses of this range face south, but there are others besides running north and south from the main range. A year ago Mr. John G. Gardner, formerly the gardener to Mr. Lorillard, leased these premises for six years, and is now operating them as a market garden.

PEACHES.—In the compartments devoted to peach-growing the trees are planted inside the house, and their tops are spread out on trellises. While these trees are inactive in winter, the temperature is kept constantly low, but as Peas and Mushrooms are grown in them at this season, frost is excluded. In some compartments Peach-trees grown in pots and tubs are forced, and these trees are now (December 10th) out-of-doors with their pots and tubs buried in the ground. This treatment serves to ripen the wood and prepare it for early forcing, and it also preserves the roots from any injury by frost. While frost may not injuriously affect the roots of Peach-trees growing permanently in the open ground, freezing the roots of pot or tub-bound plants, whether of Peach, Plum or any other tree or plant, no matter how hardy, does them no good, and possibly much harm. The green-houses now emptied of these Peach-trees are used as forcing-houses for Tomatoes.

All Peach-trees grown under glass, no matter whether planted out or grown in tubs, are on Plum roots. The Plum stock checks the gross luxuriance of the Peach, promotes the production of short-jointed, firm, fruit-bearing wood, adds vastly to the longevity of the tree, and, in Mr. Gardner's opinion, gives much more highly flavored fruit. Early Alexander, Early Louise and Early Rivers are his favored varieties. When the Peach and

Nectarine trees are in bloom, in order to assist in the fertilization of the flowers and set a heavy crop of fruit, Mr. Gardner brings a colony of bees into the green-houses, and they do the work effectually. I know from personal experience that honey-bees are among the most useful agents we can employ in fertilizing early-blooming plants, whether trees or herbs. And I have often insisted that if our Pansy and other seed-growers would keep bees in their seed-grounds they could harvest much more seed than they do, and that if the bees seem to ignore the special flowers in favor of more distant fields, they may be shut in green-houses with the flowers.

NECTARINES.—These are largely grown, both as planted-out and pot plants, and Mr. Gardner favors them, as they are in good demand, and the market is not nearly as well supplied with them as it is with peaches. Lord Napier is his favorite variety. They are on Plum stocks. The routine of their cultivation is much the same as that of the Peach-trees.

STRAWBERRIES.—These are forced in large quantities. They are all in pots and still outside. Although he grows Elton Pine (a foreign variety) a good deal, he is partial to the Sharpless, as it has the constitution, the foliage and the pollen, and not only sets well itself, but when grown along with other varieties, has a capital fertilizing effect upon them, and there is no better variety to associate with pistillate kinds.

GRAPES.—All the permanent vines—and they occupy many houses—are planted in-doors, but quite a number are also grown in pots. Those grown in pots are for early forcing mostly, and are now thoroughly ripened, pruned and buried under ground out-of-doors, like ordinary Catawbas or Raspberries, the pots having first been plunged in a row in the ground. Here they remain at rest till a house is empty and convenience permits of their being brought in-doors for

forcing. The vines occupying permanent green-house quarters were unfastened from their trellises, and pruned or partly pruned, the end of October, and then laid together in a row just over where they are planted (inside the house), and here boxed up securely from light or the warmth of the green-house, and, at intervals of several yards, are ventilating, chimney-like shafts running from the boxes up through the glass roof. These vineries are now used during the winter months for forcing Tomatoes and Snap Beans.

TOMATOES.—These are forced in very large quantity; indeed all of the vineries are used as Tomato forcing houses in winter. Some of the Tomato plants are grown in large pots, but the great mass of them are grown in boxes set upon the stages and within about five to seven feet of the glass. The variety grown is the Lorillard, which is a selection of Mr. Gardner's. It is a smooth, even, medium sized variety with a bright red skin, and the ripe fruits are firm and solid and capital for shipping. The plants are raised from seed sown in flats, and in order to maintain a regular succession of young stock a fresh sowing is made every ten days. As soon as the seedlings are big enough, they are potted singly into small pots, and they are repotted into larger sizes till the six-inch pot is reached, from which they are planted out in the boxes. They are never planted out till after they have shown one or two clusters of flower-buds, and this for a reason seldom observed by cultivators—that the flower clusters on Tomato vines all grow on one side of the vine and not here and there around the vine, and it is to note the side on which the blossoms appear that the plants are kept in the pots so long; for in planting in the boxes the gardener is always

careful to have the flower-bearing side of the vine face the south.

The boxes are of rough hemlock boards, and are a foot deep, and about two feet long by some twenty-two inches wide, and as they are set upon the green-house stages the boxes themselves are bottomless. The earth used is common garden soil and well rotted manure, and after the plants have attained considerable size a mulching of rotted manure is also added. Four

plants are set in each box—a plan in each corner. As Tomato plants seldom show any flowers from the first half dozen joints of the vines, in order to shorten the stems and let the fruit begin from the ground, the naked part is laid down and the plants at the opposite corners of the box cross each other—for instance, the plant set out in the north-east corner of the box is layered on the ground and brought up in the south-east corner, and the one that had been planted in the south-east corner is brought up in the north-east corner. The plants grown singly in large pots are coiled around on the surface till the first flower joint is reached.

The vines are all kept to a single stem—that is, no branches or laterals are allowed to grow—and each vine is trained up to a string fastened at the corner of the box, and, running perpendicularly, to the roof of the house. The boxes are not placed close against each other on the benches, but at intervals of nearly two feet apart. This allows the plants to be about two feet distant from each other, and admits sunshine and a free circulation of air. The plants are allowed to climb on the cord as high as they will, so long as they retain short-jointed, lusty vigor. The more vine, the more fruit, as every third, or sometimes every fourth, joint, has a fruit cluster.

A night temperature of 57° is maintained. Tomato plants in winter are slow to set fruit without artificial assistance, but Mr. Gardner finds no difficulty in securing sets on every cluster. First he provides a sweet, dry atmosphere in the house; then in the forenoon he takes a padded stick, and goes through the plants, giving each one a sharp but gentle tap to scatter the pollen. The first fruits are ripe for market in about ninety days from the time the seed is sown.



Fig. 84.—Neillia Torreyi.—See page 4.

ASPARAGUS.—Mr. Gardner forces a good deal of Asparagus, but does not begin with it so early as November. He uses four-year-old plants. These plants are grown expressly for forcing, and on the surface plan—that is, they are not planted deep in the ground as if for permanent beds. As good Asparagus comes in from Florida long before the winter leaves us, whatever money is to be made with this vegetable must be made before February is over. Asparagus-roots that have been forced are of no further use; strong, healthy, young stock is too easily raised to make it worth while to keep over enervated roots or to try to recuperate them.

CUCUMBERS.—These are grown in the small span-roofed structures, a row being planted on either side and trained up on trellises under the glass. A temperature of about 60° is maintained, and there is full provision for bottom heat. The Telegraph and Blue Gown are grown as the main crop, but the White Spine is largely forced also. The first two are English, long-fruited varieties, extremely prolific and long-lived, and there is a good sale for them in the Boston and Philadelphia markets, but very little demand for them in New York. Taking everything into consideration, the Telegraph is yet looked upon as the most desirable and profitable of the English varieties, while in the New York market there is a marked preference for what are known as American, or short, thick Cucumbers, although the whitish color of the skin that often appears near the end of the fruit in these sometimes gives them the appearance of having been kept too long. An effort is being made to get a short Cucumber that shall have a deep green skin, without any pale tinge or marking near the end.

PEAS.—Large quantities of these are grown and all in boxes. American Wonder is the variety used. It is very dwarf, a fair cropper, and has good sized Peas of excellent flavor. The boxes in which they are grown are long, narrow and trough-like, four to five inches wide and six inches deep, and of lengths to suit the spaces in which they are grown, say four to six feet long. The earth used is common garden soil enriched with rotted manure. A single row of Peas is sown along the middle of each box. After sowing and until the Peas are well up, they are kept as cool as possible, without subjecting them to frost, but after a good growth is made, a little higher temperature is maintained. In the green-houses the boxes are set about six inches apart from each other, and laid across the benches—that is, the Pea boxes are placed north and south in houses running east and west. This is to admit of a free circulation of air under, between and over them.

SNAP BEANS.—These are forced in abundance and are grown mainly in boxes, but, in some cases, also in temporary troughs on the benches. The boxes are six inches wide, six deep, and twenty or twenty-four inches long, and the soil used is the same as that used for Peas. Sion House, an English variety, is the only one grown, and this selection has been made after testing all other leading varieties. The Beans are sown in three-inch pots, and when the plants are four or five inches high, they are transplanted into the boxes, eight or ten plants in each box. The boxes are then placed on the benches in the warm green-houses, usually in the Tomato houses, crosswise, and each box distant from the other about six inches.

Glen Cove, N. Y.

Wm. Falconer.

The Francoas.

The Garden, of London, calls attention to the value of the Francoas as ornamental flowering garden-plants. They are all natives of Chili, and are perennial herbs, with white, pink or red Saxifrage-like flowers, produced in slender, graceful racemes. *Francoa ramosa*, which is very delightfully figured in *The Garden*, has been in cultivation for more than half a century, but none of the species are very often seen in American gardens, where this genus is practically unknown. It was named in honor of a Valentin, Dr. F. Franco, who promoted botany in the sixteenth century, and it belongs to the Saxifrage family. The following directions for the cultivation of these plants are quoted from *The Garden*:

"As in the case of many Chilean plants, Francoas are impatient of wet, needing, if they are grown in the open, a dry, sheltered position and a light loamy soil. We can occasionally see them in old cottage windows, where they often flourish amazingly. The best way is to raise the plants from seed, which can be sown at any time between the month of February and midsummer, but it is better to commence as early as possible, so that the plants will have a long season of growth before the winter. Sow the seed in a well-drained pan, and use a peaty soil mixed with sufficient sand to make it fairly light, and before sowing give it a careful watering and place a

sheet of glass over the pan, so as to promote quick germination. When the seedlings appear, remove the glass at once, and give water if necessary, placing the pan in a light position so as to keep the seedlings strong and healthy. After a time the seedlings may be pricked off into other pans filled with the same soil as recommended above, and be taken to the greenhouse or a cold-frame. It is essential to give air freely to prevent the plants becoming drawn. When of sufficient strength transfer them to five-inch pots, still keeping them in the greenhouse or frame. By the end of the summer some of the plants will commence to bloom if the seed was sown early, but if first-class specimens are wanted, it is better to pinch out the first spikes, so as to obtain an abundant supply the second year, when the plants will be much stronger. When the plants require repotting, give them pots one inch or two inches larger, and in the second year when the flower spikes are commencing to appear a few applications of weak liquid manure will be helpful. The seed may also be sown when it is ripe, which it will be at this season, and the young plants potted off in the spring. We have given a somewhat detailed description of the culture, because it is not every one who has grown the Francoa, and many consider it difficult to bring to perfection. There are many poor specimens in gardens, which often have the bottom leaves absent, but this is due in a great many instances to an over-supply of water. If there is one thing that the Francoa detests, it is a soil that is kept too moist. *Francoa ramosa* is the best of the three, and has spikes of great length, and the flowers are pure white. The leaves are something like those of a turnip, and of a paler shade of green. *F. appendiculata* has the petals of a soft reddish color, enriched near the base by a deep blotch. This is well worth growing, but the blooms are not so pure as those of *F. ramosa*. *F. appendiculata* is sometimes confused with *F. souchifolia*, but this is different, its flowers being of a purple shade. Although to obtain the finest specimens it is necessary to grow the plants in pots, the Francoas may sometimes be seen in splendid condition on the rockery."

Plants for a Trying Climate.

EIGHT or nine years ago Professor Sargent kindly sent us seeds of *Berberis Amurensis* and of *Lonicera splendens*. The seedlings of the Amur Barberry were planted in a row from the seed-bed, and have made a compact hedge without pruning, which a prairie steer could not penetrate. They have proved far more rapid in growth than any of the Barberries in our large collection, and their foliage has not been troubled with the cluster-cup fungus. When loaded with the oblong, scarlet fruit this section of hedge is much admired. As it proves perfectly hardy in the far North-west, and grows well where the rainfall is very light, I believe it will prove very valuable for hedging and also for planting as a large shrub upon the lawn.

The seedlings of *Lonicera splendens* were also set about two feet apart in a hedge-row. The uniform expression of the row indicates that *L. splendens* is a good species, or, at least, a strain quite distinct from *L. Tatarica*. The flowers vary in size, and from white to dark pink, and the berries vary from red to yellow, but as propagated from cuttings they all have the graceful, rounded habit of growth, and delicate, light green foliage of the typical *L. splendens*. Without exception these seedlings are an improvement for lawn planting or for screens on the Tartarian Honeysuckle or its seedlings.

At the West, what is known as the Wisconsin Weeping Willow, is our only hardy form of the old list common to the nurseries. This led us to introduce *Salix Napoleonis*, of which we saw hundreds of fine specimens on the steppes of east Europe, top-worked on *Salix aurea*, one of the yellowest of the Yellow Willows, that seems to be indigenous to east Europe and central Asia. *S. Napoleonis* has long, thin twigs that move with the breeze, showing to good advantage its blue-tinged foliage, forming a fine contrast with the bright golden-barked stock, on which it is worked. The stock from *S. aurea* is a rapid, upright grower from cuttings, and *S. Napoleonis* works readily upon it by either budding or grafting. It will prove specially valuable in the West, and, I think, generally in the Northern States.

Eleagnus hortensis is not hardy with us, but it is less a matter of regret, as we consider *E. angustifolia* a handsomer tree—larger in growth, and with more fragrant flowers. When favored by the breeze, the fragrance of its flowers has been noticed at a distance of forty rods. It is perfectly hardy up to the forty-fourth parallel in Minnesota and Dakota on dry soils, and it thrives where the rainfall is too light for most of our indigenous trees. It was introduced into

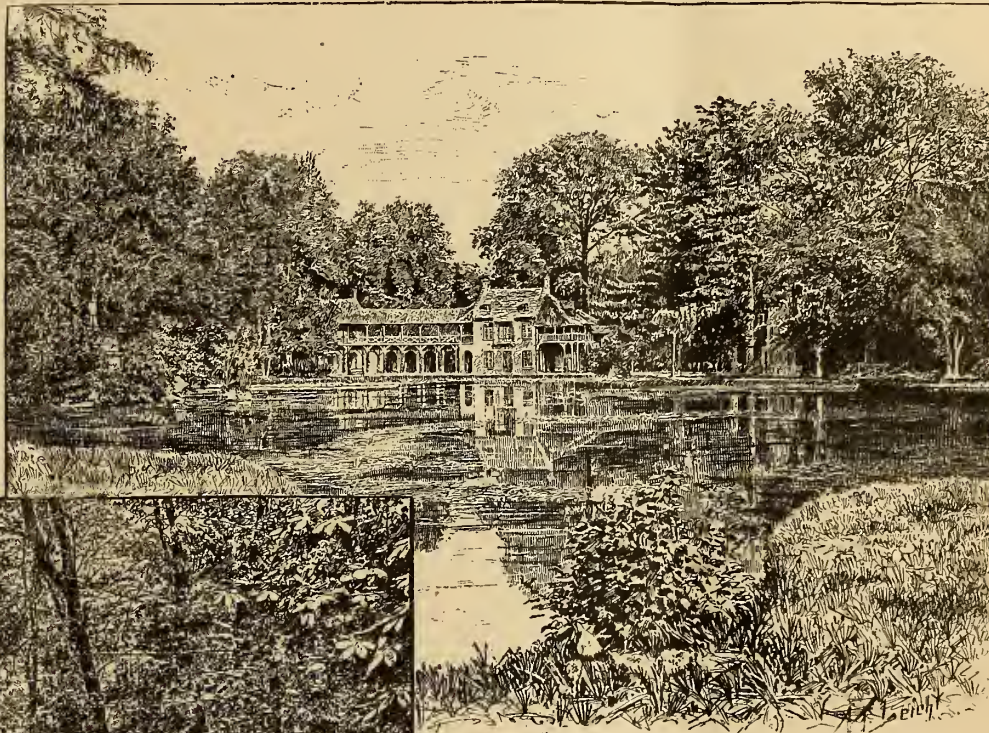
western Nebraska by the Russian Mennonites, where it has become common as an ornamental tree and for hedges and wind-breaks. If some attention is given to pruning up and shaping when young it soon makes one of our best silvery foliaged trees for large or small lawns. The seeds should be mixed with sand and kept where they will freeze during winter.

Even where *Tamarix Africana* and *T. Gallica* are hardy and flower freely, I think the *Tamarix* of the Amur, with some cutting back to secure compact growth, is more desirable as a lawn shrub. Its foliage is somewhat darker, its expression more graceful, and it flowers more profusely and for a much longer period. But at the west and north it is the only hardy species of the family, and the number of really beautiful shrubs is restricted, hence it should receive the attention of propagators. We find that it propagates readily from cuttings set in the open ground in autumn, and the young wood roots readily in the cutting bench. *J. L. Budd.*

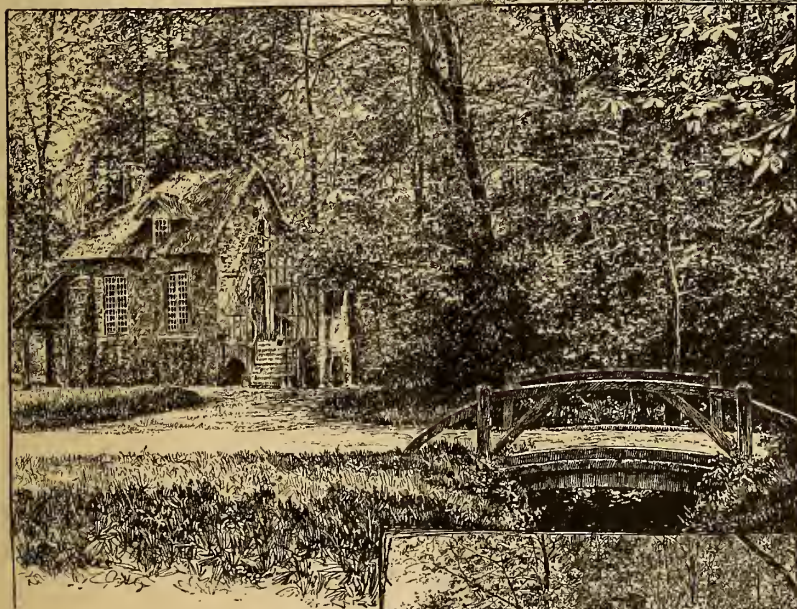
Agricultural College, Ames, Iowa.

Jersey, is an improvement on the French spraying machines, and is now recommended and used by the Department of Agriculture.

Experimenters with the Bordeaux Mixture will find that their success in preventing Grape rot will be in proportion to the earliness and thoroughness with which the mixture is ap-



The Royal Pavilion.—Park of the Petit-Trianon.—See page 2.



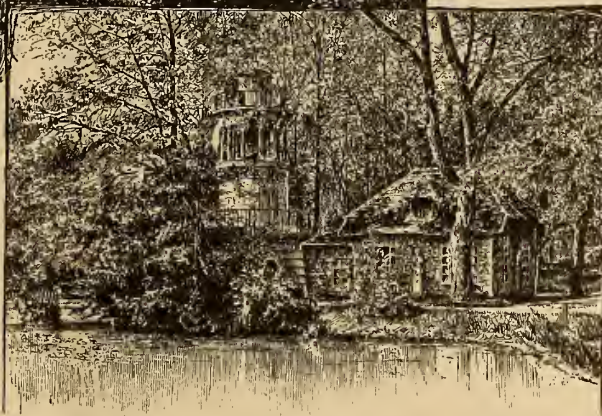
Boudoir of Marie Antoinette.—Park of the Petit-Trianon.—See page 2.

Diseases of the Grape.

SEVERAL inquiries have come to me from readers of GARDEN AND FOREST since the fact was published that experiments here, under direction of the Department of Agriculture, have demonstrated that spraying the Grape vine with copper sulphate solutions will prevent black rot and prevent or cure Grape-leaf mildew.

The best preparation is that known as the Bordeaux Mixture. This is made by dissolving six pounds of powdered copper sulphate (blue vitriol) in several gallons of hot water. Four pounds of new lime are then slaked in sufficient quantity of water. When the two solutions cool they are mixed and diluted with water to make twenty-two gallons.

The vines should be sprayed with this solution before vegetation starts in spring, and every three or four weeks thereafter until the grapes begin to color. The need for more or less frequently repeated spraying will probably depend on the weather. If hot and wet, frequent spraying will be needed. The Eureka Sprayer, made by Adam Weaber, Vineland, New



The Dairy.—Park of the Petit-Trianon.—See page 2.

plied. It may be beneficial to spray the vines in winter or in very early spring. It will also be well to practice as complete disinfection as possible. Clean the vineyard; strip and scrape the old bark from the vines after pruning; remove last year's deposits of leaves, petioles and rotted fruit. Bury everything afterward with the plow, and do not disturb this refuse during the summer by deep tillage. A light smoothing harrow will give all the summer cultivation needed.

When the foliage is dense, care should be taken that the clusters are reached by the spray. The liquid must reach the surface of the berry to exclude the rot-germ. Of course it is not advisable to spray the grapes near the time of the vintage. If the fruit is kept safe until it begins to ripen it is as much as can be hoped for. But the fruit may be infected by the fungus even after it is gathered. I now have white grapes spread out in my wine-house which were kept sound in bags until late in October. They are now specked with black rot.

Sulphate of copper thus used on the fruit is not dangerous to the health of those who partake of the grapes. In the wine made from grapes thus treated no trace of the chemical can be found.

Vineland, N. J., November 29th, 1888.

A. W. Pearson.

European Chrysanthemums.—I observe that these flowers, and especially the French varieties, are spoken of disparagingly by many American writers, and it cannot be denied that many new plants of very little merit have been sold to confiding buyers. The years 1886 and 1887 gave us a few choice varieties, but very few compared with the number

sent out by the French raisers. This year, however, really good varieties seem the rule rather than the exception, and the majority prove very valuable, in that they are early bloomers, an important item with those who grow their Chrysanthemums in the open air. Among the most distinct and meritorious of the year are Benoit Rozain, rosy pink, of good size and texture and perfectly formed; Condor, pure white, with broad, pendulous flat petals; Cythère, rosy violet, of immense size; Gustave Nadaud, with long, creamy petals, as round as seine cord, and a flower nearly globular; Harman Payne, bright rose; Magicienne, a large spathe orange-brown; Pierre Destombes, probably the finest of the set, with very long, needle-shaped florets of silvery dove color, the flower measuring six inches in diameter; Sabine and Nelson, two unusually large anemone flowered kinds, the first sulphur yellow, the other ashes of roses. All these varieties are distinct in color, of wonderful form, and are equal to any varieties shown in this country, and yet we frankly confess that those of the Philadelphia prize set sent out by Craig last year are the very finest twelve varieties ever introduced at one time.

Richmond, Indiana.

E. G. Hill.

Principles of Physiological Botany as applied to Horticulture and Forestry.

I.—INTRODUCTORY: REDUCTION OF A PLANT TO ITS LOWEST TERMS, CELLS.—THE LIVING MATTER IN A PLANT.—DIVISION OF LABOR.

PHYIOLOGICAL botany endeavors to investigate every reasonable question regarding the structure and the life of plants. It depends for the appliances which it uses in research chiefly upon Physics and Chemistry, and therefore its progress has been largely governed by the progress made in those departments of investigation. Hence it has been only within a very few years that improvements in the construction of certain instruments, notably the compound microscope, have rendered it possible for the physiologist to examine satisfactorily some of the more obscure processes of growth and of nutrition. Improved methods of research in chemistry, especially what is known as micro-chemistry, have lately enabled physiologists to attack some questions which were formerly considered to be beyond the reach of investigation; consequently, many difficulties have been cleared up in recent years. Although far too many questions have not even yet been answered satisfactorily, the additions to our knowledge of the phenomena presented by plants have been important and are worthy of careful consideration.

It seems proper that these recent discoveries in regard to the structure and life of plants should find some place in a journal devoted to the advancement of two important interests which are based largely on physiological botany, namely, forestry and horticulture. But, at the same time, it is clear that accounts of these discoveries can be given in a journal of this character only under certain difficulties, inasmuch as they must be presented in connection with a general view of the subject, and in language as free as possible from technicalities. Moreover, many of the broad, general statements cannot, from the nature of the case, be very strictly qualified, since reference to the numerous minor exceptions must be omitted. The latter are to be looked for in comprehensive treatises.*

The present series of familiar papers will deal with flowering plants—that is, with plants which produce true flowers and seeds, and the examples will be drawn as much as possible from those which possess special interest from the point of view of forestry and horticulture. These plants will be examined with reference to the manner in which they procure their food and perform their work. It is, therefore, necessary to obtain, at the outset, a general idea of the structure of plants; this can be most conveniently done by examining the plant as if it were, what indeed it is, a *machine*.

THE PLANT AS A MACHINE.—When we have any piece of machinery to investigate, our first aim is to ascertain what its essential parts are—that is, by reducing it to its lowest terms, we try to find out what parts could be dispensed with, if we wanted to make a simpler machine to do the same kind of work. Now, in all cases, we find that we can reduce plants to what must appear, at first, very simple terms, namely, *cells*. These cells are bodies of exceedingly minute size, extremely

diverse in form and general character, but all possessing certain features in common. These microscopic bodies, or cells, are variously united together to make up the structure of the different organs of the plant; hence we must examine the features which these constituents of the plant have in common before we can examine to advantage the plant itself.

If we make a thin slice through any active, living part of a plant, as, for instance, the tip of the root or the very tip of the stem, we see, under the compound microscope, that it is composed of what look like irregular cavities in a confused mass, and this is the view which the earliest observers held in regard to them. But we now know that these cavities are the interiors of minute bodies which are more or less firmly connected together, and which, from their union, give the whole mass a honeycombed appearance. Each of these bodies or cells coheres, by means of its wall, with the cells next to it. In the youngest parts the walls are thin and delicate, but as the part grows older the walls undergo great changes in thickness, hardness, color and so on, but great as these changes are, they are not so marked as that which goes on at the same time in the interior of the cell.

Each young living cell is filled more or less completely with living matter, technically termed *protoplasm*. This living matter in the cells is the only living thing in the whole plant; upon its health, activity and life depend the health, activity and the life of the plant. As long as the living matter in a cell is in a state of health and activity, the different kinds of work can go on. But it often happens, for instance in the cells of a seed which is fully ripe, that the living matter may become for a time inactive, but still ready to resume its activity under favorable conditions. Or, as is more frequently the case in our woody plants, the living matter may, as it builds up new cells, leave the seat of its former activities, and abandon the thick-walled cavity for a new home in the living and younger parts. When the living matter thus removes bodily, so to speak, from the older cavities, the shells, or cases, or old cell-walls, which once held it, become dead.

This is precisely what happens in the formation of woody parts; the cavities no longer contain living matter; their walls are simply the empty cases or shells of what once were the walls of living cells, now dead. Hence, when we speak of a piece of heart-wood exhibiting, under the microscope, the shapes of the cells, we mean merely that we have here the now hardened walls of what were once active, living cells.

It is difficult to realize that the only living parts in the stout trunk of a tree are the cells which are just under the bark, and the cells which are situated here and there in the bark itself. The wood, which plays such an important part as a mechanical support, is lifeless; it is the record of what once had life; it was built up by the living matter which now has passed on to further work of construction.

Nor is it less difficult to realize the significance of a fact which has been discovered within the last few years, namely, that an intimate union exists between the living contents of neighboring cells. It has been shown that the living matter in one active cell is connected with living matter in contiguous cells by exceedingly delicate threads of the same substance.

It is only by the use of recent improvements in appliances for investigation that these threads of living matter can be shown to exist, and hence formerly it was taught that there was no continuity between the living matter in one cell and that in those next to it. The discovery that such a vital connection does exist has led to a generalization which is probably sound, that all the living matter throughout a plant is in reality continuous.

There are many plants of minute size in which the living matter can be studied easily. These microscopic plants inhabit fresh water and possess the power of taking from it all they need for nutrition and growth. They simply consist of single cells, and yet they are able to perform practically all the kinds of work done by plants of such complicated structure as our forest trees and garden shrubs.

But in these exceedingly simple plants, where the different kinds of work are performed by a single cell, there is no clear division of labor; at least we cannot see by what part of the cell the absorption of food-materials takes place, or by what parts respiration is carried on. When, however, we examine any one of the common plants about which this series is to treat, there is more or less distinct separation of the kinds of work, and the division of labor requires different organs. These organs, such as roots, stems and leaves, all co-operate as completely as did the indistinguishable parts in the plants composed of a single cell; all the living cells in all the organs co-operate; each assists the others and is

*The following works will be found useful for reference:
Gray's Botanical Text-book, *Sixth Edition*.
Vol. I.—Structural Botany.
Vol. II.—Physiological Botany.
Vine's Physiology of Plants.
Sachs' Lectures on The Physiology of Plants.

in turn assisted by all the rest. There is a true community of interests throughout characterized by such complete co-ordination that we are accustomed to speak of a shrub or a tree as if it were in fact an individual, whereas it is composed of myriads of independent and yet dependent parts. These parts are the cells, apparently simple to the last degree in their structure, and yet infinitely complex in their organization. As a drop of water under the rays of light which strike it has been said to mirror the universe around it, so these simple spheres may reveal to us something of the mystery of life.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

Forest Tree Planting in Massachusetts.

THE first issue of this journal (vol. i., page 11) contained the report of a committee appointed to award the prize offered by the Trustees of the Massachusetts Society for Promoting Agriculture for the best plantation in Massachusetts of not less than five acres of European Larch. The following report upon another competition under conditions explained in the text has lately been made to the Society. The committee of award were C. S. Sargent, John Lowell and F. H. Appleton; and it may be added that the recommendations of the committee have been adopted and the premiums paid.

The Trustees of the Massachusetts Society for Promoting Agriculture offered in 1876 six competitive prizes for plantations of trees, to be made in Massachusetts during the following year. The conditions of this competition required that the plantations should cover not less than five acres. Two plantations only were made, and the trustees being desirous of increasing the knowledge of tree planting, especially among working farmers, offered the next year (1878) a series of prizes to be awarded during the present year for another competition, into which were admitted smaller and less expensive plantations, and plantations to be made by sowing the seeds where the trees were to stand. The following prizes, amounting to fourteen hundred dollars (\$1,400), were offered in this second competition:

Two prizes for 5,000 White Ash trees.

Two prizes for 1,000 White Ash trees.

Two prizes for five acres of White Pine, raised from seed.

Two prizes for one acre of White Pine, raised from seed.

Two prizes for one acre of Scotch Pine, raised from seed.

Two prizes for one acre of European Larch, containing not less than 2,000 trees.

Thirty-four entries were made in competition for these prizes, by twelve competitors, and your committee find that eight of the twelve competitors have for various reasons withdrawn entirely; some failed to make their trees grow at all, and others neglected to take care of them after they had become partially established. The sowing of seed produced small results. In two cases it did not germinate at all, and in another the percentage of plants raised was small. It must be remembered, however, that there was an early and prolonged drought during the summer of 1878, and that the season was unusually unfavorable for tree planting, and for the germination of tree seeds.

Your committee has visited the plantations of the four competitors who had not formally relinquished their claims to the prizes—Mr. J. D. W. French, of North Andover, Mr. E. Pierson Beebe, of Falmouth, Mr. Thomas H. Lawrence, of Falmouth, and the widow of the late H. R. Hayward, of Lunenburg.

Mr. French entered for the prize for the best 1,000 White Ash trees. He planted 1,500 trees one to two feet high, in two lots. They were set in the sod four feet apart, and have received no care since they were planted. The first lot was planted upon a slope facing the west, in strong, rich soil. A slight depression in the lower end helped to retain the moisture and increase the value of the situation for the trees for which it was chosen. This piece of ground seems to have been well selected for Ash, both as regards soil and exposure. It contains 250 trees. The largest is twenty-five feet high, with a trunk, measured three feet from the ground, one foot in circumference, and the average height of the trees is eighteen feet. The second lot was planted on dry, gravelly upland, in an angle formed by the meeting of two public roads. The situation seems to have been badly selected, and the soil was not suitable for the Ash, which requires cool, moist land for good development. This lot contains 570 trees. The largest has attained a height of

fourteen feet, with a trunk circumference of seven inches three feet from the ground, although the average height of the trees is only seven feet. Mr. French reports that the entire cost of the operation was \$14.96 for the trees and for planting, and \$30.20 for preparing the ground and for fencing, a total of \$45.16, without interest. The conditions of the competition require 1,000 trees, and, although Mr. French's Ash trees are superior to any examined by your committee, it is of the opinion that as only 850 of the 1,500 trees now remain, he is not entitled to a prize.

Mr. E. Pierson Beebe entered for the prizes for the best 1,000 White Ash trees, and for the best acre of European Larch containing not less than 2,000 trees. 1,500 Ash trees were planted, at an entire cost, without interest, of \$17.78. They were set in very light, gravelly soil, quite unsuited for this tree, and they have made little or no growth. They are not, in the opinion of your committee, deserving of a prize. The Larch were planted upon land of the same character, and have grown remarkably. The largest specimens are from twenty-five to thirty feet high, and in some places entirely cover the ground. 3,000 trees, were planted at a total cost, without interest, of \$60.90. This plantation, however, occupies less than one acre of ground, and there are only 732 trees now standing. Your committee is of the opinion, therefore, that Mr. Beebe has not complied with the conditions of the competition.

Mr. Thomas H. Lawrence entered for the prizes for the best acre of Scotch Pine raised from seed; for the best and for the second best 1,000 White Ash; for the best acre of European Larch, and for the best five acres of White Pine raised from seed. He reported in October, 1882, that the plantation of Scotch Pine had been a complete failure. Few of the seeds germinated, and the land was plowed up and laid down to grass. The Ash trees were set in soil entirely unsuited to this tree, and Mr. Lawrence does not now offer them for competition. The Larch were planted about a mile from the coast, in a slight depression on one of the low slopes which rise from the plain upon which the town of Falmouth is built. The situation is an exposed one, and the soil is light, very gravelly and almost devoid of humus. The trees, however, have made an admirable growth; many of them are more than twenty-five feet in height; they stand regularly and compactly and entirely shade the ground. The cost of this plantation is, without interest, \$33.90. Your committee recommend that the prize of \$100 for the best acre of European Larch be awarded to Mr. Lawrence.

The five acres upon which Mr. Lawrence sowed the seeds of the White Pine adjoin his Larch plantation, and is covered with the same quality of soil. The cost of the seed was ten dollars, and the cost of mowing the Blackberry vines, and bushes which partially occupied the ground, and planting the seed, was \$13.95, making the total cost of the plantation \$23.95. It was probably a mistake to mow the bushes, as they would have checked evaporation from the surface of the ground and would have served to protect the young seedlings. The seeds germinated badly, the dry season being unfavorable for them, and a considerable number of the plants which did come up perished from exposure and drought during the first season. Mr. Lawrence believes his partial failure is due to the poor quality of the seed, which he purchased at a Boston seed-store. As the seeds of American Pines usually sold in this country by regular dealers have been sent across the Atlantic twice, or are gathered from trees grown in Europe under unnatural conditions, it is not surprising that they fail sometimes to germinate or to produce vigorous plants.

There are, nevertheless, between two and three thousand healthy White Pines, averaging about four feet in height, growing upon the five acres. They do not stand regularly, however, and there are often large gaps between them; eventually, however, there will be trees enough to cover the ground. This plantation cannot be considered a success from the point of view of the number of trees raised, but it seems to be successful in demonstrating the possibility of growing White Pines cheaply, from seeds, upon land too sterile for agriculture or profitable pasturage.

These prizes were offered for the purpose of stimulating experiments which may be expected to increase the knowledge of arboriculture, and not for the purpose of increasing by a few acres, more or less, the number of trees in the state. Your committee is of the opinion that, considering the lesson that can be learned from Mr. Lawrence's experiment in sowing Pine seeds, it contains one of the most valuable of the results obtained by the competitions of 1877 and 1878, and they recommend that, in view of all the circumstances, the second prize in this class of \$100 be awarded to him.

Mr. H. B. Hayward entered for prizes for the best 5,000 White Ash trees. His trees were planted in very light, gravely soil, entirely unsuited to the Ash. They have made a very unsatisfactory growth, and are not, in the opinion of your committee, deserving of a prize.

Mr. French and Mr. Beebe would have received recommendations for prizes, except for their failure to present the full number of trees required by the conditions of the competition. They have done, however, everything in their power to further the ideas which led to this contest; their interest in tree-planting and the example which they have given by their plantations to the communities in which they live have been of service to the people of this state and its agricultural interests. Your committee is of the opinion that their efforts should receive some recognition from the Society, and they recommend that a suitable remembrance, not to cost in each case over \$50.00, be sent to them, with a letter expressing the appreciation of the Board for their assistance.

Correspondence.

White Huckleberries.

To the Editor of GARDEN AND FOREST:

Sir.—The White Huckleberry, or the variety locally known by that name, is found growing in New Jersey in small, compact, isolated patches, upon the ridge of land running parallel with the Delaware River, and extending from Carpenter's Point to Wall-pack Bend.

The existence of this variety has been known here ever since the earliest settlement of the country by the whites. My attention was called to this berry by other boys, playmates of mine, fifty years ago. They generally kept their knowledge of such patches a secret, and though without especial value, they looked upon them as a great rarity, and prized them accordingly.

Geologically, it may be said that the Jersey ridge described is capped by "Canda Galli grit," a formation partaking largely of the elements of both the slaty shale on the Pennsylvania side of the river and the limestone on the other, and upon exposure to the elements it disintegrates readily, forming a calcareous loam of great natural fertility.

Since this ridge has been subjected to cultivation, wild fruits and berries of every kind have necessarily been swept away, and now can only be found where they have been suffered to exist in the woodlands that remain attached to the farms of this section. Occasionally, too, they may still be seen growing in bunches against a rock or large stump in an old field devoted exclusively to pasturage, where a lack of zeal in the use of the bush scythe upon the part of the owner has suffered them thus unwittingly to remain.

It is hardly necessary to state that the original forest growth was exceptionally heavy, which circumstance, a uniformly dense shade, added to soil, may have had much to do with originating this particular variety. I presume the birds and inferior animals may have distributed them somewhat after its character had once become fixed.

In flavor the berries are sweeter than the common black or the blue Huckleberries. I once saw a small quantity of them after they had been dried, and observed adhering to them white crystals of sugar. They are only white when grown and ripened in the shade. If partially exposed to the sun they will have a pink cheek. When exposed to the full rays of the sun, as in a field, they will be either pink or of a bright scarlet color.

B. A. Westbrook.

Montague, N. J.

[Mr. Westbrook has kindly sent a plant of this white Huckleberry to the Arnold Arboretum. It is a variety of *Gaylussacia resinosa*.—ED.]

Barberries.

To the Editor of GARDEN AND FOREST:

Sir.—Will you be so good as to tell me what are the "Barberries" referred to by Hazlitt in the following quotation, which he had seen and tasted when he was in America, from 1783 to 1787:

"The taste of Barberries which have hung out in the snow, during the severity of a North American winter, I have in my mouth still, after an interval of thirty years, for I have met with no other taste in all that time at all like it. It remains by itself, almost like the impression of a sixth sense."

Is the fruit of the North American *Berberis* (*Mahonia*) *Aquifolium* intended, which is often abundantly produced in English gardens and very beautiful, but, as I opine, very rarely

eaten in Britain? Of course, I know that pleasing and lasting gustatory sensations are often the result of a traveler's or explorer's hunger and fatigue, or thirst, or other accidental circumstances, as was the case with the fruit of your *Rubus deliciosus*, which, eaten under ordinary circumstances, is generally considered a very poor sort of a Blackberry. I shall be glad, however, if any of your readers can corroborate Hazlitt as to the distinct flavor of frozen Barberries, whatever they may be. The bright red fruits of our native *B. vulgaris* are pickled and candied and used for garnishing venison, etc., but they do not seem to be much appreciated for their flavor.

Botanical Garden, Dublin, Ireland.

F. W. Burbidge.

[Hazlitt's Barberries were the fruit of the common European *Berberis vulgaris*, which had become so firmly established in the Massachusetts colonies in the first century after the arrival of the pilgrims at Plymouth, that we find that the Province of Massachusetts passed on the 10th of June, 1764, "An act to prevent damage to English grain arising from Barberry bushes." It is a remarkable and interesting fact that the European Barberry, which even now is naturalized only near the coast of New England, mainly in Massachusetts, has failed to spread or gain a permanent foothold anywhere in the interior of this country, although it had almost at once established itself so firmly in one limited locality, that legislation seemed necessary in order to prevent it from injuring the farmers' grain. It has been suggested that the Barberry never did injure the Massachusetts grain crops to any appreciable extent, and that the law was passed on the strength of a popular belief brought from England that it was injurious to grain. "But if this is so," as Professor Gray once remarked, "we have a curious illustration of the precarious nature of testimony. For in Europe this colonial legislation has passed into history as independent evidence that the Barberry did damage grain in New England."

The Mahonia grows in a region several thousand miles from any part of America visited by Hazlitt, and was not known until the beginning of the present century, when Lewis and Clark crossed the continent to the north-west coast and discovered it on the banks of the Columbia River, in what is now the State of Oregon.—ED.]

Recent Publications.

Notes on the Art of House-planning, by C. Francis Osborne, Architect. New York, Wm. T. Comstock, 1888.

The author of this little handbook is professor of architecture at Cornell University, and its pages, reprinted from *The Builder*, embody the substance of a portion of the notes he has used in instructing his classes. Much that he says is adapted to be of great service to young architects, and may profitably be studied by their clients as well, in order that they may have a more accurate idea than is usually manifested with regard to the exact nature of the result which they wish to see achieved by the architect whom they may employ. But as an elementary treatise on the art of house-planning in America the book has certain grave deficiencies. We are warned in the preface not to judge it for sins of omission, as it is to be followed by a second volume on the same subject. Nevertheless, we may complain if in the first volume of a work which deals with a subject that may be divided into separate topics for special discussion any of those topics are omitted with which a designer must concern himself, if at all, at the very outset of his task. To omit any of these is to give a false idea with regard to the spirit in which the task, as a whole, should be approached, as well as seriously to impair the value of a first volume while it is awaiting its successor. To illustrate our meaning, it may be said that while the consideration which should be given to "aspect" in planning a country house is by no means wholly neglected, a fuller treatment of the question is relegated to the volume still unborn, together with all discussion of the equally important and fundamental question of "prospect." But until the claims of aspect and prospect are thoroughly considered, no feature of a plan can be properly decided upon, and it would have been better to finish with this matter before beginning to discuss the relative claims of separate apartments. A still more serious blemish, however, is the omission to recognize the piazza as a feature of equal importance with any of the interior rooms. The author rightly remarks that the history of house-building is the history of civilization, and one might therefore

expect that he would perceive that the peculiarities of American civilization, as expressed in the tastes, habits, and physical and mental needs of our people, are nowhere so clearly revealed as in the importance which the covered piazza has assumed in our country homes of every size and class. The subject has been so recently discussed in these pages, that no further explanation of it is necessary here. We would merely state that although the veranda is once or twice incidentally mentioned in Mr. Osborne's pages, it is nowhere dwelt upon as an important feature, and still less is it recognized as a feature which should be considered in the very beginning with the greatest care as one upon the right arrangement of which the comfort of a country home is always very largely dependent, and one which, in many cases, may well have a controlling influence upon the arrangement of the whole interior. To plan the inside of a country house without distinct reference in every part to the position and extent of its piazzas, and then to add these as chance may allow—this is one of the grossest mistakes into which an American architect can fall; and it is one, therefore, which should have been guarded against in the very first chapter of a book like Mr. Osborne's. We should have been glad, again, had he said something of the need for considering the approaches to a house, and for consulting a landscape-architect—or, at least, consulting the principles of landscape-architecture—before even the station of the house and of its entrance are decided upon. Perhaps this very vital point will come up for discussion in his second volume; but it is one, we must say again, which might better have been explained at the beginning, since it must be understood and settled at the beginning, if at all, whenever the student commences actual construction.

Periodical Literature.

THE flower trade of London is estimated at £5,000 a day, and, as well as the trade in fresh fruits, is rapidly increasing, a fact which is held by Mr. Sampson Morgan, whose interesting paper upon "Imported Flowers" has recently been issued by the Cobden Club as one of their 'Leaflets' to show "that there is improvement in a nation whose taste is changing in such a remarkable manner from drink to fruit, and from gaudy gildings to fragrant flowers."

From the same paper it appears that "between Nice and Cannes to London, especially during the winter and spring, there is a special railway and postal service by which the flower cultivators of France are enabled to pour into the English markets such things as White Lilac, Violets, Snowdrops, Lilies-of-the-Valley, Daffodils, Roses, Hyacinths and Fern by the thousand dozen bunches at the time; in fact, these consignments are at times prodigious. The growers of the Riviera and elsewhere in the south of France are now paying special attention to the culture of cut flowers for the English markets; and when we consider the tasty manner in which their consignments are got up, one can hardly be surprised that these goods have become so deservedly popular with English buyers. Many men might be mentioned whose names in our markets have almost become household words; but I would simply refer to M. Solignac, of Cannes, whose *champs-fleurs* (field-flowers) have for years past been so much sought after and bought up, especially by the London florist, and who, it is believed, disposes of various kinds of flowers, such as Roses, Carnations, Violets, Anemones and "Marguerites," annually, to the extent of £12,000, and in the face of this fact we can easily see that it must be a very profitable branch of trade. Of course his goods are well grown, and for some years during the "great run" on the "Yellow Marguerite," his consignments secured very high prices indeed. Further, Mr. Potter points out a fact that is totally ignored, even by men in the horticultural world, for although these flowers are called in France *Champs-fleurs*, yet they are always protected mostly with glass, and the ranges of these glass erections at Cannes, and especially on the hill-sides, is a sight worth seeing.

"The principal kinds of flowers imported to our markets, especially Covent Garden, from the Continent, etc., consist of Lilac and Syringa, Violets, both Parma and the Czar, and Mignonette and Lent Lilies, in enormous quantities, Mimosa or Acacia in two or three kinds, Narcissus in several varieties, including Paper White, Double Roman, Grand Monarque, Soleil d'Or, and the White Roman Hyacinth. All the above, if English grown, realize a better price in the market, but they are not grown in sufficient quantity in this country, and the Anglo-French salesmen in Covent Garden are now—during the winter, I might state, without hesitation—the most important venders in the market, and they are fully aware of

their importance. Safrano Roses, too, are sent us in abundance, and Fern, the black Spleenwort, *Asplenium* and *Adiantum nigrum*, known as French Fern, are disposed of to the tune of some thousands of pounds. Orange blossom, too, is another imported article that fetches a large sum.

The following extracts taken from this instructive paper are of general interest:

"It is said that attar of Roses, manufactured in the Valley of Kesanlik, Roumelia, is exported to the value of £44,000; and some one has made a calculation to show that ten billions one hundred and four millions of blossoms are used each year at this one place alone. In connection with flower culture on the Continent, and now in the United States of America, the manufacture of perfumes from flowers forms a very profitable industry, and one which certainly might be adopted by the English grower. The town of Grasse, near Cannes, the capital of the department of the Alpes Maritimes, is the centre of a flower-growing district, and the principal seat of the manufacture of perfumes in France.

"It is stated that the famous attar of Roses is made from the *Rosa Damascena*, which grows like a weed in Smyrna, and in some parts of Turkey and France, though the growth is comparatively small in the latter country. The natives of these places collect this oil in a simple manner. The Roses are placed in water, and after decomposition sets in, the oil floats on the surface, and is absorbed by cotton balls deftly dipped into the liquid. The cotton under pressure gives up this oil, which is bottled and sealed. A bushel of flowers will produce only a few drops of oil. The genuine is the most expensive oil in the market and worth over £6 an ounce. It is adulterated with oil of rhodium, wax and other substances, and the price is arranged to suit the purchaser. The strength of this oil makes it sickening in its natural state. The adulteration has reached such a high state of perfection that even the most expert judges of perfumes are deceived by it.

"Patchouli is made from a natural plant growing in great abundance in the Malay Islands, and is a great favorite as a perfume. There is a growing demand now for lavender water. It is made by mixing Rose and Orange waters with the oil of lavender, and has a refined and pleasant as well as refreshing odor. The English oil of lavender is the best that is on the market, and besides being used as a perfume, is a favorite article in bakeries as a flavor for cakes and fancy products. It is a high stimulant and an efficient aid to digestion until the system becomes used to it, and then it is liable to breed one of the worst forms of dyspepsia. The Lavender shrub and the Jessamine plant are cultivated to a large extent in England and France for this industry. The genuine Heliotrope is not as fine an odor as the imitation. The latter is known as the White Heliotrope, and is made from a combination of violet and vanilla, and has a soporific tendency if breathed any length of time. Bergamot, with musk, forms the staple perfume of the colored."

It was not until the year 1652 that Coffee was introduced into London as an article of commerce and that the first Coffee house was opened by a Greek named Pasqua Rossie. For many years Arabia, where the Coffee plant had been introduced from Abyssinia, was the only country which produced it, but in 1696 the Governor-General of the Dutch East Indies procured a few of the seed and planted them in a garden at Batavia. The plants flourished and some were sent to Java, whence one went to the Botanic Garden in Amsterdam. From this plant seedlings were raised and sent to Suinam, where the cultivation of Coffee was established in 1718. Ten years later plants from the same source were sent to the West Indies, so that the offspring of the single plant which grew in the Amsterdam garden now produces, it is said, more Coffee than all the other plants in the world. These statements are taken from the fifth bulletin issued by the Botanical Department of Trinidad, which is devoted to "A Short Treatise on Coffee Cultivation," filled with practical instruction upon the cultivation of Coffee in the Island of Trinidad, including directions for selecting sites for plantations, clearing land, the formation of nurseries, planting, weeding, pruning, manuring, harvesting and curing the crop, with descriptions of the most improved machinery now used in preparing the berries for market. Half a dozen varieties of different origin of the Abyssinian plant (*Coffea Arabica*) are cultivated in the Trinidad Botanic Garden, as well as the species discovered a few years ago on the west coast of Africa and known as the Liberian Coffee (*C. Liberica*) and now widely disseminated in Coffee-growing countries. This plant flourishes in Trinidad and has already attained a height of thirty feet, producing large crops

of berries. Its great height, however, makes the collection of the fruit slow and expensive, and it is perhaps doubtful if it will ever really supplant the dwarf Abyssinian plant. This instructive and interesting report upon one of the most valuable industries of the West Indies is from the pen of Mr. J. H. Hart, F.L.S., long connected with the Botanical Department of Jamaica and now the energetic and successful head of that of Trinidad.

Notes.

The Colorado State Horticultural and Forestry Association will meet at Denver on the 10th instant.

December was so exceptionally mild in England that Snowdrops and Marechal Neil Roses, Hepaticas and Christmas Roses were blooming together in gardens.

Mr. Henslow, at a recent meeting of the scientific committee of the Royal Horticultural Society, of London, called attention to the fact that the Dahlia was first introduced into England 100 years ago by the Marchioness of Bute.

The pretty little *Draba verna*, one of the earliest of spring flowers, was blooming holiday week in abundance in Germantown. The constant rains of late summer advanced the plants much more than usual, and it takes but a few warm days to bring them into bloom. It has been many a year since this flower could be gathered at Christmas.

In the Colorado State Agricultural College, theoretical and practical arboriculture form part of the regular course of study. Preparation has been made for the establishment of four experimental stations in as many different sections of the state, to be conducted in connection with the college, and special attention will be given to trees and tree-planting.

The Phylloxera has made its appearance at the very gates of Paris, having been detected recently in the grounds of the School of Agriculture at Grignon. The discovery naturally causes great excitement and alarm among the Grape-growers of Argenteuil, who derive an annual revenue of a million francs from their vineyards. They have petitioned the Minister of Agriculture to order the destruction of all the vines at the school.

It is stated upon good authority that in Germany the small holdings in land of two and a half acres and less exceed 1,000,000; of two and a half acres to twenty-five, 2,000,000; and while, in the whole kingdom, 14,000,000 acres are devoted to grass, 47,000,000 to vegetables and corn, over 64,000,000 are utilized for fruit and the productions of market gardens worked by the spade, in England there are to every five acres devoted to fruit over 1,000 devoted to root crops and corn.

The American Philosophical Society is printing the manuscript diary kept by the French botanist Michaux during his travels in America during the last century. It was presented to the Society more than sixty years ago, by his son, the younger Michaux, the author of the standard work upon American forest trees. This curious document, which covers the whole period of Michaux's residence in America, with the exception of the two first years, contains much information of interest to students of the habits and customs of the people of this country, especially of the inhabitants of the frontier settlements during the last century, as well as to botanists. The Journal is edited by Professor Sargent.

In the report made by Professor Beal upon his examination of the Jack Pine Plains of Michigan, he says: "In watching the rapid flow of the Au Sable and the Manistee passing by the plains which were thirsting for water, it often occurred to me, 'Why not turn the waters on the fields and make them fertile, instead of using them to float logs to the lakes?' A thing so easily done, I believe one day will be done—and done with great profit—not likely by those owning small farms, but by those owning land by townships and sections. If we could control the water on these plains, so they should not lack for it, we could grow good crops, and with good crops the soil would rapidly improve in fertility."

The following description of a singular freak of nature was recently printed in *The Garden*: A few days ago a friend was exploring a room in a dwelling house which appeared to have been unused for a long time, when he found a curiosity in the shape of a Potato plant which had sprung from a large Kidney Potato that was lying at the bottom of a damp cupboard. It had made no roots, but had thrown up several leafless stems which were perfectly white and had filled the lower compartment of the cupboard. From every

joint of these stems, long white filaments were sent out, each of which bore several small tubers. In all, the Potatoes must number some hundreds, all grown from the same parent tuber.

An English correspondent of *The Garden* writes as follows with regard to the effect that the wet summer of 1888, followed by a very warm autumn, has had upon the foliage of Oaks: "Last year, growth was made early and became well ripened, and the leaves fell at the usual time. But this year the first growth of the Oaks was stripped of leaves by a plague of caterpillars. After the plague subsided a second growth, in some cases as much as nine inches in length, was made. This wood was quite soft when early frosts came in October and the leaves were perfectly green; but gradually the shoots have hardened, the leaves have colored, although they refuse to drop, and resist the force of strong November gales which have been recently sweeping over the country."

According to the Cairo correspondent of the London *Times* the arable area of Egypt has been almost quadrupled since the days of Mohammed Ali, half a century ago. An immense impulse was given during the reign of Ismail, when the War of the Rebellion in this country stimulated the cultivation of cotton in other lands; the cultivable area of Egypt then increased at the rate of 22,000 acres a year. During the last five years, when the English have administered the departments of Finance and Public Works, an almost equally rapid increase has taken place, and it is said that during 1888 no less than 75,000 acres will have been reclaimed. Irrigation is, of course, the expedient employed. When one stands on an elevated point in any part of the Nile Valley, a straight, clear line is described which separates the rich growing crops from stretches of white sand, as barren and hopeless-looking as the beaches of the sea. But this line merely marks the extent to which the waters of the river have been admitted at the time of their annual overflow; and it only needs that they shall be admitted further and stored by a simple system of little dams and canals, for the sand to become a soil of marvelous fertility. A certain verse in the Bible speaks of the laborer as "watering the ground with his foot"; and the persistence of Eastern customs is revealed by the fact that to-day this process may be seen in execution. The fields in many districts are cut into rectangular squares, between which run little canals, their banks formed by low ridges of earth. At due intervals the cultivator goes from one to another, pressing down a bit of the ridge with his foot, letting the water overflow the square, and then closing the aperture in the same manner. The arable area of Egypt is now 4,885,968 acres, as against 1,856,000 estimated for the year 1833.

A correspondent of the *Gartenflora*, writing from Caracas, in South America, tells of the recent development of horticulture in that country. Twenty-five years ago, he says, the art was almost unknown; no public parks or gardens existed, and private cultivators made but a sorry showing with a few species of common garden flowers and native plants grown, very often, in broken pots and boxes. The first impulse toward improvement was given by a German botanist, Moritz, who laid out a charming garden for a German colony at Tovar and introduced many unfamiliar plants, among them the *Gladiolus*. His efforts were followed by those of a fellow-countryman, Herr Hahn, who formed a beautiful Rose garden near Caracas, and then by those of General Guzman Blanco, who established the first public park, and turned the squares of Caracas—formerly mere stone-covered or weed-grown spaces—into charming gardens. A French gardener was imported, who, in addition to his other enterprises, succeeded in the difficult task of making beautiful lawns in this hot, dry climate. The principal park is now called "Paseo Guzman Blanco," and adorns a hillside near the city which was formerly a sterile expanse of red-brown earth. Now it is terraced and planted with fine groups of trees, shrubs and flowers—various species of *Ficus* and *Cassia* being conspicuous—and among them large clumps of a tree-like Grass (*Guadua*) and of broad-leaved *Aroideæ*. Among the native shrubs, the writer notes as most beautiful, *Duranta Plumieri*, which has a compact growth and evergreen foliage, and bears its violet-blue flowers and profuse yellow-red fruit together. *Araucarias* have been largely planted, and while *A. imbricata* does not do well, *A. Bidwelli* flourishes and *A. excelsa* seems likely to succeed. Fortunately, adds our author, only a single formal bed can be seen in this park. Private citizens have had their ambition excited by the success of the park, and many of them can now show delightful gardens for which they import plants from Belgium and England.

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The Needs of American Forestry.

EXCEPTION was taken in our last issue to Mr. Gannett's sweeping statement that cutting off the forest from the watershed of a mountain stream increases its irrigating capacities, a statement which we believe has not been confirmed by a record of the exact flow of any stream before and after the forests had been cut from about its sources. We quote, however, the closing sentences of the same address, which contain the whole gist of the forestry question of the United States at the present time, as we understand it:

"It seems to me that, apart from the uselessness of it, Nature is planting trees at an infinitely more rapid rate than man. For every tree planted under the Timber-culture Act, or on Arbor Day, a thousand spring up of their own accord. Every deserted farm east of the plains grows up to a forest. Half of southern New England to-day is wooded, and the proportion is increasing every year, and yet in Massachusetts they have every year an Arbor Day, when the farmers turn out and solemnly plant a tree apiece."

What we need, indeed, in this country is not so much to plant trees for forests, as to take care of those which are planted without the assistance of man. The climate of eastern North America is surprisingly favorable for the growth of trees. They spring up in every part of the country, from the Atlantic Coast to the Missouri River, wherever a piece of ground is left undisturbed; and it is only in the arid parts of the country, where the rainfall is too small or too unevenly distributed to develop forest-growth, that trees are not as common as weeds in a neglected field. But in all that has been said and done in this country under the general and rather ambiguous term of "forestry," attention has been paid mainly to the subject of planting trees, while little has been said in regard to the necessity of taking care of and improving the natural woods. This, perhaps, is not surprising. There has been no question in the Eastern States until recent years of any scarcity of naturally-grown timber, or any practical necessity of husbanding the abundant stores which were encountered on every side as the tide of

immigration pushed westward. It reached in time, however, the treeless prairies and plains which distinguish the interior of this continent; and the efforts of the settler were turned to securing shelter and a supply of fuel by planting trees. The treelessness of the interior of the continent directed popular attention, naturally, to tree-planting, which has gradually come to mean forestry in the minds of most Americans, as nearly all American writers and speakers upon this subject confine their remarks to this comparatively unimportant branch of forestry, and overlook the broader question of forest-protection.

What is really needed in this country, now that the most valuable products of the forests are growing scarce, is an appreciation of the value of our native forests, and a comprehension of the natural laws upon which the development of forests depends. We have yet to learn as a people that fires are destructive not only to trees, but to the productive capacity of the ground which bears trees; that animals browsing in the forest will, in time, destroy it entirely; that some trees are more valuable than others, and that the development of the valuable ones can be hastened and increased by the assistance of man. The real work for those persons who are interested in the forest as a source of material prosperity for this nation is in inculcating sound principles for the management of the forests that spring up spontaneously on all sides, and not in urging tree-planting exclusively as the only branch of forestry worthy of consideration.

Arbor Days have their uses, and they are not unimportant ones, perhaps, but the mistake is often made of considering that Arbor Day has anything to do with forestry, or can have any direct influence upon the forest-question. The educational influence of Arbor Day is already considerable, and this purely American institution is capable, no doubt, of being turned to better account even than it has been up to the present time. But we are among those who believe that the care and development of a single acre of self-sown White Pine seedlings will do more for American forestry than has ever been accomplished under the working of the Timber-culture Act or of all the Arbor Days that have ever been celebrated.

When to Employ the Landscape-Gardener.

IT has been said more than once in these pages that small gardening problems, as well as great ones, demand the artist's aid. Parks and city squares, cemeteries and large country-places must be laid out and planted by one who has studied design, and the effects and needs of trees, shrubs and flowers. This has long been acknowledged, and if we sometimes fail to act upon our knowledge, we do it with full consciousness of error. But small country-places and even villa-plots, if they are to be made the most of, must be entrusted, too, to competent hands. Whenever building, road-making and planting mean arrangement, they mean varied combinations of lines, masses and colors; this means the opportunity for a work of art. We certainly do not make the most of our surroundings if we miss this opportunity when it offers; and we are almost sure to miss it unless an artist tells us how to seize it. This fact also we are gradually, but surely, learning in America. Every prominent American landscape-gardener would affirm, if asked, that he has more work to do now than he had ten or fifteen years ago, and that the increase has come largely in the shape of problems which, ten or fifteen years ago, would have been thought too small and simple for professional treatment.

There is much that is encouraging in this evidence of increasing wisdom and good taste on the part of the public. But it is important that another necessity should be clearly understood, and that the client who feels the need for a landscape-gardener's services should understand just when they ought to be secured.

This time is at the very outset of his undertaking. As

soon as he thinks of building—as soon as he consults his architect, or even sooner—he should consult his landscape-gardener. Each artist is equally needed, whether the scheme be great or small, and the chief need is that they should work together from the very outset. The landscape-gardener should be the first to speak, though the architect may be the first to act, and within certain limits should throughout be allowed the controlling voice. It is for the advantage of both, and therefore doubly for the interest of the client, that such should be the case. When a landscape-gardener is called in after the house is finished, he too often finds that it is impossible to do the best that might have been done for the grounds. But he often finds, as well, that the best has not been done for the house itself. A building that is conspicuously placed is not of necessity well placed, although it often looks as though its designer had thought so. Only the trained landscape-gardener can tell what may be done to a spot to improve it as a building site. If he understands architecture as he should, he is at least as competent as an architect to say where, under existing conditions, a building will look best; and if he understands his own art, he is far better able to decide where it should be placed in order that the outside world will look well from windows—the most important of all considerations to its owners. Moreover, he alone can understand the suggestions of the site with regard to the laying out of approaches and the placing of minor buildings. His advice may be very helpful to the architect in deciding the question, What sort of an architectural design will best suit this locality? And when the locality has a very distinct expression, or when he desires to give it such an expression, then the architect is bound at least to consider his intentions. An architect ought to be willing to make great personal sacrifices if it can be proved that great benefit to beauty or convenience in the general result of his work and his fellow-artist's will result; but rarely will such sacrifices be required. Very often such slight modifications of the architect's wishes as even the stubbornest spirit would not object to making, may result in all the difference between a well laid out place, with convenient approaches and dependencies and beautiful views, and a botched place, the owners of which, if they have eyes to see, will be perpetually tormented by the thought of what might have been. Even a different arrangement of two or three windows, a different allotment of two or three rooms to their special purposes, may vastly increase the pleasure which the owner will take in his home; and when an architect is an artist, he will be quick to see the fact if another artist points it out, and quick to feel how his design can be adapted to a necessity which, unassisted, he might never have divined. Moreover, with regard to certain things of a purely architectural sort, the landscape-gardener should be allowed to speak in a very emphatic voice—if, we repeat, he understands architecture as he is bound by the canons of his own art to understand it. All architectural features which come in close contact with natural features—piazzas, terraces, external stairs, steps and seats, summer-houses, boat-houses, bridges, balustrades and boundary walls—should, whenever possible, be built with his assistance.

This, then, is the way a landscape-gardener's services should be sought. Send for him first of all, even though it is but a villa on an acre of ground that you mean to build; ask him where your house had better stand, where is the best place for the main entrance, the piazzas, the stable, the gates, the dog-house, even; if the grounds are larger, ask what architectural style seems to him most fitting, where on the plan the chief rooms should stand, what views their windows should command; then send for your architect, let them devise and decide together and work together till the work is done. If they are both of the right sort—and there are many of the right sort in our country to-day—they will not greatly disagree; or if they do at first, they will find a scheme of mutual compromise and eventual harmony; and you will run a far better chance of getting a

good house and a good place than if they had worked separately—the architect building his house without knowing where it might best be placed or how best surrounded, and the landscape-gardener coming in afterwards to find, perhaps, that no chance was left him to assist the house or to do his own work well.

The possession of a remarkable tree even in communities from which better things might be expected, has little influence upon its owner when a few dollars are placed in the balance against it. The *Salem Gazette* and other papers of Essex County, Massachusetts, have recently made an appeal for the life of a remarkable Walnut-tree which grew near the house of the late Ben Perley Poor, Indian Orchard Farm, near Newburyport. The tree, which was a very large one, with a trunk circumference of some twelve feet, was considered by Mr. Poor to be an English Walnut, but while the general habit and foliage were those of that species, the nuts were almost identical in appearance with those of the common Butternut, and suggested that it was a hybrid between the English Walnut and one of the American species. Such hybrids are not unknown, and there are two or three well-established instances of their existence in Europe. This tree was large, broad-branched and stately. For years it had been the pride of its owner, while its botanical peculiarities made it one of the most interesting trees in New England. The man who had nurtured it all his life was dead. It contained a few hundred feet of valuable lumber, and so, in spite of a general protest, it has been sent to the saw-mill.

Bamboos.

A VIEW of the entrance of the Botanic Garden at Peradenia, in the Island of Ceylon, appeared in one of the early numbers of the first volume of *GARDEN AND FOREST*. Among the most striking features of this garden are the clumps of giant Grasses which serve to illustrate the present issue. The one in which the base only of the stems appear is the great Bamboo of Penang (*Dendrocalamus giganteus*), of which the shoots, eight or nine inches through at the base, attain a height of a hundred feet. The second illustration represents a clump of the Java *Gigantochloa atter*, a plant hardly less stately than the last. Ernst Hackel, in his "Visit to Ceylon," thus describes the striking appearance of these plants: "If on entering the garden we turn to the left towards the river (the Mahavili) and follow its beautiful banks, we see from afar enormous green thickets of Bamboo, more than a hundred feet high, and as many wide, bending their mighty crowns like huge waving plumes of some giant's helmet over the river and the path, bestowing shade and coolness on both. As we go nearer we see that each of these bushes consists of several—often sixty to eighty—tall, cylindrical stems, each from one to two feet thick. They grow closely crowded together, like the creeping stems of a Rush." The rapidity of the growth of the stems is astonishing. They appear during the rainy season—that is, during the months of June and July—and are said to grow sometimes at the rate of a foot in every twenty-four hours.

The Bamboos, of which some 180 species, divided among eighteen genera, are now known, are widely and generally distributed through the tropics of both hemispheres. A single species (*Bambusa vulgaris*) is cosmopolitan, being found in both the old and new worlds, although General Munro, the author of the classical monograph of these plants, was uncertain if it was known anywhere in a truly wild state. Some genera are strictly American and others are found in the East only. *Arundinaria*, which furnishes the only Bamboo which grows spontaneously within the limits of the United States, is represented in both hemispheres, reaching to great elevations in the Himalayas, while a representative of an allied genus, *Chusquea*, first makes its appearance at an elevation of 13,000 feet in the Andes, and 2,000 feet higher

completely covers the surface with thickets impenetrable to man or beast.

The berry-bearing Bamboos, of which there are eight genera, are all found in the East; three of the species are found in Madagascar, one (*Schizostachyum parvifolium*) is described by Ellis in his account of that island, as "an elegant, slender creeper, with a stem scarcely as thick as a quill, growing nine to ten feet long, and hanging in most elegant festoons from tree to tree alongside of the roads."

No native Bamboo occurs in Europe, while from the whole of the vast continent of Africa only one native species is known. Bamboos are found widely distributed through southern China, in Japan, the Philippine and Fiji Islands, and one species occurs in the Sandwich Island group. The largest of the whole tribe, *Bambusa Brandisi*, a native of the hill districts of India, attains a height of 120 feet, with stems nine inches in diameter.

No group of plants, not even the Palms, is more useful to man than the Bamboos. They supply food and raiment and shelter to millions of people. The young shoots and the seeds furnish food to man, and the leaves fodder for domestic animals. The stems are used for building purposes and the leaves for mats and cordage; paper is made from the leaves, and furniture and almost everything else, where wood can be used, from the stems. The whole industrial fabric of the East is dependent upon these great Grasses, and it is impossible to think of a Chinaman or a Malay, without associating with him, in some form or another, the Bamboo.

The arborescent species have long been familiar ornaments in all tropical gardens; and, as our illustrations show, no plants of the north possess their stately grace and beauty. A good deal of attention has been paid in late years to the cultivation of some of the smaller species, of which several have proved hardy in the more temperate parts of Europe. Some of these are highly valued as ornamental plants, and their general introduction and cultivation in the gardens of southern Europe is one of the interesting events of modern horticultural progress. These dwarf Bamboos are not yet very well known in this country, although the climate of the Southern States is admirably suited to them, and there are several species which can be grown in California, with the aid of irrigation. There is at least one species, although unfortunately of dwarf and not very attractive habit, which is hardy in New England, *Arundinaria Japonica* (the *Bambusa Metake* of most gardens), and there are probably six or eight more, natives of Japan, China and the Himalayas, which can be grown in the more temperate parts of this country. None of them have stems which exceed, under the most favorable conditions, a height of twenty feet, so that while they may serve to add grace and charm to any garden, and to recall the vegetation of the tropics, they can give but a very faint idea of the veritable giants of the race, which can be seen in all the splendor of their beauty in the tropics themselves only.

Notes from a South Carolina Naturalist.—II.

AT Sandy Run I find *Euonymus Americanus*, the bursting capsules gladdening the heart, and here, also, I see a few of the prickly follicles of *Gonolobus hirsutus*. Formerly there were many vines here, all growing together, but bearing flowers of different colors, yet they were all *G. hirsutus*. Some of the flowers were palish yellow or straw color, others brownish purple and some almost black. One vine had paler flowers, somewhat approaching lilac. The petals in all were veined, the straw color showing it best. *G. suberosus*, Gray (*G. macrophyllus*, Chap.), with its smooth and angled fruit, is found some miles off. The road runs through deep sand, still following the river westward, with Corn and Cotton on each side. We pass Linden, see the large Magnolia, so prized by the ancient owner, and think of the days that are no more! Next, Gascoigne's Bluff on the one side and Middleton swamp on the other, on whose knolls of Beech and Magnolia and Hickory the wood-cutter is

now cutting down the finest trees of Walter's Pine (*Pinus glabra*), so long ignored, till rediscovered by Dr. Ravenel—now, alas! lost to us; lost to the science he loved! In the surrounding Pine-land I have seen only one or two trees of this Pine, but deep in the recesses of the swamp it is abundant enough to be cut and floated to the mill, which, like a devouring monster, is taking the choicest treasures of our woods. Certainly a beautiful Pine, with its peculiar bark, its smooth limbs, its soft looking foliage. The wood-cutter told me that he had cut trees there thirty inches in diameter. I have often wondered that this tree had been so long ignored, or that it was not cultivated as an ornamental shade tree. So far as I know, it makes no forests of its own, but is found only sparsely among other trees, yet very lately it is said to have been found in great abundance in Wassamassaw Swamp, not far from Charlestown, the trees there being of great size and beauty, tall, stately, columnar. As to its locality, it is never found, I believe, very far from salt water. I find it on the banks of the Edisto, in the swamps near Jacksonboro' station on the railroad, in the swamps bordering the Savannah River rice fields, in the driest soil not far from the Colleton River, and on Hilton Head, along the bluffs of Calebogue Sound, between "Spanish Wells" and the ocean. It will grow, therefore, in most soils, both dry and wet, in the low country, save some Pine-lands. It is doubtful whether it would grow at the north, but it is worth the trial.

In many trees I have observed that the small branches grow out horizontally from the larger limbs, making the foliage appear dense and flattened, even though the smaller branchlets be really erect. The spray, therefore, often looks flattened, and it has always seemed to me a striking peculiarity. On James Island, near Charlestown, there were formerly many large trees, but the finest, which, it is said, were ninety or even a hundred feet high, were killed by the great cyclone of 1885. At "Burch's," on the same island, there are others left (so a friend writes me) which are about eighty feet high, tall and straight, having no branches for sixty feet from the ground.

As we continue, a few trees of the Swamp Chestnut Oak (*Quercus Michauxii*) are seen with Beech, and Magnolia and Maple, but the only Pine is Loblolly (*P. Teda*), which indeed is everywhere. At a roadside bridge, as we approach "Rose Dhue," vines of *Forsteronia difformis* are growing, the bloom, of course, long over, but I look in vain—as I had looked for years—for the long follicles. The road is now overarched with a dense growth of Cedar (*Juniperus Virginiana*) on one side and Live Oak on the other, making a dark and shady avenue, which carries us at last to the salt-water bridge, where, in the hottest days of summer, a sweet, cool draught comes to us across the marshes from "Rephaim." As we cross the next bridge a sad sight meets us in the utter destruction of a field of sea-island cotton by the caterpillar. Close to the marsh a few acres of brackish myrtle land had been cleared by the industry of negroes, and when last I saw it there was the promise of a most abundant crop, but what a scene of blackness and desolation met us! The tall stalks were all stripped bare of leaves, with only the black and shriveled pods remaining. Only a few of these were bursting here and there with the "snow of Southern summers." We were glad to pass on till we reach the deep swamp at the foot of a white and sandy hill, as we of the low country call so slight an elevation. Here is the usual swamp growth of Nyssa, Maple, one or two small Cypresses, and a single high-climbing vine of *Decumaria*; but the tree which will most attract our attention will be the (to us) rare *Pinckneya pubens*. We see the greenish and pale yellow capsules in thick clusters among the mellowing leaves, but they will soon be ruddy-tinged when the later frosts come. This spot is, so far as I know, its farthest northern limit, and I have seen it in only one other place not far off, and a single small shrub near the Savannah River. It is a shrub-like tree, but it reaches a height of twenty-five feet, and a section of one such I sent, some years ago, to Professor Sargent for the Jesup collection. The flowers in June, with their beautiful peach or rose-bloom floral envelope, are very showy. The young trees sometimes have the floral envelope almost white, with but a tinge of pale pink, but those of the old trees are usually most deeply colored, and are very beautiful.

The edges of this swamp in June, all ablaze with the rose-pink bloom, is a sight worth seeing, and at such a time I wonder the more that it has never been cultivated. As it seems most likely that this was the tree which Bartram found growing with his now long-lost *Gordonia pubescens* (*Franklinia Altamaha*), I thought it barely possible that I

might stumble upon it here. My explorations have never rewarded me with its rediscovery, but it may doubtless yet be found in the Fort Barrington region, where Bartram first saw it in 1773. We take our last draught of water from the cool spring, mount the sandy hill, and for some distance see only trees of *Pinus palustris*, and of Oaks—*Q. cinerea* and *Q. Catesbaei*—fit soil for them all! Passing through a wet "gall," I look for Elliott's *Solidago elliptica*? which I met with at this spot a few years ago, but I failed to see it; yet I have since found it not far from the Okeetee, where, also (but in clay land near the bridge), I was fortunate enough to collect, for Dr. Gray, fine specimens of the equally rare *Actinomeris alba*. We toil on laboriously through Scrub Oaks and Pines, and, before we leave the sand, look for *Asimina parviflora* (which grows abundantly in an old field near by), but no plants were to be seen on the roadside.

At last we reach the cane-brakes of the "Great Swamp," and, by the new growth of Pine met with, know that clay soil has been reached. It is the rough "Spruce Pine," to distinguish it from Walter's smooth Spruce (*P. glabra*). I refer to *P. mitis*. I have but rarely met with the three leaves in a sheath. *P. Tæda* is here, also—for it is everywhere. *Collinsonia punctata* was once most abundant in the woodlands about, but it seems to be disappearing, and a little further on I see but a single specimen of *C. scabriuscula*. The last seems very rare. We pass the old Garvey gate, with its few Cypressess, and are cheered by the autumn colors of Golden-rod—seemingly *Solidago tortifolia*—covering whole fields. The faint glow of coming winter is already in the trees about the river, chiefly Nyssa and Maple, and now the distant rice-fields are seen. We cross the bridge at New River, and see the signs of the late disastrous freshet which had burst over the railroad, overleaping dams and submerging the harvest-fields of rice, and had carried destruction with it, thus mingling the red waters of the Savannah with the purer tide of New River! The marks were on every side in the bending and prostrate plants and sheaves of golden grain, still lodged high and dry on the shrubs and tall grasses.

It was the highest, and, I believe, the most destructive freshet ever known in the rice-field country hereabouts, and will never be forgotten either by planters or negroes. On the middle bridge of the Causeway I looked for the remains of *Eryngium præaltum*, where I collected specimens in the summer, but I saw none, and but one tall specimen some six or seven feet high (of what I took to be *Eupatorium serotinum*), was left green and flowering, of the many formerly seen.

Turning, now, sharply to the right, I look down the Screven's Ferry road to the left, and recall, with the same glow of pleasure, my great "find" last summer of the (to me) most rare *Anantherix connivens*. This was but the third plant I had ever seen—the second having been collected many years ago, some fifteen miles away in a damp Pine-land, and sent to Dr. Gray. That plant was about eighteen inches high, if I remember aright—this four feet three inches. We wade through long slashes of water on the edges of swamps with *Quercus Phellos* abounding. Emerging from these glooms, we come to red clay, which soon runs off into a drier and more gravelly soil, and here I was glad to see several acres of the young saplings of *Pinus palustris*, to the exclusion of all other Pines. As we go on through damper soil we see the long, slender plumes of *Liatris graminifolia*, with here and there the *L. gracilis* of Elliott. *Liatris odoratissima* is also here, but its bloom is long since over. *L. paniculata* we left behind long ago, with also *L. scariosa* in the dry woodlands, but the show of the fall is poor in comparison with former years. Visiting the house of a negro patient, and seeing a splendid Hibiscus in full bloom, I hoped that by a mere chance it was the long-lost *H. Carolinianus* of Elliott, but a closer examination proved it to be only the *H. grandiflorus* of Michaux. It was brought from Georgia, but it grows also in South Carolina, for I once saw several acres of it in black and brackish soil just back of the sand hills on Hilton Head. Few sights more beautiful could be imagined. Again we meet with *Pinus Cubensis* abundantly, and at last reach the railroad, where my journey ends and my work begins.

Bluffton, S. C.

J. H. Mellichamp.

"Meantime, there is one duty obvious to us all: it is that we should set ourselves each one of us to doing our best to guard the natural beauty of the earth: we ought to look upon it as a crime, an injury to our fellows, only excusable because of ignorance, to mar that natural beauty which is the property of all men."

—Morris' Lectures on Art.

Cultural Department.

Selaginellas.

ACCORDING to the latest monograph of these plants, there are no less than 334 species now known. For horticultural purposes many of them are either wanting in beauty and interest, or are too much like other species to be worth growing. The collection of species and varieties of Selaginella cultivated at Kew is the largest I have seen, comprising, as it does, ninety-two species and varieties. Most of these are grown in a portion of the large house devoted to tropical Ferns, the Selaginellas occupying a side stage on the north-west side. Each kind is represented by several large panfuls, the pans being from one and a half to two feet square and about six inches deep. The effect of these plants, when grouped as at Kew, is exceptionally handsome, and they are looked upon as one of the most interesting and attractive features of the house collections. They are easily managed—in fact, no plants more easily; they grow quickly into perfect specimens, and they may be propagated to almost any extent in a short time. Many of them are of dimensions large enough to be grown as big specimen plants, others make pretty basket plants, while the smaller creeping kinds may be employed for many purposes, such as forming a carpet under large plants either when grown in pots or planted out. But to enjoy these plants to the full they should have a house or portion of a house to themselves. There is variety enough among them to please any one. Next to the filmy Ferns, I consider the Selaginellas the most delicately beautiful of all the Vascular Cryptogams.

The following list of twelve good kinds, for the stove or warm green-house, comprises representatives of all the most attractive types or groups. They are the pick of the Kew collection, and they have the merit of keeping well through the winter. Probably, however, delicate plants such as these do not suffer so much in America in winter as they do here.

The soil used is a mixture of loam and leaf-mould, with a good sprinkling of silver sand. It should not be pressed hard into the pans or pots, but about as firm as for Verbenas, etc. The drainage should be carefully prepared, so that the water daily required by these plants all through the summer will not have any difficulty in passing away. The temperature of the house where they are grown at Kew does not fall below 60° Fahrenheit in winter, and 70° Fahrenheit in summer. About the end of February cuttings of all the kinds should be put into pans or boxes, so that any specimens which are too shabby to be worth keeping another year may be replaced. Such species as *S. Mertensii*, *S. denticulata*, etc., are omitted from the list, as they are already universally grown, the object here being to call attention to the many beautiful kinds of Selaginellas which are in cultivation in a few gardens, such as Kew, but which are almost unknown in general horticulture.

S. affinis, a recent introduction from British Guiana. It has stems nearly a foot high, with the habit of a dense variety of *S. Mertensii*, and scale-like leaves, crisp, imbricated, rather firm and bright green. The branches are tasseled and curved back. This is a beautiful plant, as delicate and soft-looking as a *Todea pellucida*.

S. atroviridis, a fairly well-known plant, a native of India, China, etc. It is remarkable for the shining dark olive-green of its broad fronds. In tropical countries its leaves are almost black. The stems are about nine inches high, freely branched, the leaves being very broad and flat in their arrangement. This is as easy to grow as *S. Mertensii*.

S. caulescens, var. *argentea*. The lower part of the stem of this kind is unbranched, while the upper half is bent horizontally and covered with lance-shaped, overlapping branches, so that the whole stem has the appearance of a large deltoid frond with a long stalk. The branched portion is a foot long by about eight inches broad, beautifully clothed with small bright green leaves arranged almost flat; the tips of the upper branches are whitish. This grows freely, and is the handsomest of all the varieties of *S. caulescens*. It is a native of the Malay Peninsula.

S. Emeliana, a semi-erect kind, nine inches high, the fronds like those of *S. Mertensii*, but much more delicately divided and triangular in outline, while the leaves are smaller and inclined to curl. The color is a soft, deep green. It was introduced by B. S. Williams, of Holloway, in 1886.

S. grandis, the handsomest of all cultivated Selaginellas. It grows to a height of two feet, the stems erect and unbranched, except on the upper six inches, where the branches are numerous, arranged side by side so as to form a flat, shell-like frond, of the brightest and clearest blue-green. Each

branch is terminated by a square, tassel-like spike one and a half inches long. It was introduced in 1882 from Borneo.

S. hamatodes, a large-fronded, beautiful plant, which will grow into very fine exhibition specimens. Nothing could be more delicate and pleasing than the arrangement of the branches and leaves of this species. The stems are from one to two feet long, bright crimson, unbranched in the lower half, the upper half horizontal, and branching freely, so as to form a large frond a foot across, and as delicate in its details as a *Todea superba*. There are several varieties, all of them beautiful. It is a native of Peru.

S. inequalifolia, an erect grower, two feet high, with the main branches arranged alternately at regular intervals from the base to the top of the stem, the branchlets forming flat, deep-green fronds five inches long and four inches across the base. It forms a very distinct and handsome specimen when grown in a mass. It is a native of India.

S. stenophylla, var. *albospica*, a graceful plant of medium size, with erect stems, freely branched, somewhat like *S. Mertensii*, but much more delicately divided. It is one of the prettiest for growing in masses in large pans. The branches are sometimes tipped with yellow. It is a native of Mexico.

S. suberosa, similar to the last, but deeper green, and the stems are brown, those of *S. stenophylla* being pale straw-colored.

S. uncinata (*S. casia*), a pretty little trailer, with alternate branches, somewhat triangular in shape, about three inches long, and covered with tiny leaves of a steel-blue color. This color varies in intensity at different times of the day, sometimes being almost pure green, at others an intense shining steel-blue. It is a useful plant for growing amongst Orchid-pots, and like situations. It comes from China, and is often met with in cultivation in England.

S. Wallichii, an arboreal kind, attaining a height of three feet or more. The stems are upright, clothed with horizontal branches, each of which is a triangular frond nine inches long by three inches at the base, plumose, and bearing small, rigid spikes from the tip of every branchlet. This is a very handsome species, which may soon be grown into a large specimen, if properly staked and trained. It is a native of India and neighboring countries.

S. Willdenovii (*casia arborea*), a remarkable plant, the stems climbing to a length of twenty feet or more, as thick as a goose-quill, and bearing at intervals of about six inches frond-like branches, each two feet long, triangular in outline, and covered with the small scab-like leaves, which are shining blue-green. There is a mass of this species in the Fernery at Kew eight feet through and ten feet high, forming a most beautiful specimen. It is a native of India.

Many more species, quite as handsome as those described, might be added, but these dozen kinds will give a very good idea of what the rest are like.

Kew, December, 1883.

W. Watson.

Winter Apples of New England.

UNQUESTIONABLY the Baldwin is the leading market apple grown in southern New England, and westward, along the same parallel, to western New York and Michigan. The Rhode Island Greening makes a close second; while, as a long keeper, the Roxbury Russet has no rival among the commercial sorts. In the business sense these are favorite apples, and a well-grown, yellow-fleshed Rhode Island Greening is worthy to rank with our really best apples in quality, for dessert, as well as for the kitchen. And here it may be well to say, that it is a mistake to speak slightly, as some do, of cooking apples. Much the larger part of our great apple-crop comes at last to pies, dumplings and apple sauce. Equally is it wrong to suppose that an apple poor in quality is good enough for cooking. We often hear the Esopus Spitzenburg referred to as the *ne plus ultra*, in quality, of American apples. It is all that, as a cooking apple—preserving its high, aromatic flavor through the trial of fire; but I never could consider it as a dessert apple. Its flesh is too solid for that.

The Baldwin, well grown and well ripened, is a fair dessert apple. We could get along with it, if we had no better. But we have. Among the big red apples, Northern Spy is much its superior. The Red Russet is an apple superior to the Baldwin in quality, keeping and vigor of tree, and its equal in size and productiveness. It is supposed (by Cole) to be a cross between the Baldwin and the Roxbury Russet, but no reason is given for the supposition. It had its origin on the Sanborn farm at Hampton Falls, New Hampshire. In Maine it thrives so well, that in all but a few localities it seems to be supplanting the Baldwin. Though not an "iron-clad," its northward

range is beyond the Baldwin's, perhaps coincident with Jewett's Red, or Northern Spy. It is worthy of much more attention than it has yet had from commercial growers.

Another very valuable winter apple of Massachusetts origin is Sutton Beauty. It is not so good a keeper as the Baldwin, and though often called a large apple, it requires good soil and treatment to do justice to itself in this particular. As usually seen, it is not so large as the Baldwin. Its color is crimson red on a waxen yellow ground. It is a crisp, juicy apple, with a sprightly, pleasant, acid flavor. Though highly prized in Massachusetts, the fame of the Baldwin overshadows it and keeps it in the background.

Yellow Bellflower is an apple hard to surpass when in perfection, and prime fruit of this variety always fetches a high price in Boston. But it is very particular in its choice of locality. I have never seen first-class Bellflowers grown anywhere except upon the banks of, or near to, some large river, like the Connecticut, or the Kennebec. When suited in location, no Apple yields better or finer fruit. Maine-grown Bellflowers keep as well as Baldwins, though it is reckoned an early winter sort. Although called a yellow apple, choice river-bank fruit always has a fine pink cheek, which is not only an additional beauty, but a seal of excellence.

It is a curious fact that so great an apple-growing state as Maine should not yet have produced a first rate market apple, that is also a long keeper. Black Oxford, perhaps the best keeper among the well known Maine apples, is but a third rate fruit in quality. New Hampshire has her Red Russet; Connecticut her Westfield and her McLellan; Rhode Island her Greening; and Vermont her Landon; but Maine is yet in arrears to the country on this point.

The Westfield Seek-no-Further of Connecticut is a market and dessert apple of a high grade, successful over a broad extent of country. It is grown westward to Michigan, and the finest specimens of the variety that I have seen on exhibition have been from that state. It is an apple very even in size, a thing important in barrel-fruit. The peculiar Pearmain flavor, noted by Downing, makes the Westfield very popular with old-fashioned people. The McLellan, somewhat less in size than the Westfield, is not inferior in quality. A yellow apple, marbled and splashed with clear red, its white under flesh juicy, and with a saccharo-vinous flavor, rare to find, makes it a choice apple indeed. The tree is vigorous, productive, and hardy nearly up to 45°, though, unfortunately, not "iron-clad." Peck's Pleasant must not be forgotten among Connecticut's choice apples; indeed there are many who would name it first. Large, round, fair, greenish yellow, with a sunny blush, as rich in flavor as Newtown Pippin, with a softer flesh, it must long remain among New England's best apples. It is a fair, but not very long, keeper.

Vermont's Landon has not received the notice among pomologists which its merit deserves, possibly because it is not a large apple—merely medium. Round, slightly conical, yellow, mottled and shaded with rich crimson, with a little russet around the stem, it is handsome enough, as it is good enough, to be better known. Flesh yellowish, firm, crisp, juicy and aromatic, and but slightly acid, this is a choice apple indeed. Origin, the Landon farm, on Grand Isle, Lake Champlain. Season, February to May. The one apple, which space now allows me to notice, and which should not be omitted, is Hunt's Russet, sometimes called "The Golden Russet of Massachusetts." If there is a best apple, surely we have it here. (Downing has it under both names, seemingly unaware of the fact.) It originated in Concord, the home of patriotism, poetry and philosophy. Not a large fruit, rather small indeed, it illustrates the saying that the best things are put up in smallest packages. It is thinly russeted on a yellow ground, with a bright, rich red cheek; with a fine-grained, yellowish flesh; with a tender, juicy, very rich, aromatic, and briskly (but not excessively) acid taste, and altogether, Hunt's Russet is an apple to offer to our most highly valued friends, in our most friendly mood.

Newport, Vt.

T. H. Hoskins.

About Sea Kale.

WHERE the plants are obtained from seed this is sown in early spring, either in the open ground, in hot-beds, or green-houses. If the seed is sown in the open ground in drills, these should be two feet apart, and the seed should be dropped thinly, so that the plants stand twelve inches apart in the row. Under good cultivation the plants may become strong enough to force the first year, but it often happens that they do not get sufficiently large until the second year, when the seed is sown in the open ground.

When the seed is sown in the green-house or hot-bed during

February or early in March, and well cared for, nine-tenths of the plants will be strong enough to force the same season.

My treatment of the crop the past year was this: As soon as the seed was received, about the tenth of February, a boy was set to crack the capsules which contain it. The seed was sowed in drills between rows of Smilax, in a temperature of about fifty-five degrees. The plants appeared quickly, and as

They were stripped of their leaves and buried in sand out-of-doors, so that they could be reached from time to time during the winter.

The first lot for forcing was brought in the last day of November, and planted in rows eight inches apart, each way, in ordinary soil. The temperature was kept at fifty-five to sixty degrees. The house was kept as dark as tight boards all around and over head could make it. Water was given twice a week,

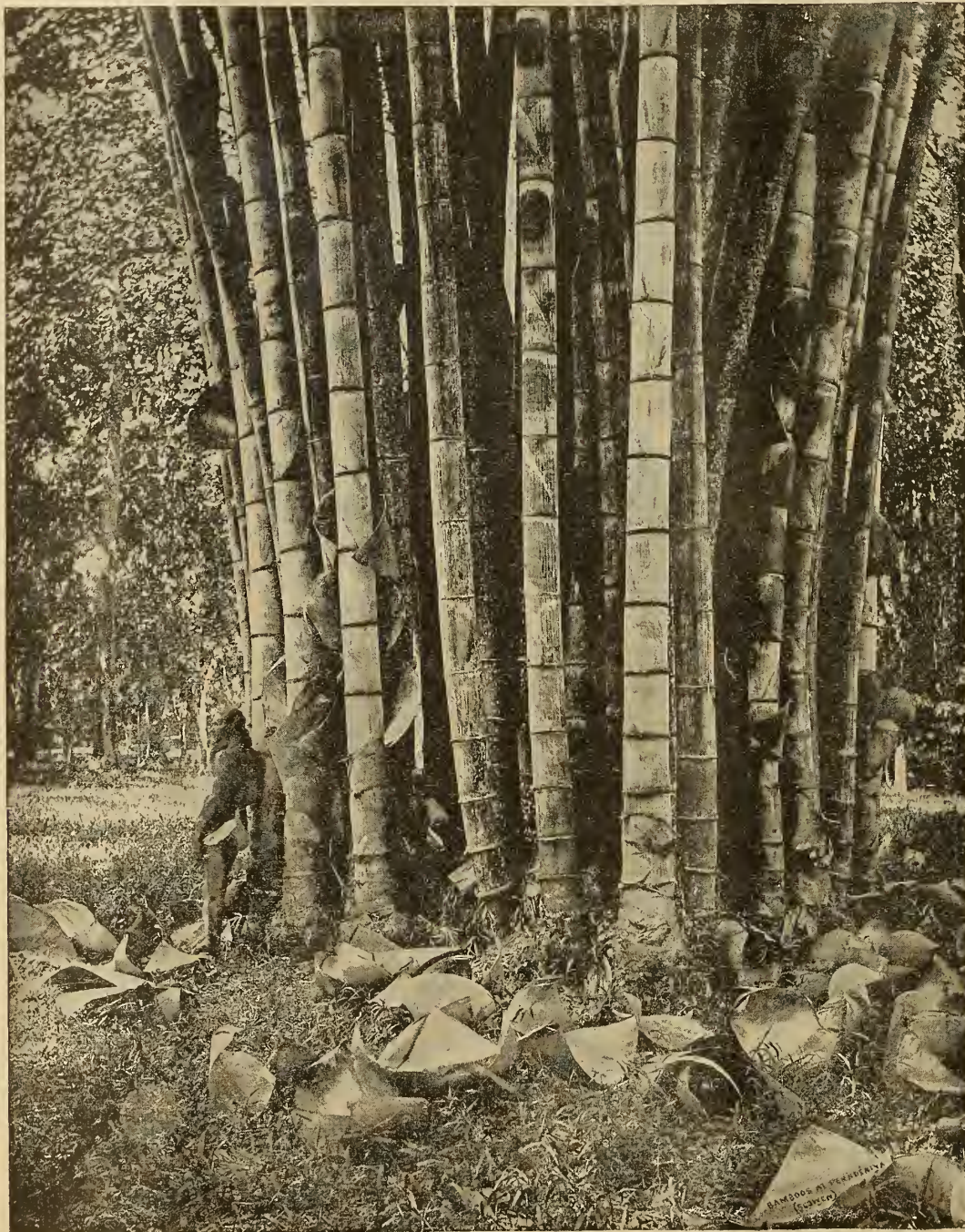


Fig. 85.—Giant Bamboo (*Dendrocalamus giganteus*) in the Botanic Garden, Ceylon.—See page 14.

soon as the two seed leaves were developed and the third leaf could be seen, they were potted into two-inch pots and placed close to the glass, in about the same temperature. They were kept well watered, and often moved to prevent their rooting in the soil beneath the pots, until the end of May, when they were planted in the open ground, fifteen inches apart in the rows, which were three feet apart. After this they received exactly the same attention as did other members of the Cabbage family.

On the 7th of November the roots were dug and stored, many of the largest ones being two inches in diameter, and the smallest three-fourths of an inch in diameter, although there were few of the last size.

and the crop was ready to cut on Christmas. In appearance it was like very fair, perfectly blanched celery. A succession of crops is now following, and as the season advances, two weeks, instead of three, will be long enough for forcing a crop.

It is surprising that Sea Kale is so rarely grown in this country, since it is a delightful dish when properly cooked and served. It should never be used when in the least wilted or flabby. When not perfectly crisp it should be immersed entirely in water for six or seven hours before it is plunged in the boiling water. This water should contain enough salt to give it a distinct flavor, and a lump of soda as large as a hickory nut will improve the appearance and flavor of the vegetable.

Pearl River, N. Y.

John Thorpe.

Orchid Notes.

Zygopetalum Mackayii.—Several plants of this old and well-known Orchid are now in full beauty here, and the bold spikes of bloom form quite a prominent feature of the collection at this season. The value of the flowers is enhanced by their lasting quality, both on the plant and after having been

which, if strong, will produce two, each bearing from eight to twelve of its large, handsome flowers. The sepals and petals are yellowish-green blotched with purplish-brown. The large, spreading lip is pure white striped with blue. There are several varieties, differing chiefly in color. It is a native of Brazil.

Odontoglossum Dormanianum.—This rare and pretty little

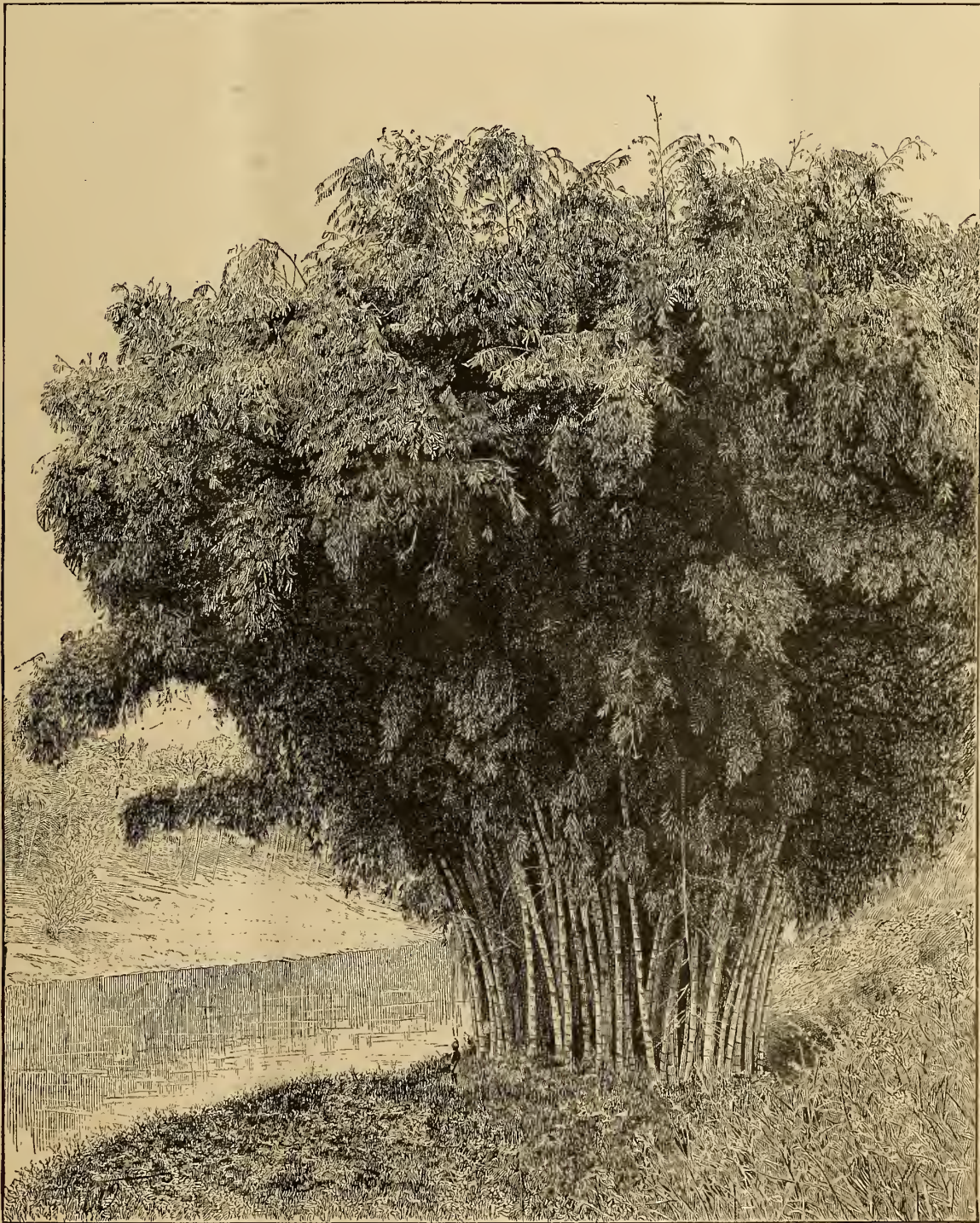


Fig. 86.—Giant Bamboo (*Gigantochloa atter*) in the Botanic Garden, Ceylon.—See page 14.

cut. This species will be found exceedingly useful to florists for cutting. It can be grown easily and will accommodate itself to almost any house, thriving well among foliage plants, Roses, or in the coolest plant-house. The flowers appear at different periods, according to the temperature given them. A strong compost of fibrous loam, kept open with nodules of charcoal, seems to suit the thick, fleshy roots, and during active growth it needs a plentiful supply of water, and if in good condition is benefited by frequent waterings of weak, liquid manure. The spikes appear from the young growths,

Orchid is now in flower. In habit it bears some resemblance to *O. blandum*, and is probably only a geographical form of it. The flowers, borne on drooping racemes, are about two inches across, and are pure white densely spotted with mauve-purple, excepting the tips of the segments. It is a robust grower, and requires the treatment usually given to the genus.

Odontoglossum ramosissimum is a rare species producing branching scapes with numerous, wavy, speckled flowers which, in a mass, are particularly attractive. The bulbs are

large, compressed and ovate, surmounted by a linear-lanceolate leathery leaf about a foot long. The flowers are about two inches across, wavy in outline, white speckled with rose-purple. This plant is found in dense forests on the central Corderillas at elevations of 6,500 to 1,300 feet; consequently it will stand very cool treatment, but does best with an average temperature of 55°.

Odontoglossum Shuttleworthæ.—This is a superb species, and the specimen in flower here is unique. It is presumed to be a natural hybrid between *O. triumphans* and *O. Pescatorei*. The habit and inflorescence resemble the latter, but the bulbs attain an immense size. The flowers are about three inches across, the sepals and petals of a straw-color margined with deep yellow, the sepals being spotted and blotched with cinnamon red. The large pandurate lip is yellow, with a large, broken blotch of reddish-brown on the crest. The plant was imported among a consignment of *O. Pescatorei*.

Oncidium excavatum is a very strong, free-growing kind, with large, ovate bulbs, and broad, deep-green leaves about twelve inches long. The strong, branching scapes are three to four feet long, and bear numerous showy flowers about two inches across. The sepals and petals are bright yellow blotched with brown. The lip is large, flat and of a deep golden color. The crest, which is very prominent, is yellow marbled with brown. This is a particularly showy species, producing its flower-spikes freely, and it would also be extremely useful to florists for cut-flower purposes. It is a native of Peru, and grows freely in a cool, damp atmosphere with the *Odontoglossums*, but should be accorded a good rest as soon as growth is finished, or new growths will appear instead of flowers.

Kenwood, N. Y.

F. Goldring.

Principles of Physiological Botany as applied to Horticulture and Forestry.

II.—THE CONTENTS OF VEGETABLE CELLS; PROTOPLASM, OR LIVING MATTER; THE VARIOUS LIVING GRANULES, OR PLASTIDS; RELATIONS OF THESE TO THEIR SURROUNDINGS.

STARTING from the point reached in the first paper of this series, we recognize these facts (1), that all plants are composed of minute bodies, termed cells, and of the products formed by them; (2), that these cells, while living, contain active living matter, or protoplasm, in which and by which all the proper work of the plant is carried on, and (3) that this living matter, or protoplasm, in one cell, is practically continuous with that in adjoining cells, and so on throughout the whole plant.

The properties of protoplasm must now engage our attention, since we cannot understand in what way all these cells work harmoniously together and accomplish certain results, unless we first ascertain the teachings of modern science regarding their active contents.

It should be stated frankly at the outset, that it is a hard matter for one who is not engaged directly in the study of plants to get a clear notion of this part of the subject. A tree appears so strong in its framework, and we have seen it resist so many gales of summer and storms of winter, that, as we have said before, we can hardly realize that the stout framework is not alive, but is merely the mechanical support of a film, or succession of films, of extremely delicate cells which lie just under the protecting coats of the inner bark. And it is still more difficult to realize that it is the living matter of these cells that we must look for every sound explanation of the phenomena of plant life. Our present course of thought must lie, therefore, for a time among the things which are unseen except by aid of high powers of the best microscopes. In fact, one or two of the more recent acquisitions in this field have been possible only because of important advances made of late years in the construction of microscope lenses.

PROTOPLASM, OR THE LIVING MATTER OF THE CELL.—This is essentially the same in animals that it is in plants, and presents about the same phenomena. Under the microscope it appears as a colorless, somewhat granular, half-liquid mass, which in certain thin-walled cells, which it does not quite fill, can be observed to change its shape more or less rapidly. These movements of protoplasm can be readily made out in such thin-walled cells as the hairs of the Squash-vine and Nettle, and in innumerable other instances may serve as a good criterion of its activity. For the examination of such phenomena it is not necessary to use a very high power of the microscope, two or three hundred diameters being sufficient. These movements are hastened by increasing the warmth of the cell up to a certain temperature, say about

one hundred Fahrenheit; but when we reach a temperature forty or fifty degrees higher than this, all motion stops and does not begin again. If, on the other hand, we cool the cell down, the motion can be retarded until, a little above the freezing point of water, it is arrested, but on warming the cell again, very cautiously, the movement is resumed.

There are many ways in which the movement can be arrested—as, for instance, by strong electrical shock, or by crushing, and so on; but the only ones which need to be particularly noticed now are the following: (1) by shutting off all water and food from the cell, as in starvation, and (2) by shutting off all oxygen, as in preventing free access of air. It is proved beyond question that when protoplasm is active there is a consumption of food, which, under the influence of the oxygen absorbed, is converted sooner or later into the gas known as carbon-dioxide* and water. The latter process is nothing more or less than respiration, so that we have here in the microscopic cell, two processes which are essential to all activity in the animal as well as in the vegetable world, namely (1), the appropriation and utilization of food, and (2) respiration or breathing. No growth can take place and no work can be done by the plant or by the animal if either of these processes is suspended.

But just here appears a world-wide difference between the plant and the animal. The plant, by virtue of certain granules which its protoplasm contains, can, under certain circumstances to be described later, construct its own food out of inorganic matters obtainable from the air and from water in the soil, whereas no animal can do this. (We are leaving out of account, as was explained in the introduction, some interesting exceptions, which will be found explained in all large works on the subject, for our purpose is merely to show what are the general cases and comprehensive rules.)

We must now look at the granules by which plants can effect this extraordinary change of inorganic into organic matter.

The cells in the green parts of plants contain, imbedded in their protoplasm, minute greenish granules of various shapes, generally roundish. These are known as the chlorophyll-granules, or, what means the same thing, leaf-green granules. When these are provided with a supply of carbon-dioxide in proper amount, and are exposed to sunlight, they can, if all the other conditions as to warmth and so on are favorable, manufacture a sort of sugar, or something very much like it, giving off at the same time a certain proportion of the oxygen which was in the carbon-dioxide. This sugar, or its equivalent, is the primary food of the plant. This process, which appears to be so simple, is in reality very complex, and can be only partially understood even after we have examined the structure of the parts where most of the green granules are found in our plants, that is, in the leaves. It is enough for the present to state that this wonderful laboratory of a green cell constructs all the food for animals, as well as for plants, since it is the excess of what plants make and do not themselves consume that animals employ as their food.

One more thing should be noticed at this point, namely, that part of this food made by plants is stored up in the form of starch or oil for future use by them, while a large part is turned to account in building up, in the form of cellulose, or cell-wall substance, the fabric of the plant.

We must next combine a few of the foregoing statements, in order that the relations of the cells to each other may become plain. The cells which contain the leaf-green granules require for the manufacture of sugar (1) water, which comes in by absorption from the immediate surroundings; (2) carbonic acid, procurable from the air; (3) light of a certain quality and intensity; (4) a certain temperature. Now, the green cells of our trees are mainly in the leaves. The position of the foliage exposes them sufficiently to light and air, while communication with the soil is effected through the stem and roots. In other words, millions of cells in the roots and elsewhere in the plant are tributary to these green cells of the transient foliage.

Our task is now fairly before us. We are to see in what way this co-operation between the cells in the roots and leaves is accomplished, and to what extent the roots, stem and leaves share in all the varied work of the plant. Reserving the examination of these organs to later papers, we may give a passing glance at certain curious relations which have been recently discovered by Professor Schimper, between the leaf-green granules and other granules within the cells of plants. In the cells at the growing points of plants

*Carbon-dioxide is often termed carbonic acid, and these terms may be used interchangeably.

there are discernible, under high powers of the microscope, minute granules which, without special chemical treatment, easily elude observation.

When the cells at the growing points develop into the leaves and into parts of the flower, changes take place in these granules, or plastids, as they are called. Some remain with hardly any change in the cells where starch and other substances are to be stored, and here they take on the work of gathering up the provision for future use. Others become the leaf-green granules, and have for their office the manufacture of food, while still others and their products are made to play the chief part in coloring our fruits and flowers. As we have seen that from modifications of the simple cell all the different parts of the plant are derived, so from modifications of the simplest plastids at the points where the cells arise, are formed the other plastids, or granules, in which the myriad activities of the plant are manifested.

There is still one other body to be referred to as existing in the protoplasm of the cell, namely, the nucleus, a somewhat denser part, which passes through a succession of remarkable changes when new cells are produced. The consideration of these changes must be deferred until, after having examined the roots, stems and leaves of the plant, we can properly approach the subject of growth. Our first work is to apply these general statements regarding the cell to an examination of the organs which the cells compose.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

The *Catalpa speciosa* for Timber Planting.

I READ with interest the address of Mr. Burnet Landreth, in GARDEN AND FOREST (December 12th, vol. i., p. 500), on "Forest Planting in Virginia," although to one about to start a young forest Mr. Landreth's experience would not be very encouraging. Forest planting, however, can be made a success if the right trees are planted and proper care given for only a few years. An improper selection of trees is the cause of most failures. Why should so many trees be recommended, when a very few would answer every purpose? For a timber tree in the central part of the United States (including the great corn-producing States, Ohio, Indiana, Illinois, Iowa, Missouri, Kansas and Nebraska), no other tree is equal to *Catalpa speciosa*. It is very easy to grow from seed, transplants from nursery to field better than any other, and, after a plantation is once set, it is as easily cared for as so much corn. In three years from planting the trees will almost completely shade the ground, keep out weeds and retain moisture, and then cultivating can be dispensed with.

These trees should always be planted four feet by four, and at from nine to fifteen years the trees can be thinned so as to stand eight feet apart each way. If planted closely they will trim themselves, and, in time, grow into tall, straight trees. But while close planting helps the young trees, thinning should not be delayed too long or the entire grove will suffer. The value of the tree for posts alone makes it the very best kind to plant for profit, as it only takes a few years to grow one large enough for fence posts, while many other forest trees—notably Black Walnut, Red Cedar and White Pine—are worth very little while young. In the prairie region of Kansas and Nebraska the demand for posts is very great, the prices are good and likely to improve. What the forest tree planter wants is a tree that will grow into usefulness in a dozen years. To plant trees that will take forty or fifty years to have a market value, requires too much trust in the future. White Ash would be the best tree in many places, for it can be used even earlier than the *Catalpa*.

Desiring to ascertain, for my own information, what tree would best endure dry, hot weather, I examined many groves during the dry period of July, 1886. I visited the Farlington forests, located in Crawford County, Kansas, and composed mostly of *Catalpa speciosa*. They are from five to eight years planted. Small bodies of *Ailanthus*, *Osage Orange*, *White Ash* and *Black Walnut* were scattered among them. These forests cover a section of prairie (640 acres) located in an exposed and treeless region, having, at the time, no protection from the prevailing strong winds.

This immense body of trees having passed through a long period of intense heat, without rain, was healthy and vigorous, and had made an annual wood growth that was surprising. Among the trees the ground was in fine condition, with plenty of moisture, and that, too, when the thermometer stood at 104° in the shade.

They had not been cultivated for some years, but their

foliage had formed a complete shade to the land, stopping the growth of weeds and grass and restraining evaporation from the soil.

The *Ailanthus* showed no signs of dry weather. *Black Walnut* and *Osage Orange* looked very well, but were making a very slow growth. *White Ash* was making feeble growth, and showed the injurious effects of the intense heat.

The *Catalpa*-trees at Fort Scott, Topeka, and in a grove in Morris County, Kansas, were also examined, and in each case were found doing better than any other tree.

Observations during the last two years have confirmed the belief that under our trying prairie climate this tree has no rival for forest planting. The wood is beautiful, and takes a fine polish; for durability in posts and fencing material it is only equaled by the *Red Cedar* and *Black Locust*.

So far as I can see, there is little danger of failure with the *Catalpa* here. Close planting seems to be the one thing needed, so that the ground may receive as soon as possible that shading which is always afforded by natural forest-growth.

Topeka, Kansas.

G. W. Fincher.

[As our correspondent insists, the first and most essential step in tree-planting is the selection of trees suited to the climate and the soil of the locality in which the plantations are to be made. The importance of knowledge of the requirements of trees, and the unsatisfactory results which must follow the planting of trees where their nature and wants are not understood, are made apparent by the result of the tree-planting experiments recently described in this journal.

A little knowledge, the result of the most casual observation, would have shown the men who competed in Massachusetts for the prizes offered by the Trustees of the Agricultural Society of that state, that they could not hope to induce the *White Ash* to grow to any size or value upon thin, gravelly, worn-out drift, upon which they would not have found an *Ash-tree* of any size growing naturally.

Mr. Landreth's experiments in tree-planting in eastern Virginia (see vol. 1, p. 500) show too, that observation of natural conditions may save useless expenditures of time, energy and money. The soil with which he had to deal was never very strong, and it had been practically exhausted by long years of cultivation upon the wasteful principles which have ruined much of the soil of the south Atlantic sea-board States. Upon this soil, when fire is kept away, the *Loblolly*, or *Old Field Pine* (*Pinus Tæda*), springs up in the greatest profusion, and, during many years, grows with great rapidity. But the presence of this tree shows that the land is of poor quality, and that it has been so impoverished that other trees cannot grow vigorously in these old fields with the *Pines*. A knowledge of the *Loblolly Pine* and its habits might have saved all the cost and trouble of these plantations, which lead only to the inevitable conclusion, that the best tree for any particular climate or soil or location is the one which is growing naturally and flourishing in that climate and location and upon that soil; and that in eastern North America the planting of trees in forests is not so much needed as the care of the trees which spring up freely in all situations and upon all soils.

The absence of trees, due to causes not entirely climatic, from the region extending along the eastern border of the dry and treeless central plateau of the continent, made experiments in tree-planting in this part of the country necessary in order to establish the fact that trees could be grown there successfully on a large scale, and to determine the varieties of trees best suited to flourish under conditions in which the controlling features were dry and hot summers, cold winters, fierce winds at all seasons of the year, and deep and very rich soil.

The large plantations at Farlington, in eastern Kansas, described by our correspondent, were made for the special object of determining what trees would thrive under these peculiar conditions; and while sufficient time has not yet passed since the trees were planted to make the result conclusive in any way, it is evident that the *Western Catalpa* is the most promising tree which has yet been tried to any extent on the western prairies. It is not wise,

however, to decide hastily in regard to the value of any tree for planting under conditions quite dissimilar to those in which it grows naturally.

The Western Catalpa is confined to a comparatively small area, of which the junction of the Ohio and Mississippi Rivers may be taken as the centre; it grows only in deep, river-bottom lands, which are often submerged for weeks together; and while it flourishes while young, growing with remarkable rapidity when planted under conditions entirely dissimilar to those under which this species has been produced, it has not been tested yet long enough in cultivation to enable any one to speak with entire positiveness of its adaptability to prairie-planting. The fact that it becomes valuable for many purposes in comparatively few years, is a great point in its favor, as many trees, placed in the midst of abnormal surroundings, thrive for many years and do not display their inability to adapt themselves to new conditions until they begin to approach maturity.—Ed.]

Correspondence.

To the Editor of GARDEN AND FOREST:

Sir.—In one of your recent numbers you spoke of experiments in the use of elastic cement for filling decayed places in the trunks and limbs of trees, resulting from neglected amputations. Can you refer me to any parties for particulars and for the purchase of the proper article? I have heard of introducing cotton-batting, steeped in turpentine, and then closing over tight.

It seems as if this subject of tree-doctoring is of sufficient importance to justify a hope of some attention in your columns, for general use.

New York.

G. M. Weld.

[We have had no experience in the use of elastic cement for filling the cavities in the trunks and branches of trees. The method recommended for the treatment of trees in this condition is as follows: The edge of the cavity should be cut away smooth and even, and all decomposed matter or growth of new bark formed in the interior should be removed. A coating of coal-tar should then be applied to the surface of the cavity, and the mouth protected with a piece of well-seasoned oak securely driven into it. The end of this plug should be cut even with the surface of the trunk or limb, made perfectly smooth, and then coated with coal-tar. If the cavity is too large to be closed in this manner, a piece of seasoned oak-board should be fitted and securely nailed into it, and then covered with coal-tar. A new growth of bark will gradually extend over the board and so effectually cover the cavity.—Ed.]

About Kniphofias.

To the Editor of GARDEN AND FOREST:

Sir.—In the article by Mr. T. D. Hatfield concerning these plants I observe a few slight errors, arising, probably, from want of true material, which I hope he will kindly permit me to amend.

The name of *K. carnosa* has been given by erroneous distinction and bad handwriting; the plant certainly is but *K. Leichtlinii*. *K. media*, of Gawler, identical with *K. sarmentosa*, Kunth, is a very distinct plant, and differs in many points from *K. aloides*, Moench. The former has broader and shorter leaves, which are glaucous. It has a longer flower-stem, and the flower-spike has a different form from that of *K. aloides*; while the flowers of *K. aloides* are fiery red to yellow, those of *K. media* are somewhat rainbow-colored, at first greenish-brown, then changing to blood-red, and finally turning to a sulphury yellow, the whole spike shaded off by a thick glaucous bloom, which causes the colors to appear very dull. *K. nobilis* and *K. Saundersi* are very distinct plants, and far superior to *K. grandis* or *K. grandiflora*. *K. nobilis*, which may be considered a giant variety of *K. aloides*, was discovered by Mr. Parker in a small garden near London, and *K. Saundersi* I found in the garden of Mr. W. Wilson Saunders, at Worthing, probably a remnant of Mr. Cooper's introductions from Caffraria. I am inclined to take *K. Saundersi* as a species. The two plants look very much alike, except in the flowers; the foliage looks coarse and ro-

bust, that of *K. Saundersi* being a little narrower and deeper green; the stems reach up to five feet; the spikes of *K. nobilis* are of an ovoid shape, being thickest in the middle; its color is a fiery scarlet turning to deep bright yellow, and its size is eight inches long by more than four inches wide. The spikes of *K. Saundersi* are cylindrical, scarlet, with a brick-red shade turning yellowish. The spike is thirteen inches long and three and a half inches in diameter. This is by far the noblest of the whole genus. I have of late raised some most beautiful hybrids and varieties; a blood red and a golden yellow variety of *K. Leichtlinii*, and among the hybrids some bright canary-yellow ones, and others with anthers far protruding, looking just like a brush. The small-flowered *K. albi-flora*, introduced by myself from Madagascar, is pretty, but of botanical interest mainly. *K. Natalensis*, which flowered here for the first time in Europe, is not very showy, yet highly interesting; the spikes being over two feet long, loosely beset with narrow flowers of a foxy brown color.

Baden-Baden, December, 1888.

Max Leichtlin.

Periodical Literature.

The December number of the *Bulletin of Miscellaneous Information*, issued by the Royal Gardens at Kew, completes the second volume of this useful publication, from which we have more than once had occasion to make copious extracts. The present number contains articles on *Inhambane Copal* (*Copaifera Gorskiana*), a new tropical-African product, from which it appears that "the term copal is commercially applied to various hard gum-resins yielded by certain tropical and sub-tropical trees. In the majority of cases copal is obtained in a semi-fossil state on land where no trees at present are found, but where at one time large forests existed. In other cases, what may be termed recent copal is a gum-resin in a comparatively fresh state, collected from living trees or from trees in a state of decay.

There is also an exhaustive report upon the cultivation of Rice in Bengal, which should be reprinted for the benefit of the rice-planters of the Southern States.

The Silkworm Thorn of China (*Cadrania triloba*), which has been successfully introduced into the Royal Gardens, is described. There are notes upon a new rubber-producing plant of Jamaica (*Forsteronia floribunda*), and upon some supposed seedlings of the Sugar-cane which have been detected at Barbadoes, and which are of special interest, as the following extracts will show:

"The Sugar-cane is one of the most valuable economic plants we possess. It has been cultivated for so long a period that the primitive habitat of the species, according to De Candolle, is unknown. Bentham, in the "Flora of Hong Kong," page 420, states that 'We have no authentic record of any really wild station of the common Sugar-cane.' Further than this, in common with many plants that have been for a long time under cultivation, and reproduced solely by means of buds and suckers, the Sugar-cane so rarely produces mature fruits that no one, as far as we are aware, has ever seen them. Certainly in the rich Herbarium at Kew there are no seed-bearing specimens. In botanical works the subject is often referred to, but apparently only to restate the fact that botanists like McFadyen, in the West Indies, and Roxburgh, in India, 'have never seen the seeds of the Sugar-cane.'

"Schacht is one of the few persons who has given a good analysis of the flower of the Sugar-cane, including the pistil; he also had not seen the ripe seed.

"In discussing the problem how far the saccharine qualities of Sugar-cane could be improved on the same lines as those so successfully adopted with regard to the Beet, it was lately pointed out in a letter addressed to the Colonial Office that, owing to the power of producing fertile seeds having apparently been lost in the Sugar-cane, it was impracticable to deal with it by means of cross-fertilization or by the ordinary course of seminal selection. It was further pointed out that new and improved varieties amongst Sugar-canes were to be looked for amongst bud variations, and planters were advised to mark any canes that showed a departure from the type and cultivate them separately for experimental purposes, with a view to test their yield in sugar.

"Recently, however, a statement has reached Kew from a trustworthy source that seedling Sugar-canes have been found at Barbadoes, and that the plants were in course of being raised at the Botanical Station in that island, under the care of Mr. Harrison and Mr. Bovell.

"The statement sent by Professor Harrison appears to prove, in a perfectly natural and circumstantial manner, that a few mature seeds may occasionally be produced by the

Sugar-cane under certain circumstances. It is stated by Rumphius that the Sugar-cane 'never produces flowers or fruit unless it has remained several years in a stony place.' He does not, however, say whether he ever saw the fruit, nor does he cite any proof of the fact in the shape of seedlings, self-sown or otherwise. The canes that would be likely to produce fruit would be those varieties nearest the original wild cane, and probably on that account they would be less rich in sugar than the canes improved by a long course of cultivation.

"Without expressing a decided opinion on the subject, and in the absence of the specimens themselves, the information supplied by Professor Harrison is, so far, the most tangible of any yet received to show that the cultivated Sugar-cane may occasionally produce mature fruits."

The December number of the *English Illustrated Magazine* contains a charming article by Mr. Grant Allen on "Surrey Farmhouses." Many Americans know the beautiful village of Dorking, not far from London, and those who are familiar with that delightful book, Cobbett's "Rural Rides," have some idea of the surrounding country. But even among Londoners there are few who have realized its loveliness for themselves or seen its richness in examples of domestic architecture. It is one of the most primitive districts in all England, despite its proximity to the capital; for its heavy clay soil has prevented agricultural advance. But in the sixteenth century it had what Mr. Allen calls a temporary "boom" from the discovery of iron-ore in its hillsides, and the consequent enrichment of many families has left its trace in beautiful manor houses, while nowhere have so many old farmhouses escaped the hand of modern progress. The "Weald of Surrey," as it is called, once formed part of the famous "Andreaswald"—the impenetrable forest which withstood the feet of the advancing Saxons and furnished a refuge for the Britons whom they displaced; and in the aspect of its present population Mr. Allen thinks he can read patent signs of Celtic descent. "The great characteristics of the Surrey village," he writes, "are green and common. No county in England, perhaps, except Yorkshire, Devonshire and the Cumbrian shires, has so large a proportion of its area still unclosed. As late as Queen Anne's day Holmwood was a deer-forest, and . . . for miles even now one may traverse the open heather and bracken along the sandstone hills; while on the plain itself the amount of open common always surprises the stranger in a Surrey district. The fact is, till very recently, land in Surrey had but a ridiculously small value. The county remained very sparsely inhabited, and the area for the most part was unfit for tillage. Hence every hamlet had its corner of green, and it is the existence of these universal cricket-fields at their very doors, with the consequent practice from early childhood, that has made the Surrey men the champions of England." But, interesting as is Mr. Allen's text, we desire especially to call our readers' attention to the numerous pictures which accompany it. Perhaps they do not deserve, from the point of view of artistic execution, the very enthusiastic praise which the author gives them; but they show, at all events, an exceptional feeling for the most picturesque points of view and much skill in the rendering of tree forms; and the subjects themselves are so charming, that we should be glad to see them even though the pictures had much less artistic merit than they possess. Most of the houses are of half-timbered construction, with beautiful tall polygonal chimneys and many gables; and helpful lessons for our own practice may be gained from them, as they show how a diversified ground-plan need not give a disjointed, heterogeneous look to a house, and how broken roofs and conspicuous gables of different sizes may be brought into a result of the greatest harmony and charm. Only, in studying such houses as these, it must not be forgotten that time has added vastly to their picturesqueness. If one of these gabled houses were to be copied exactly, it would by no means have exactly the same effect—great softness and grace having often been given by such practically unfortunate facts as a sagging of the roof-ridge and a slight inclination in the walls. Nor could one immediately imitate the charming effects produced by the trees and shrubs that grow so harmoniously up to the very base-course, and by the mellowing mosses, grasses and flowers that, in the damp English climate, have seized upon every smallest foothold in brick or stone. Nevertheless there is much to be learned from these pictures, as well as much to be enjoyed by the mere casual observer.

Mr. Arthur Hollick contributes to the December number of the *Bulletin of the Torrey Botanical Club* an interesting account

of a group of remarkable Oaks recently detected near Tottenville, on Staten Island, and containing plants of a supposed hybrid between *Quercus Phellos* and *Q. nigra*, which has been described by Dr. Britton as *Quercus Rudkini*, and of *Quercus heterophylla*, the Bartram Oak, the range of which is now extended considerably further north than it has been known before. This is the plant which has, for a century almost, been the subject of active discussion on the part of various botanists who have studied our Oaks. It has been considered a species by some, and by others a hybrid between *Q. Phellos* and one of the other Black Oaks—*Q. aquatica*, *Q. imbricaria*, *Q. falcata*, *Q. coccinea*, *Q. tinctoria* and *Q. palustris*, all being made to serve in turn as the other parent. Mr. Hollick agrees with those botanists who believe that *Q. heterophylla* is a hybrid derived from *Q. Phellos*, but he discards all the species which have been named as the other parent, and suggests that it is *Q. rubra*, arguing that the shallow cup of the supposed hybrid attaches it to that species, which, moreover, he believes is the only Black Oak constantly found growing in the neighborhood of *Q. Phellos* in the region occupied by *Q. heterophylla*.

Every additional station of *Q. heterophylla* which is found—and it is now known in many places between Staten Island and Newcastle County, in Delaware, besides having been collected in North Carolina by Curtis (*vide* Herb. Canby), and by Hall in Texas—would seem to confirm the ideas of those botanists who have considered it a species of recent hybrid origin, perhaps, but now fixed in its characters to the degree of being able to reproduce itself exactly from seed. The important thing, however, is that the tree exists, and that there is no confusion in regard to its name, which is not obscured under a mass of useless and annoying synonyms. Its origin and parentage cannot be accurately determined, and must always, of necessity, remain a matter of personal opinion.

Recent Plant Portraits.

PITTOSPORUM PHILLYROIDES, *Bulletino de la R. Soc. Toscana de Orticultura*, November.

Botanical Magazine, December:

BEGONIA SCHARFFEL, *t.* 7028; a native of the Peninsula of Desierto, in southern Brazil; and described by Sir Joseph Hooker as "one of the most magnificent species of the whole genus."

IRIS SUWAROWI, *t.* 7029; another distinct Iris recently discovered in central Asia by Dr. Albert Regel.

PENTAPERA SICULA, *t.* 7030; a low, much-branched, Heath-like shrub; a native of Sicily, Cyprus and Barca, and the only representative of a genus distinguished from the true Heaths by its pentamerous flowers (which Sir Joseph Hooker points out is not a constant character), by its large sepals and pubescent ovary. The flowers are larger than those of the other European Heaths, and are pure white.

HEXISIA BIDENTATA, *t.* 7031; a small Central American Orchid, with scarlet flowers, which possess a botanical rather than a horticultural interest.

PRIMULA RUSBYI, *t.* 7032; a native of the mountains of southern New Mexico and Arizona, already described in the columns of GARDEN AND FOREST, p. 320.

ARUNDINA BAMBUSÆFOLIA, *Gardeners' Chronicle*, December 1st.

DISA LACERA, var. MULTIFIDA, *Gardeners' Chronicle*, December 8th.

DISA GRANDIFLORA, *Gardeners' Chronicle*, December 8th.

NEPENTHES RUFESCENS, *Gardeners' Chronicle*, December 8th; "this is stated to be a cross between *N. Courtii* × and *N. Zeylanica rubra*. *N. Courtii* is itself a cross between an unnamed Bornean species and *N. Dominiana* ×, this latter being a cross between *N. Rafflesiana* and the same undetermined Bornean species."

PHILLYREA DECORA, *Gardeners' Chronicle*, December; this is the *Phillyrea Vilmoriniana* of many gardens; a native of the shores of the Black Sea, and a member of the Olive family. It is a strikingly handsome shrub, with bright green, coriaceous leaves and axillary clusters of white flowers, which are followed in the autumn by olive-shaped, reddish-purple fruit. It is specially recommended for planting in cities, as smoke and dust does not affect it seriously. Its hardiness in this country, however, has not been established yet.

KALMIA LATIFOLIA PAVARTI, *Revue Horticole*, December 1st; a handsome variety of the common American Laurel, with high-colored, almost red, flowers, obtained in the garden of the Trianon by Monsieur Pavart.

QUERCUS RUBRA, *Bulletin Torrey Botanical Club*, *t.* 83, December.

QUERCUS PHELLOS, *Bulletin Torrey Botanical Club*, *t.* 83, December.

Notes.

Dr. Regel, in a private note, calls attention to the interesting fact that *Picea pungens*, the so-called Colorado or Blue Spruce of the Central Rocky Mountains, is by far the hardiest and most desirable of all the Spruces in the very severe and trying climate of St. Petersburg.

Among flowers forced for the holiday trade in this city were both white and red varieties of the Japan Quince. The white was especially admired, making a satisfactory substitute for Orange blossoms. These plants flower under glass as readily as Lilacs. They are grown in pots for a year before being forced, to encourage an abundant growth of roots.

Professor B. D. Halsted, of the Agricultural College of Iowa, will remove next month to New Brunswick, New Jersey, to accept the Chair of Botany in Rutgers College, and to assume charge of the Horticultural Department of the Agricultural Experiment Station. Professor Halsted will continue his special study of American weeds, and will be glad to receive reports in regard to plant pests from any part of the continent.

The value of the so-called Japanese Ivy (*Ampelopsis Veitchii*) for use along railroads is rapidly being recognized. Its compact, clinging habit serves to bind together loose stones and shaly surfaces, thus protecting the sides of embankments and cuttings, and in consequence the track itself, while delighting, in summer, the eyes of the weary traveler. Thousands of plants are already sold each year to railroad companies.

During the past season Mr. A. A. Crozier cross-fertilized a large number of the blossoms of different kinds of Apples, Pears, Plums, Grapes and Squashes, with a view to ascertain whether any effect from the cross appears in the fruit of the first year. An account of the results of these tests is given in full in the December number of *Agricultural Science*, and in no case could the influence of the variety furnishing the pollen be detected in the fruit.

The cultivation of flowers for the manufacture of perfumes has been begun in this country with seemingly good results. A company already exists in Florida which has planted for this purpose 200 acres in Tuberose, while a correspondent of *The American Garden* writes from South Carolina that the preparation of pomades is easily practiced by individuals, and that she is herself engaged in it, having planted this fall 150,000 Tuberose (which require three acres of ground) and about double the quantity of Jonquils, and having engaged 10,000 roots of Violets for spring planting.

The teak baskets which are commonly used in England for growing epiphytal Orchids are made of wood obtained from broken-up ships in the London docks. The wood is supplied in square rods about as long as ordinary builders' laths, though, of course, a good deal thicker. The edges of the rods are rounded off, and then they are cut into the required lengths and pierced at each end with holes, through which copper wires are inserted to bind them together. Such baskets are said to last from ten to twelve years if thoroughly cleansed whenever a plant is removed from them. They are furnished in every size from three inches to a yard square.

Among the newer and more promising varieties of Grapes is a very early, greenish-white one, first brought to notice by Mr. James M. Paul, of North Adams, Massachusetts, who found it growing wild in the Green Mountains, after which it has been named. Mr. E. S. Goff, who has fruited this Grape for the past two seasons, writes in *Popular Gardening* that it ripens about with Champion, while in quality it ranks with the best. The vine is vigorous and quite productive, bearing medium-sized, not very compact bunches, with berries a little larger than those of the Delaware. The flesh is quite free from hard pulp, and entirely without harshness or foxiness, and its flavor is very sweet, with a slight inclination toward the vinous. The Green Mountain is the only Grape so far tested at the New York Experiment Station which is at once very early and of the best quality.

The meeting of the Illinois State Agricultural Society held last week proved unusually profitable and pleasant. The managers made a special effort to secure a fine display of fruit, and especially of new varieties from all parts of the state, and so many liberal premiums were offered, that all exhibitors of fine specimens were sure of gaining something to help pay expenses. These facts were well advertised through the press and by private letters, and as a result, the attendance was very large, even the remote parts of the state being well represented. One session of the meeting was conducted entirely by the young people, who read carefully prepared papers and discussed the subjects presented with such intelli-

gence, that the session was pronounced the most interesting of the entire series. It is probable that other states will follow the example of Illinois in this particular, as it promises to encourage the study and practice of certain branches of horticulture among the boys and girls from the farms, as well as those in towns and cities.

We have already referred to Dr. Ernst's first article, published in the *Gartenflora*, on "Horticulture in Caracas." It has been followed by a second chapter that contains much interesting information with regard to the plants which flourish in the Venezuelan climate, and those which, upon trial, have been found ill suited to it. The cultivation of useful plants, he tells us, has lagged so far behind that of flowering and ornamental plants, that it is no exaggeration to say, not a single new fruit or vegetable has been introduced into the country during the last fifty years. On the other hand, the prices paid for flowers are enormous, running so high in the case of native Orchids, that their re-importation from England may prove profitable. A specimen of *Cattleya Wagneriana*, with twelve leaves and eight blossoms, had recently been offered to the author for \$45, and he attributes such demands to the fact, that collectors for English firms have given such enormous sums for white-flowering Cattleyas, that the natives in consequence have "lost their heads" to a degree which can only be cured by a persistent abstinence from purchase on the part of local customers. That they have by no means lost their cunning, is shown by the statement that they treat the common *Cattleya Mossiae* with sulphur fumes so as to make it look like *C. Reineckiana*, bring the plants bearing these blanched blossoms to unsuspecting amateurs in twilight hours, and often receive large prices for them.

Professor L. H. Bailey recently contributed to *The American Garden* some "Rural Notes from Scandinavia," from which we extract the following passages: "In ornamental gardening the traveler finds much to admire, particularly in Sweden. There is not that richness of finish and variety of plants which one sees in England, but there is usually a most excellent and tasteful use of materials. The Slots Park, at Christiania, is an admirable example of the adaptation of common plants to ornamental gardening of a high character. The greater part of the plantings are Birches and Elms, trees which everywhere clothe the adjacent hill-sides. Perhaps the very contrast of this simple park with the ornate and burdened ones of England and other parts of Europe may heighten its charms in the mind of the traveler. Yet one must feel that the absence of effort and artifice and the repose which comes from the very simplicity of its design and details gives this park an intrinsic merit. Parks are usually burdened with accessories, mere display, a feature of gardening—if gardening it can be called—which is supported and often demanded by the popular desire for show and curiosities. One extreme in this direction now holds rule in America—the craze for carpet-bedding, which is so generally and so unfortunately denominated landscape-gardening! It is said that American carpet-bedding 'beats the world,' and my own observation thus far sustains the boast, much to the credit of other countries."

At the International Exposition held at Barcelona during the past season, the Department of Forestry was a conspicuous feature. It embraced general forest maps of Spain and more detailed maps of the different provinces; maps showing the distribution of the most important trees, such as the Aleppo Pine, the Beech, Cork Oak, etc.; a herbarium of the plants of the forest; relief plans of the Mountain of Covadonga, and of the Dunes of Cadiz, with their artificial plantations, plans for forest cottages for workmen and forest guardians. One of the most interesting things in the exhibition was a scheme for the establishment of a telegraph system to announce fires in the forest. A detailed forest map of the Philippine Islands was contributed from the Bureau of the Minister of Foreign Affairs. The second section of the exhibition contained a large collection of forest products, such as woods, resins, barks, various textile products, specimens of charcoal and seeds of trees. In this collection there is also a very large collection of woods and other industrial and economic products of the Philippines. All the instruments used in the Spanish Forest Department were displayed, while upon a lawn near the exhibition building, a miniature mountain was created, upon which were shown, of the size of life, the different methods used for transporting wood from mountain forests, such as slides, narrow gauge railroads, and the like. A collection of insects, wild animals and fish collected in the Spanish forests, made another group of this exhibition, which was probably the most complete and interesting seen in Europe for many years.

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Schools of Horticulture.

A CORRESPONDENT describes upon another page the organization of the National School of Horticulture of France, one of the most successful in Europe for the purpose for which it was established—the training of practical, working gardeners. The theory of the school is, that instruction in horticulture, if it is to be of any value, must be both practical and scientific. The courses of instruction, therefore, extend over a period sufficiently long to permit the students to acquire, by actual practice, under experienced cultivators, the skill which will enable them to perform all the operations of the garden in its various departments, and to learn, from lectures and by study, something of the sciences upon which the art of horticulture rests. All the operations of the establishment, which is a large one and admirably kept, are performed by the students; and, although it is not self-supporting, the sales of produce of various kinds are sufficient to pay a considerable part of the expenses, including the salaries of several instructors. The institution is an excellent example, certainly, of what a large School of Horticulture can be made.

A number of Schools of Horticulture were established in this country several years ago, and some of them are still in operation. They have all been connected, more or less intimately, with agricultural colleges; for, with the exception of a school for women which existed for a short time in Newton, Massachusetts, a few years ago, there has been no institution in this country devoted solely to horticultural instruction. These schools have, in some instances, done admirable work as horticultural experiment-stations, and the country is indebted to them, in their capacity as such, for much valuable information. Many of them now provide an excellent course of botanical study and offer instruction in some branches of practical horticulture. It will not, however, be maintained by the best friends of these schools, that a well equipped gardener was ever graduated from any one of them.

The causes of the failure of these schools are deep seated. They spring, in part, from the want of appreciation of the requirement of a sound horticultural education

on the part of their founders, and in part from the prevailing tendency of the American people to be satisfied with a hasty and insufficient training for any vocation in life. A young man who devotes an hour or two a week during the thirty or forty weeks of a school course, even if his studies are carried into the second year, may find a certain amount of satisfaction in thus playing at horticulture, but he will gain little that will be of any practical value to him in earning his living as a gardener. And yet, to create gardeners of broader intelligence and greater skill than can be gained from the rule-of-thumb system of the old apprentice days, is the only legitimate purpose for which such schools can be established merely as schools.

But the directors of our Schools of Horticulture are not altogether responsible for the existing state of affairs. Americans are in too great a hurry to learn anything thoroughly. The lad who has passed a few months in some successful florist's green-house, or in the garden of some private establishment of good reputation, is generally pretty sure, in this country, to obtain a responsible situation in which he is practically his own master, and where he gets as high wages as if he had devoted a number of years to learning his profession. It is not surprising, therefore, that Schools of Horticulture are not supported in this country, and that the number of ignorant and half-trained gardeners is far in excess of those who really understand their business. The best gardeners in America, with a few exceptions, are foreign born, and got their early training before they came to this country. Really good gardeners are rare, of course, in every country, for the combination of knowledge with the qualities that make a great gardener is seldom found. They are more rare here, however, than they are in Europe, because absence of competition permits very inferior men to aspire to important positions; and we must continue to depend, as a rule, upon foreign nations for gardeners, until the struggle for existence here is so sharp that only men thoroughly trained in their profession can hope to live by it, or until a more general knowledge of gardening and its possibilities among the class who employ labor makes it impossible for ignorant men to obtain positions requiring such a high order of intelligence, industry and zeal. Such a change will come to pass, perhaps, in the United States, sooner or later; but in the meantime our Schools of Horticulture can wisely give up trying to teach young men who do not want to be taught, and devote their energies to those wider fields of usefulness which, fortunately, are open to them, and by experiments, and in many other ways, at least help to create the demand for skilled gardeners which they were founded to supply.

There is no better season of the year than winter to study trees with reference to their surroundings, or to determine the amount of the damage inflicted by one tree upon another when they are brought together too closely in ornamental plantations. If there is any one in this city interested in trees in their ornamental aspects, he cannot devote a few hours of one of these days of early winter, before the snow makes walking uncomfortable, to a better purpose than a stroll through Central Park. The overcrowding and the poor condition of many of the trees there is more apparent now than at any other season of the year, and tree-lovers will be able to see for themselves that many trees should be removed at once if there are to be any fine ones left in the Park at the end of another quarter of a century. Large and healthy trees are crowded in all parts of the Park by smaller and less valuable ones. There can be but one ending to the struggle between a strong and a weak tree; but the process of destruction is slow, and the victorious giant too often carries through life the marks of the contest. Man can aid nature wonderfully by the judicious use of the axe, and there is hardly an acre of the Park plantations which has not suffered, and is not now suffering, from ill-judged caution in cutting. The sickly and often half dead Norway

Spruces and foreign Pines look even more wretched and unhappy in winter than they do when the leaves cover the branches of neighboring trees. Still they are allowed to disfigure the Park year after year—while they are dying slowly—and what is a great deal more serious, they are allowed to inflict great and ever-increasing injury upon valuable trees which are unfortunate enough to stand near them. The interesting and unique Japanese Elm, near the Seventy-second Street entrance to the Park from Fifth Avenue, to which we have more than once called the attention of the lovers of rare and handsome trees, is still crowded and injured by neighbors of no value or beauty—a piece of neglect on the part of the Park authorities which is inexcusable, and should cause the indignation of all persons who can appreciate the beauty and value of this remarkable tree.

A Japanese Stable.

A FEW weeks ago we illustrated the approach to the famous memorial temples at Nikko, in Japan. On page 31 we now reproduce a photograph of one of the minor buildings within the wide temple enclosure. It is neither a temple nor a dwelling, but a stable, yet—as we might divine from its ornamentation, which is much richer than that of the habitations of Japanese humanity—not a stable destined for an ordinary steed. It houses one of the sacred ponies—albino animals with pink eyes—which are frequently found within the precincts of large temples. These ponies live on the charity of visitors to the temple, who are in the habit of piously investing a few coppers in peas or grain for their sustenance.

Despite the peculiar service to which it is put, this building is not only charming to look at, but suggestive of schemes which might serve an American architect for work of another kind. The strong yet graceful sweeping roof is, of course, its chief claim to admiration; and although such a roof is used in Japan upon sacred or semi-sacred edifices only, this canon need not bind foreigners who find it beautiful. Modified to suit our methods of construction, yet not deprived of its essential character, it might well be used to cover some minor building in the neighborhood of an American country home—a lodge or tool-house, a summer-house or well. Nor is the construction and ornamentation of the walls devoid of interest for a people like ourselves, who are often at one with the Japanese in using wood without an admixture of more monumental materials, but who have much to learn in the way of using it in fashions at once simple and strong. Rich color, of course, adds much to the effect of such Japanese buildings—so much, that their beauty, displayed, as it is, against a background of deep green foliage, cannot be at all appreciated from a black-and-white print. The flagged path in front of the stable is a good example of Japanese workmanship in another and likewise interesting direction.

Boundary Walls and Entrances for Prospect Park.

IT was decided some time ago by the Brooklyn Park Commissioners to surround a great part of Prospect Park with a substantial stone wall in place of the rough wooden paling which has stood there so long, and to furnish the chief approaches with entrances of corresponding dignity. Some of the designs for this work have now been prepared and approved, and their execution will soon be begun. An inspection of these designs shows that the park and the city will be vastly improved by the constructions which they portray.

The wall is to be low but massive, carefully profiled, and constructed of Milford granite, the soft pinkish tone of which, mottled with black, is well adapted for association with masses of verdure. At the approach facing Coney Island Avenue the wall ends at points considerably removed from one another and the entrance for carriages is set somewhat far back from its line. Each side of this entrance—which is to have no gates—is flanked by a large but not lofty rectangular pier bearing a sculptured group. From these piers long stone seats with low but massive backs curve outward toward the ends of the wall;

and at the points of junction stand large rectangular pavilions, open except for a colonnade formed by square angle-piers with two intermediate columns on each side and covered with red-tiled roofs. Each long curved bench is broken midway of its length to admit of the passage of persons on foot, and behind each (within the park) stand two graceful, tall columns, bearing the national eagle. The design is classic in character, simple in its elements, but scholarly and beautiful, and exquisitely treated as regards matters of detail. The combination of the massive central piers with their groups of sculpture, the long, curving benches, the colonnaded shelters, and the tall, isolated shafts, forms a composition of the most dignified simplicity and harmonious variety. It is a great pity that in accepting this design the Commissioners should have thought best to mutilate it by the omission of the four isolated shafts. Not only are they beautiful in themselves, but their slender, aspiring lines are needed to relieve and dignify the low horizontal lines that elsewhere prevail. Without them the park will still have a good and tasteful entrance, but with them it would have an architectural adornment of the highest monumental beauty.

The design for the Willink entrance shows again no gate, but two massive round low piers, with conical roofs covered with the scale-like stone tiling familiar to all students of classic art. From the apex of these roofs rise rich finials of wrought-iron, and between them springs a lofty elaborate arch of the same material, from which depends a lantern. Long stone seats flank this entrance also, divided as before for the passage of pedestrians; but in place of the colonnaded shelters, we have here two small circular entry-boxes, with conical red-tiled roofs. This design, it will be seen, is less ambitious than the other, but it is as good in its own way; and again one must count it a great misfortune that it must be executed in a mutilated shape—the iron-work is to be entirely omitted, though it adds immensely to the effectiveness of the composition, which without it seems almost too simple and severe. In both cases, however, these mutilations can easily be rectified at a later day, and meanwhile Brooklyn may congratulate itself upon having secured the services of genuine artists for this part of its park improvements. No competition was opened for the walls, or for these two gates, or for the still simpler one which will face Third Street and Ninth Avenue. The task was given directly to Messrs. McKim, Mead and White, of this city, and the excellence of the result secured by this simple process of selecting architects of recognized ability, may well encourage other commissioners and committees to a similar course.

It remains, however, to speak of the most important item in the scheme for improving the circuit of Prospect Park. This is the gateway for the main entrance on the Plaza, which it is proposed to make a memorial to those citizens of Brooklyn who fell in the War for the Union.

Several years ago it was proposed to build such a monument on the Plaza, and a design was selected which would have cost \$250,000, and represented a huge drum surmounted by emblematical figures. But the Legislature voted only \$100,000 for the work, the design was fortunately abandoned, and the matter was turned over to the Board of Aldermen. This Board had almost decided to erect an isolated commemorative shaft, when it was suggested that the memorial should take the shape of a triumphal arch (such as has often been used for a similar purpose abroad and in our own country at Hartford, Connecticut), and should stand, not on the Plaza, but beyond it, forming the entrance to the park. This new idea was adopted, and the control of the scheme was placed in the hands of Mayor Chapin, the City Works Commissioner, and the President of the Grand Army of the Republic. Competitive designs were solicited by them for a monument which should cost \$250,000, and these designs have recently been on view in the Brooklyn Art Rooms, on Montague Street. An inspection of them has given no such grounds for satisfaction as were felt when the drawings for the wall and the smaller entrances were studied.

Just how the competition was organized we are unable to say, but, apparently, not in the only right and proper way—as one in which all the contestants were to be paid for preparing their studies, and in which their names were to be concealed until after the committee's decision had been made. All the sets of drawings, with one exception, were signed in full; and so few of the names thus revealed were well and favorably known, that the observer was forced to believe either that no intelligent choice among American architects had been made when the circulars were sent out, or that no payment had been promised which could induce self-respecting and busy practitioners to compete. The result was what might have been

expected. A more unscholarly and inartistic collection of designs it would be impossible to imagine, or one which should be further from representing the real status of American architecture in its best developments at the present day. It is impossible here even to hint at all the vagaries, trivialities, monstrosities and veritable nightmares in the shape of triumphal arches which the collection revealed, or the manner in which Romanesque art, especially, had been maltreated and caricatured in an attempt after magnificence of general effect and symbolic significance in detail. Suffice it to say that, in the large collection there was but one really good design, and two others to which a qualified word of praise might be given. The rectangular Romanesque castle-like building which the Messrs. Parfitt Brothers, of Brooklyn, showed as their second or alternate design, had a certain dignity and grandeur, and, by contrast with its fellows, much simplicity and good sense; and with certain alterations in matters of treatment—notably as regards the four angle turrets which surmount the roof—it might be made into a fine structure. But its form is hardly appropriate for a gateway—it is a building, rather than a triumphal arch—and its style alone would render it inappropriate for the place now in view. Mr. Page Brown's classic design, on the other hand, though sensible and scholarly, lacks beauty of outline, and is too heavy and utilitarian of air.

The one design which is really excellent in itself, and really appropriate, is the single one which was sent in without a signature. It shows a deep and lofty semi-circular arch, with figures of victories in the spandrels, above which runs in large letters the simple but sufficient legend: "To the Defenders of the Union, 1861-1865." This arch is recessed between two large and solid rectangular wings, from the front of each of which projects a colonnaded portico, bearing groups of sculpture. At the level of the springing of the arch these wings are encircled by a simple but effective cornice-string, and, together with the curtain of wall above the arch, they are crowned by a true cornice, simple again, but massive, and amply sufficient to cast an effective shadow. Above this cornice is an attic, with groups of pilaster-piers and circular openings between them, crowned itself by a lighter cornice; and the whole is surmounted by a group, finely suggested in the drawing, of Victory in a chariot with plunging horses. This group is exhibited on a separate sheet, so that the effect of the arch without it may be appreciated. Even without it the effect is fine; but of course a really good sculptured group would vastly increase beauty and dignity of air. The style is classic, with Composite capitals to the portico columns. The monument, as will be seen, is very simple, yet it is not too plain, for the porticoes and the three works of sculpture would give sufficient lightness and grace, and the cornices and strings and water-tables which alone relieve the massive side walls, are charmingly profiled and adorned. On the whole, it is an excellent, scholarly and appropriate design, and the judges would commit no sin in selecting it, although their fault would be great, towards Art and towards their fellow citizens, did they even think of selecting any other among those as yet submitted. It seems strange that the necessity should not at once have been recognized of limiting the contestants to classic designs. Such designs having been chosen for the other gateways, common sense, not to speak of good taste, dictates that no Romanesque or other alien style should be chosen for the main gateway. It has not yet been announced that a decision with regard to these designs has been arrived at by the committee, so it is, perhaps, not too late to say that three courses are open to it—either to select the unsigned design just described; to put the work directly into the hands of the able architects who have undertaken the rest of the park inclosure; or to open a fresh competition, inviting a number of competent artists to take part, paying them fairly for their labor, and prescribing that only designs in a classic style shall be submitted.

The National School of Horticulture at Versailles.

THIS admirable institution for the education of practical gardeners dates from the year 1874, and is probably the best of similar schools in Europe. Its present situation is historically an interesting one and is well suited for the purpose, though perhaps the soil is rather too heavy and cold. As early as the year 1679, this piece of ground was laid out as a *potager* or kitchen-garden for Louis XIV., and for years, centuries even, it supplied the royal and imperial tables of France with vegetables, fruits and flowers.

It is entirely a free school, and the only requirements of admission necessary are, that the student on entering should be between seventeen and twenty-seven years of age, and that he should pass an easy examination in reading, writing, spell-

ing and simple arithmetic. The regular course is for three years and at the end of each year an examination is held covering the work gone over. Those students who fail to pass this examination cease to be members of the school. Those who pass a satisfactory final examination at the end of the course receive a certificate from the Minister of Agriculture.

The work of the school is divided into eleven departments: 1. The cultivation of fruit trees in the open air and under glass; 2. The cultivation of ornamental and forest trees; 3. The cultivation of vegetables in the open air and by forcing; 4. The cultivation of flowering-plants in the open air and by forcing; 5. Elementary and descriptive Botany; 6. Principles of Landscape Gardening and Garden Architecture; 7. Elements of Physics, Meteorology, Chemistry, Geology and Mineralogy as applied to Horticulture; 8. Elements of Zoology and Entomology as applied to Horticulture and Arboriculture; 9. Geometry and Arithmetic necessary for gardening purposes; 10. Linear design and the sketching of plants and implements; 11. French Language and Book-keeping.

Instruction is given by means of lectures and recitations. In addition every student is expected to actually do his share in the necessary manual labor required for the maintenance of the gardens. The time is so divided between the theoretical and practical branches of instruction, that all the students take a part in the work of the garden every day, and divided into squads of ten or more under the guidance of well-trained master gardeners, they spend at least a fortnight in each department of the garden, thus acquiring the manual dexterity which is so indispensable. In addition to the instruction given in the school, the students are taken from time to time to visit the large horticultural establishments in France in order to make them familiar with the methods employed in them.

Good permanent collections are all the time being formed, and already there is one of seeds and cones, one of wood-specimens, a large herbarium, a quantity of models of fruits, etc., a collection of animals, birds and insects harmful to vegetation, and an excellent library. There is also a living collection of trees and shrubs, but this is in rather bad condition at present owing to overcrowding on account of lack of space and consequent heavy pruning. It serves, however, to make the students familiar with the more common varieties usually found in gardens and furnishes a constant supply of herbarium specimens.

Much attention is paid here to the espalier system of growing fruit trees, now so popular in France, and this school has, without doubt, done much towards diffusing information as to this method of growing fruit in the open air.

Paris, 1888.

H. S. Codman.

Foreign Correspondence.

London Letter.

AFTER a week of heavy fog the unusually mild and sunny weather has returned, which, at the beginning of December, had such an extraordinary effect on vegetation. The poisonous gases of a London fog destroy most white flowers, a foggy day leaving such flowers as those of *Phlox*, *Calanthe*, many *Begonias* and white *Chrysanthemums* withered or limp, as if they had been dipped in boiling water. The recent fog has done a great deal of mischief here, very few choice flowers of any kind remaining in London gardens.

In the markets the principal plants are the same as those we had at least five years ago:—*Epiphyllums*, *Erica hyemalis*, *E. caffra*, *E. gracilis*, Roman Hyacinths, Lily-of-the-Valley, Tulips, Marguerites, Primulas and Poinsettias. It takes a long time for a new and useful winter-flowering plant to gain favor with market-growers, so that, notwithstanding the numerous good plants of recent introduction, the market-favorites here are almost identical with those grown a generation ago. No one suspected that *Epiphyllum* would prove a good market plant, till one of the shrewdest and most enterprising of London market-growers tested it and found out its worth. The cut flowers of the season are the same as of old. We have *Gardenias*, *Eucharis*, *Tuberose*, *Stephanotis*, forced *Lilac* and a few other things of less importance. All these are abundant, and they are always in great demand. I am told that flower-growing in winter is done better in the neighborhood of New York than in England. Probably the advantage you have in drier, brighter winter-weather will account for this. Cut flowers are very abundant here this Christmas.

FREESIAS.—These beautiful cape-bulbs are amongst the very best of the newer additions to winter-flowering green-house

plants. It is only about five years since they were brought into notice, and now they are in almost every garden. But their cultivation is not yet properly understood, save by a few. They are as easily managed as Roman Hyacinths; but one point of special importance must be observed. This is, the plants ought to be kept growing all the year round, not rested, as is the usual practice. The best plants in flower now have spikes two feet high, with from four to seven branches and many large, pure white, deliciously fragrant flowers. These have not been rested since they flowered last year, but kept watered and shifted into a size larger pot in May. Bulbs which were dried off and rested dry have not produced nearly such fine spikes. It is true that at the Cape, where Freesias are native, they undergo a long period of drought and enforced rest, but nature is not always the best guide in regard to the cultivation of other plants besides Freesias. There is only one really first-rate kind, and that is the one known as *F. refracta-alba*. All the known kinds are varieties of one, or at most two, species.

LACHENALIAS.—The first species to flower here is *L. pendula*, and, taken altogether, this is the best of all. It blooms early, lasts a long time, the flowers are the largest, most numerous on the spike, and their colors are attractive. The species varies somewhat, the best form having erect spikes, fifteen inches long, with from thirty to forty flowers on a spike, each flower one and a half inches long, of good width and substance, and colored vermilion, marked and tinted with sea-green and purple. *L. quadricolor* (syn. *L. tigrina-Warei* and *L. superba*) is also in bloom. It is a variety of the old and common *L. tricolor*, which every one grows, or should grow, and of which we have several other distinct and pretty varieties. This has erect spikes nearly a foot long, with from ten to fifteen nodding flowers, each one inch long; the sepals, yellow tipped with emerald green, half as long as the petals, which are greenish-yellow, banded at the apex with brown-purple. Well grown plants of these two Lachenalias make a fresh and pretty display in December and January. The genus is limited to the Cape, where there are about thirty species. They are commonly known as Cape Hyacinths. If not already well known in American gardens, they deserve to become so. We grow large quantities of most of those above named for the conservatory in winter and early spring.

SKIMMIA FOREMANNI.—A group of small, bushy plants, grown in pots and covered with berries, was exhibited at the last meeting of the Royal Horticultural Society under this name. The berries were in large clusters, as in the Holly, about the size of small peas and shining coral-red in color. The plants were very ornamental, and exactly of that character which is certain to prove valuable for Christmas decorations. Mr. Foremann, nurseryman, of Eskbank, Dalkeith, professes to have obtained them by crossing *S. fragrans* and *S. oblata*, but they look rather like a seedling sport from the well-known *S. Japonica*, though they promise to be much more useful in the garden than even that good old plant. Mr. Foremann states that the berries remain on the plants eighteen months or two years.

CYDONIA MOERLOOSEI is a new variety of *C. Japonica* recently obtained by Messrs. Veitch, and till lately flowering in their nursery at Coombe Wood. In a mild winter it is usual for *C. Japonica* to develop a few straggling flowers; it has done so somewhat freely this month. But *C. Moerloosei* was covered with bloom and buds in mid-December, so that if the mild weather continues it will be in full bloom at Christmas. This free-flowering plant would probably be worth growing in pots for the supply of cut bloom in mid-winter. The flowers are scarlet, and larger than in the type. Apparently there is another variety, with white and carmine flowers, under the name of *C. Moerloosei*, in continental gardens.

BOUVARDIAS.—I am told that these plants are grown a great deal better in America than we can hope to grow them here, owing, no doubt, to your bright winter sun. In England no one grows them better than the Messrs. Low, of Clapton, where I saw half a dozen enormous houses full of them, all either in full bloom or in bud. The single-flowered varieties are beautiful, President Cleveland being perhaps best of all. But the doubled-flowered kinds are ugly, stiff, ungainly, bearing the stamp of monster on every petal. I believe they all originated in America. Would it be asking too much if one requested your Bouvardia raisers to burn all the double sports they get and limit their efforts to singled-flowered varieties? Many double flowers are ugly; double Bouvardias are especially so.

CHRISTMAS ROSES are in glorious perfection in sheltered borders out-of-doors here. Some of the clumps bear each fifty or more flowers, all expanded, pure white or rose-tinted, and

promising to remain in beauty for weeks if the fog will only permit them.

PLATYCLINIS.—These plants are better known by the garden name of *Dendrochilum*. Several species are flowering at Kew, the two best being *P. Cobbiana* and *P. uncatata*. I suppose these plants are well known in America, and I only notice them here for the purpose of stating a fact which may not be known to all growers, in regard to the temperature they like best. Until about three years ago we grew them in our East India house, treating them as distinctly tropical Orchids. They thrive under such treatment for a time, and then weakened, becoming spotted and sickly. On removing them to the Cattleya house they improved, and have continued to do well and flower freely every winter since.

MAXILLARIA GRANDIFLORA is the best of those species which thrive in a cool house. It is much superior to *M. venusta*, its nearest affinity, the leaves being less apt to spot and the flowers better in shape and more upright. Each flower is elevated on a peduncle six inches long and is nearly four inches across, pure white, save the soft yellow of the front lobe of the labelum and the tinge of rose on its two side lobes. The flowers are fragrant and remain fresh at least a month.

BROMELIADS.—There is a very large collection of these plants at Kew, some of which are always in bloom. The order is not popular in England, a few only, such as *Tillandsia Lindenii*, being recognized by horticulturists here. In Continental gardens these plants are as popular as Orchids are here. The late Professor Morren had a large range of houses filled with all kinds of Bromeliads, which made a glorious display of a very interesting and exceptional kind at all seasons. Such fine genera as Billbergia, Vriesia, Æchmea and Pitcairnea are now represented by flowering examples at Kew, where, singularly enough, they are as much admired by visitors as the best of Orchids.

December 21st, 1888.

W. Watson.

New or Little Known Plants.

An Addition to the Trees of Florida.

IT is only after a good deal of hesitation and a careful examination of the material which illustrates the American species in the herbaria at Kew, Paris and Berlin, that I venture to propose a new species in the large and very difficult tropical genus *Eugenia* for a Florida tree which none of the described species with axillary inflorescence at all resembles.

Eugenia Garberi, nov. spec.,* which is figured upon page 29 of the present issue, is, in Florida, a tree fifty to sixty feet high, with a straight trunk, eighteen to twenty inches in diameter, covered with thin, bright red bark, separating freely into thin, flaky scales; the branches are rather stout, upright and covered with reddish bark; the branchlets are round, very slender and ashy gray. The leaves are an inch and a half to two inches long, and a half to nearly three-quarters of an inch wide; they are ovate-oblong, acute, or more rarely somewhat rounded at the base, and gradually contracted at the other end into a long, obtuse point; the margins are revolute and thickened. The leaves are very coriaceous, dark green and glandular-punctate on the lower surface; the mid-rib is prominent, and the primary veins are connected near the margins, and form a conspicuous line nearly parallel with them. They are borne on stout petioles one-third to nearly one-half an inch long. The flowers, which appear in September, are small, hardly more than an eighth of an inch across when fully expanded, with short, rounded, obtuse sepals and nearly round white petals. They are produced in several-flowered axillary umbels upon glabrous, slender pedicels, which about equal the peduncles in length, and have two minute, acuminate, deciduous bracts just below the flowers. The ovary is two-celled, with numerous ovules. The fruit, which matures in March and April, is

* *EUGENIA GARBERI*, nov. spec.; arbor mediocris; ramulis novellis teretiusculis, glabris; foliis petiolatis, ovato-oblongis, obtuse longiuscule acuminatis, basi acutis, vel sub-rotundatis, glabris, rigide coriaceis, margine revolutis, subtus minute punctato-glandulosus, nervis mediis supra vix impressis, subtus prominentibus, venis tenuibus, arcuatis limbinervis, utrinque reticulatis; pedicellis glabris, umbellatis, axillaribus, 4-floris, sub. flore bibracteatis, folio 4-5-plo brevioribus; sepalis 4, ovatis, membranaceis; petalis subrotundatis; ovaris, bicoloris, loculis multiovulis; baccis calyce coronatis, sub-globosis vel obovatis, longe-pedunculatis, x-spermis, coccineis.

Habitat in silvis Floridae australis, et in insulis New Providence et Antigua. E. PROCERA, Sargent, Reports Tenth Census United States, ix., 89, in parte.

round or obovate, a quarter to a third of an inch in diameter, crowned with the calyx-lobes, one-seeded, and bright scarlet when fully ripe. The wood is very heavy, exceedingly hard, very strong, close-grained and compact; bright orange-brown, with somewhat darker sap-wood. This tree grows very slowly, the specimen in the Jesup collection in the American Museum of Natural History (now labeled *E. procera*) is but twelve and a half inches in diameter, and shows 155 rings of annual growth, with fifty-one rings of sap-wood.

Eugenia Garberi occupies a rich hummock or low island, raised somewhat above the level, sandy, Pine-covered plain which separates Bay Biscayne, in the extreme southeastern part of Florida, from the Atlantic Ocean, and situated about three-quarters of a mile east of the mouth

noviana) here replacing the more northern Sassafras; while the margin of the bay, a few hundred feet away, is lined with the Red Mangrove (*Rhizophora*), the familiar inhabitant of tropical shores, and here attaining in the United States its greatest size.

Eugenia Garberi has been detected also by Curtiss upon Old Rhodes and Elliott's Keys, two of the Florida reef-keys west of Bay Biscayne. It was collected by Brace upon the Island of New Providence in 1878 (Herb. Kew., without flowers and fruit), and by Dr. Nicholson, in Antigua (Herb. Kew., without flowers and fruit and without date).

It is by far the largest, as well as the most beautiful, of the species which occur in Florida, and may commemorate fitly the botanical services of the late Dr. A. P.



Fig. 87.—*Eugenia Garberi*.—The flower and fruit much enlarged.—See page 28.

of the Miami River, and close to the shores of the bay (*Garber* (1877) in flower; *Curtiss, Sargent*). It is the most common, and, with its bright red bark and lustrous foliage, by far the most conspicuous object in this particular spot, which is one of the most interesting in the United States for the student of trees; for here, and in no other place with which I am acquainted, are seen trees of the typical North American flora mingling freely with tropical West Indian species. Here, in an area of a few acres, besides this *Eugenia*, are found the Live Oak of very large size, the Red Mulberry, the Palmetto, the Pine (*Pinus Cubensis*), the Mastic (*Sideroxylon Masticodendron*), the Gumbo Limbo (*Bursera gummifera*), the Iron-wood (*Condalia ferrea*), the Marlberry (*Ardisia Pickeringia*), the Busic (*Dipholis salicifolia*), the Calabash (*Crescentia cucurbitina*), the Pigeon Plum (*Coccoloba Floridana*), the Lance-wood (*Nectandra Willde-*

Garber, of Pennsylvania, who, so far as I have been able to learn, was the first botanist who visited Bay Biscayne, and who was the discoverer of this species, which has heretofore been confounded in herbaria with *E. procera* of Poiret, a very different and much smaller plant, with smooth, gray bark, and thinner and less coriaceous leaves, larger flowers on longer pedicels, appearing in May, and large, black fruit, which ripens in November.

Six species of *Eugenia* are known in Florida. They are all trees, with the exception of *E. longipes*, Berg., a Cuban species, discovered upon No Name Key by Mr. A. H. Curtiss a few years ago, and not seen elsewhere within the territory of the United States. It is a low branching shrub, growing in an open forest of *Pinus Cubensis* and *Thrinax argentea*. The other Florida species (*E. buxifolia*, *E. dichotoma*, *E. monticola* and *E. procera*) are,

with the exception of the second, all common upon Key West, where they form, especially *E. buxifolia*, a large part of the forest scrub, and have been known as North American plants for half a century, or since their discovery on the Florida Keys by Dr. J. L. Blodget, who first made the botany of this region known.

The *Eugenias* are members of the Myrtle family. No less than 750 species have been described by botanists, of which nearly two-thirds are found in tropical and sub-tropical America. The genus, however, is widely and quite generally distributed through the warmer parts of the two hemispheres. Several of the species produce valuable fruit. The most important is *E. Pimenta*, which produces the allspice of commerce, and is largely cultivated in some of the West Indian Islands, especially in Jamaica. The well-known Jabuticaba fruit of Brazil is produced by *E. cauliflora*, and the Rose Apples of the East are the fruit of *E. Malacensis* and *E. Jambos*. Several species are grown in tropical gardens for their handsome evergreen foliage and fragrant flowers. C. S. S.

Cultural Department.

Lachenalias.

THE Lachenalias are bulbous plants, natives of south Africa. Their flowers are all pretty and interesting; some are very beautiful and a few are fragrant. They deserve to be better known and more widely cultivated than they are.

Their needs are few and easily provided for. Briefly stated, their requirements are: (1) A season of complete rest in the summer, when the bulbs may be left in the pot where they grew, or, better, may be taken out of the earth and put away in boxes or bags; (2) a good supply of water and a moderate heat in their growing season; and (3) an open soil. Their culture being so easy and their habit of growth very neat and compact, and their spike of flowers so sure to appear, they are excellent for window-gardening as well as for more extensive planting in green-houses or frames.

I propose in this paper to name all the species of the genus, giving notes and descriptions of the kinds I have grown, with some account of a few of the varieties which occur in a natural state. Of hybrids there are as yet very few. Neither *L. Nelsoni* nor *L. Cami* is an improvement upon the best forms of *L. tricolor*, from which both are descended. I have not yet flowered the series of hybrids offered by Dammann & Co., nor do I expect to be very much pleased with them, for the pendulous-flowered species are not the most promising.

Lachenalia pendula is an exceedingly beautiful species. Its flowers are of a bright coral color; the three inner segments—which, as in all the species, form a tube inside of the three shorter outside ones—are tipped with deep purple and green. This species is the earliest of all to blossom. If its bulbs are potted, as they should be, about September 10th, they will be in blossom by the end of November. Although so showy, *L. pendula* does not depend upon insect-fertilization, but forms fertile seed abundantly, being the only species, so far as I know, which does this. Bulbs purchased under the name of *L. pendula* very often prove to be *L. tricolor*.

The last named species, though very pretty, is inferior to *L. pendula*. It is of weaker growth, and its flowers are much smaller, being usually not over seven-eighths of an inch long. The colors are deep yellow as a ground, with green on the tips of all six segments and deep red at the base of the flower. As the flower grows older the red and green fade, and the yellow alone remains.

L. tricolor has two varieties, which are almost, if not quite, equal in beauty to *L. pendula*. These are var. *luteola*, which is twice as large in flower as the type, and much superior in color, which is a full, deep golden yellow, and var. *quadricolor*, a magnificent kind, whose colors are crimson, deep yellow, emerald green and violet in about equal proportions. Both of these varieties are larger than the type in all their parts, and increase by offsets much more rapidly; they have the same beautifully spotted leaves. The variety *quadricolor* is often sold under the names of *superba* and *versicolor*.

L. rubida is rarely found under its true name in catalogues, but is usually offered as *L. contaminata*, a widely different plant. A few years ago I bought as *L. rubida* and *L. stolonifera* two bulbs which I found would not blossom under ordinary conditions, though they multiplied rapidly. Tired of the vain attempt, I planted them out-of-doors and let them take their chance. The next spring they came up, much to my

surprise, and grew vigorously, but did not flower. I spoke of the hardness of these Cape bulbs to several persons, who were as much surprised as I had been. A few weeks ago a note appeared in an English paper to the effect that the writer had persuaded both of these to blossom, and found that they were identical, and not Lachenalias at all, but Scillas. Since then I have had the true *L. rubida* (there is no *L. stolonifera*). It is a very pretty kind, with broad leaves, faintly marked with dark green. Its flowers are eight to ten in number, an inch and a quarter long, deep pink, spotted and freckled with other shapes of the same color. It is Jacquin's *L. tigrina*.

L. contaminata has four or five long, narrow leaves, and a flower-stalk thickly set with greenish-white flowers, with brownish-purple-tipped segments and conspicuous green seed-vessel. The position of the flowers is as nearly erect as their crowded condition will allow. The flowers are not showy, but they have the merit of fragrance. It is sometimes sold as *L. orchoides*, but the true *L. orchoides* is very different.

L. orthopetala has from twenty to thirty white flowers, somewhat tinged outside with purple, and not very showy.

L. orchoides is very variable, and not easy to get in any form. The one I have shows numerous yellow, red-tipped flowers, purple in the bud, and very fragrant. Plate 854 of the *Botanical Magazine* represents a far less showy variety, having the outer segments green and the inner dark purple.

L. glauca is exceedingly variable, and highly ornamental in all of its forms. Andrews (*Botanical Repository*, t. 460) gives, under the name of *L. sessiliflora*, a bright rose-pink variety of this species, and the *Botanical Magazine* (t. 3552) gives one almost white, tinged with purple and spotted with blue. The form I have is, I think, the most beautiful of all Lachenalias. Its leaves and flower-stems are strongly and thickly mottled with chocolate-purple. The flowers are about twenty-five in number, violet and indigo in bud, becoming, when open, the color of a robin's-egg, with white or flesh-colored tips, and shading off in sea-green. They are about an inch in length, and incline upward. This is sometimes sold as *L. reflexa*; sometimes as *Calanthus complicatus*.

L. pallida, sold sometimes as *L. carulescens*, is exceedingly beautiful, being, in its best form, light blue, with one inner segment much expanded like a lip and marked with lemon-yellow. Another inferior form has outer segments dark blue and inner ones light green. There are one or two other forms which I have not seen.

L. unifolia has a single rolled-up leaf, expanding, however, as it rises, the lower part of which is mottled and lined with crimson and gray, like a water-snake. The flowers are short and broad, much like the Lily-of-the-Valley. The outer segments are blue, running to red; the inner, white and green.

L. isopetala is very handsome in its best form, having bright rosy flowers an inch long. Another variety is so inferior as not to be worth describing. I see no reason for its name.

L. pustulata has erect flowers of small size, light green and very fragrant. The leaves are curiously blistered.

L. anguinea has most singular leaves, so strongly blotched with light green on a dark-green ground, as to resemble a snake. The flowers are whitish and not attractive.

L. lucida has nothing of horticultural interest except the perfume of its flowers, and even that has a somewhat disagreeable sweetness. I have grown it for many years as *L. fragrans*, under which name it is sometimes sold.

L. racemosa has postulate leaves, and flowers which are placed horizontally on the stem, whose three inner segments are white, tipped with purple, and whose outer are much shorter, white, tipped with olive. About thirty are borne on a stem, and are somewhat fragrant.

L. purpureo-carulea has blue and dull red flowers and blistered leaves. It is not very attractive.

L. reflexa (syn. *Calanthus complicatus*) is the least showy of all I have seen. The flowers are very small and few, greenish-yellow, marked with dull red.

The following species constitute the remainder of the genus. I have some of them, but they have not yet blossomed, and I cannot describe them: *L. patula*, *liliflora*, *carnosa*, *Zeyheri*, *convallarioides*, *hirta*, *Cooperi*, *juncifolia*, *versicolor*, *violacea*, *nervosa*, *Bowieana*, *bifolia*.

Canton, Massachusetts.

W. E. Endicott.

The *Arctostaphylos Uva-ursi* seems a much neglected evergreen. I passed a clump of it to-day that covered a space of six square feet. Planted in light, sandy soil, it is exactly suited, and soon spreads so that the ground is completely covered. At this season of the year its shining leaves are of a dark chocolate color above and redder beneath. There are many positions which it would fill well.

Germanstown, Pa.

Joseph Meehan.

New Chrysanthemums.

DR. WALCOTT'S article in the issue of December 29th must have interested all Chrysanthemum growers. As he has stated, new offerings have been so numerous lately (S. Delaux alone putting out 100 in 1887), that no one grower has been able to test them all. As I have had strong slips of the most promising foreign varieties, I can add a few names to those given. Of recent French varieties, Madame Baco is distinct—a rose colored Mrs. Bullock. Of Delaux's list for 1887, William Cobbett (salmon, with a violet cast) is a first-rate addition to the October flowering varieties. Royal Aquarium (white, with violet tips) is good for the same season. With the numerous early varieties

remarkably fine; Ralph Brockelbank (yellow sport of Meg Merrilies), identical with the original in form and size; William Stevens (orange, shaded red).

Ed. Audiguier has distinct flowers, but bluish-red. To the list of American importations may be added The Bride—a first-rate white. (Is this Avalanche?) Has any one found any prizes among the American seedlings of 1888? Many of the prize kinds failed to give me any results from the forced slips sent out, while of numerous kinds under trial, E. Oakley (Spaulding) is the only one to be saved—it is a medium-sized flower of the clearest, brightest light chrome. J. Thorpe (Spaulding) is marked for a discard, its blue-red not being counterbalanced by enough good qualities. Judging from



A Japanese Stable.—See page 26.

one can now have, if desired, a show of large flowers from early September onward. Of the general list, Mr. Garnar (canary and bronze), Arthur Payne (deep red), Charles Waggstaff (fine white) and Mina (white, striped with pink) have proved best with me. Duke of Berwick has met with most success, but with me its beauty is doubtful. Among others of the same list, perhaps Samuel Morley (red, early), Hogarth, Priscilla and Madame Payne may develop better on a second trial. Lord Mayor I shall try again on Dr. Walcott's recommendation. Le Reveil is a very large quilled ball, of no great beauty. Of Cannell's Japanese collection, Mr. H. Cannell seems to me only fit for exhibition boards. Lady Lawrence is R. Bottomley repeated. There seems some confusion as to Mrs. Cannell, several different plants having been sent here so named. Edward Molyneux is easily first of this list. Of English kinds, mostly sports, I can recommend Mr. Charles Gibson (bronze, sport of Mrs. N. Davis); Miss Annie Lowe (primrose, sport of Lady Margaret), a very fine and lovely flower; Carew Underwood (bronze, sport of Baron Prailly), a very large and light flower,

appearances, we shall have the best lot of American seedlings in 1889 ever sent out. The plant of Mrs. A. Carnegie, shown in New York, scarcely allows a doubt that this is a very valuable variety for general culture; for exhibition its merits were well shown in a few specimens. It seems to be a decided step toward a dark, wide-petaled, self-colored flower.

The market value of novel Chrysanthemums has evidently not yet reached its limit, since M. Delaux holds a small stock of a new variety at 10,000 francs. The interest in Chrysanthemums, too, is extending, and a national society, with a committee to which new flowers could be referred for endorsement, would be a help to amateurs and the trade as well. Too many new varieties are now offered at high prices with the simple endorsement of the raiser, no doubt in most cases given in perfect honesty, for every one who has raised seedlings will understand how difficult it is to take an unbiased view of one's own productions.

Elizabeth, N. J.

J. N. Gerard.

Orchid Notes.

Cattleya Triana.—This magnificent winter flowering Cattleya has now commenced to enrich our Orchid houses with its large and very handsome blossoms. A great treat is in store for those who may visit the collections of Messrs. Kimball, Corning, Ames and others, where these plants are to be seen rapidly developing their enormous flowers, which are remarkable for great variation and brilliancy of color. At a recent visit to Mr. De Forest's Orchid houses at Summit, New Jersey, this Cattleya was seen by the thousand, abundantly furnished with foliage and literally covered with flower sheaths. Some flowers were already expanded, having label-lums of a fine magenta purple, and exquisitely fringed. Besides this variety, there were hundreds of *C. Mossiae*, *C. Bowringiana*, *C. Percivaliana*, *C. Gaskelliana* and many other free flowering varieties. It is safe to assert that the possessor of this vast number of plants is the largest Cattleya-grower in the country. As a florist's flower, *C. Triana* is fast becoming popular, as it blooms at a season when flowers are in great demand, and its easy culture, with the abundance and lasting quality of its flowers, make it a specially desirable Orchid. During the months of March and April importations of this species generally arrive. They are then in a dormant condition, and this will also be found a very convenient season to commence establishing them, as the spring and summer months enable the plants to make strong and satisfactory growth. They enjoy a mixture of rough fibrous peat, clean sphagnum in small quantities, with charcoal added, which last is a sure preventive of stagnant compost. When making their growth full sunlight should be kept from them carefully, as the foliage is not so robust as that of *C. El-Dorado*, *C. speciosissima*, *C. Walkeriana*, and such varieties. All thin-leaved Cattleyas, such as *C. Mendelii*, *C. Chocensis*, *C. Gaskelliana*, *C. Percivaliana*, would grow as well if not fully exposed to direct sunlight, as good, sturdy growths and bold, substantial blossoms are easily obtained by giving the plants a thorough rest after flowering, and an abundant supply of pure air and moisture during their growing period. A. D.

Principles of Physiological Botany as Applied to Horticulture and Forestry.

III.—THE ABSORPTION OF LIQUIDS BY PLANTS—THE TRANSFER OF WATER FROM THE SOIL TO THE ROOTS.

THAT plants have in their composition a large proportion of water is a very familiar fact. The amount of water differs in different kinds of plants, in different parts of the same plant, and, as has been repeatedly shown by experiment, in the same part at different seasons. Illustrations of these differences will occur to every one upon reflection, and do not require to be further examined at this time. But, back of these differences lies a fact that a certain percentage of water in plants is essential to their activity. When this amount is diminished below a certain point the activity of the plant is diminished, and, if the lack is long-continued, the life of the plant is imperiled. The first case is well illustrated by the slow ripening of seeds, the latter is too often illustrated in times of drought.

Part of the water in the plant exists as liquid water in the sap of the active cells. In what are popularly called the pores of wood—namely, the microscopic tubular bodies known as ducts—produced by a peculiar development of coherent cells—it is rather uncommon to find any liquid water, although this does occur at times. The sides of the ducts are moist, and the whole wall seems to be saturated with water, but the cavities themselves do not generally contain any water at all. In these and similar cases it is believed that the water exists in a combined state so thoroughly incorporated with the substance of the walls of the long cells and ducts that it cannot be discerned as water. But it can be proved to exist there by the simple experiment of drying the whole. It is not, however, very clear in what way the water is combined with the cell-wall substance in plants. One theory, which has met with general recognition as capable of explaining a large number of facts, is that the water surrounds each structural molecule as a delicate film which is practically continuous with the films nearest to it, and thus all the water throughout the plant is a connected whole which, under normal conditions, is in a state of equilibrium very easily disturbed. Thus it can be disturbed by the evaporation of the films of water around the structural molecules in foliage, which makes a demand upon the supply of water below the point of loss, and so on down the whole stem, until the roots are reached, and here, of course, all further supply must come from the soil. This

transfer can be easily examined in the case of our forest trees and shrubs after we have ascertained the manner in which the loss from evaporation can be made good by means of the roots. Under ordinary circumstances no water even in the state of vapor is absorbed by leaves.

MICROSCOPIC STRUCTURE OF ROOTS.—The structure of roots can be most readily understood by confining our attention at first to the parts of the root which are near the end of the delicate root-branches. These parts may be considered in the order of their succession, beginning at the very tip. The extreme tip has, in the case of our common plants now under consideration, a well-marked cap of a protective nature, made up of somewhat flattened cells constituting a hollow cone, in the inner angle of which is a group of cells. Each of these cells is completely filled with protoplasm, and is actively engaged in the work of producing new cells; hence the group is conveniently known as the "growing point." New cells are formed in front and around this growing point, and these new cells, through changes in their size and shape, serve to extend the rootlet by terminal growth. Thus the minute rootlets are ever reaching forth into new soil, into the crevices of which they can, owing to their minute size, make their way. After they have crept into the interstices of the soil, they thicken up sooner or later, while far ahead of the thickening parts is the still advancing point of growth protected by its root-cap.

The tip of the root is not, however, a passive thing, merely pushed forward by something behind it; it possesses sensitiveness and the power of spontaneous motion. It is constantly revolving within a very narrow orbit. When it is in the soil, this motion is wholly obscured by the crowding of the particles of earth, nevertheless by this restricted motion in a cramped space, the tip can work along almost as if in search of a pathway. Moreover, the tip by its dull sensitiveness can distinguish between particles of soil which have different physical properties, and thus, one might say, choose its course. The description of the marvelous faculties possessed by the tip of the rootlet, as given in the "Power of Movement in Plants," is among the most interesting of the writings of the late Charles Darwin.

ROOT-HAIRS AND OTHER ABSORBING CELLS.*—It was formerly thought that the tip of the root, having, as appears under the microscope, a sort of spongy structure, is the efficient agent in soaking up moisture from the soil. But it is now well known that it is the cells which lie just behind the tip of the young rootlets which perform the work of absorption. These thin-walled cells on the surface of the rootlet, just behind its tip, are in most cases associated with peculiar cells which have slender outgrowths or prolongations like hairs, and these are sometimes so thickly crowded together that they give to the narrow zone the appearance of white or almost colorless velvet. The root-hairs are transient, working actively for a time, and then falling off, but the newer parts of the extending rootlets are continuously provided with fresh ones, and thus the supply of absorbing organs is constantly increasing just in proportion to the branching of roots and the formation of new rootlets, each of which is, of course, furnished with its zone of plant-hairs. And, furthermore, from the manner of growth, the new root-hairs are formed just where they can find fresh soil for their work of absorption, ever foraging through new fields.

The root-hairs come into most intimate contact with particles of soil, and undergo, in many if not most cases, a modification of their walls which may be said to glue them to the contiguous particles. It is probable, but not yet positively proved, that they exert a slight solvent action even upon some sorts of soil which appear to be otherwise practically insoluble in any aqueous solutions. As we shall later see, when we examine the action of the tip during the process of growth, there is always a slight excretion of an acid at the tip itself. Soil-water, as well as the water of our rivers and ponds, contains in solution small amounts of various mineral and other matters, and these in certain proportions are absorbed by the rootlets through the mechanism before described. The mineral substances are, for the most part, compounds of the following elements (chiefly with phosphoric and sulphuric acids, together with chlorine): Calcium, magnesium, potassium, iron, and others in smaller amount. Besides these, certain compounds of nitrogen are absorbed. The origin and destination of all these substances will be discussed when we take up the subject of nutrition.

OSMOSE.—Absorption of liquids takes place through the activity of the superficial portion of the thin layer of proto-

* Another possible manner in which roots may absorb will be taken up for consideration in a subsequent paper of this series.

plasm which lines the newer cells just back of the tip of the rootlets. When two liquids which can diffuse through one another are separated by a membrane which the two liquids can moisten, diffusion goes on rather more rapidly than if no membrane were interposed. The process is termed osmose. But in the case of such a membrane as parchment and those formerly used in experiments, it was found that there was always an outgoing current to replace the incoming one, and that these currents, if one can call them such, had certain relations of equivalence to each other. Now, as there is no true compensatory outward current in the case of absorption by root-hairs, it was beginning to be felt that the theory of osmose, as formerly understood, was inadequate to explain the taking up of matters from the soil. Professor Pfeffer has shown within a few years that in some artificial membranes, which are very nearly like those of the root-hairs, there is for a time a process of repair going on, by which the activity of the artificial membranes is constantly renewed, and in such cases, just as in that of the root-hairs, there is no compensatory outward current to be observed. Thus strengthened by Pfeffer's contributions, the theory of osmose has again taken its place as sufficient to explain the process of root-absorption, or, rather, speaking more generally, the absorption of liquids by any active cells. It is as yet impossible to understand clearly the ultimate nature of the force at work in osmose. We know that it is correlated with certain molecular activities, such as electricity, and that its principal seat in plants is in the surface of the film of protoplasm which lines living vegetable cells. We know also that it is related to imbibition and to capillarity, as these are manifested in non-living matter. Furthermore, we know that the capacity of the protoplasmic matter in cells, for the repair by which osmose can alone be continued, is limited in some cells sooner than in others; but why the chemical changes underlying repair should cease in root-hairs sooner than in some other cells of the plant, is, thus far, beyond the reach of experiment. We know, however, that when the power of osmose fails in the root-hairs or in the cells near these, the work of absorption is taken up by others which are freshly formed, and these new ones are, in their turn, soon replaced by others. In every case the new ones are produced in new soil, where fresh materials can be obtained.

George Lincoln Goodale.

Cambridge, Mass.

The Forest.

The Forests and Woodlands of New Jersey.—I.

THE following is the first part of a report on the forests and woodlands of New Jersey which has been prepared for the final Report of the Geological Survey of that State by J. B. Harrison, Secretary of the American Forestry Congress. Advance sheets have been kindly furnished to GARDEN AND FOREST by Professor George H. Cook, Director of the Survey.

The area of the woodlands in New Jersey is about 41.5 per cent. of the surface of the state. This area is slowly diminishing, but the diminution has been but slight during recent years. In the mountain regions of the northern part of the state, some small fields that were once cleared and cultivated are relapsing into forest. Seedling trees are encroaching upon them from all sides, and the woods are re-establishing themselves in their ancient dominion. There are instances of the same thing in southern New Jersey; but they are few and unimportant, and in the whole state the area of land once cultivated which is being again surrendered to forest growth is very small.

Wherever the soil is worth cultivating, on the plains and in the river-valleys, and even on the hills in the limestone lands of the northern part of the state, a little more of the remaining woodland is cut off and cleared up each year. In the Pine country of southern New Jersey some considerable tracts have been cleared for farming purposes within a few years.

Considering that the state has been settled so long, the proportion of forest land is very large. The soil varies greatly in quality. In the limestone regions and in the river-valleys in the northern part of the state, much of it is very fertile, and the growth of the trees is rapid, while on the granite and slate lands the soil is thin and poor, and the trees grow much more slowly. On a few small tracts there is so little soil, that when the forest is once cut off it does not reproduce itself. That is, the new growth is so scant and scrubby that it has no value as timber. But over the whole state, with this very slight exception, the forest grows again after it has

been cut off, the deciduous or hardwood trees sprouting up from the stumps and the evergreens coming again from the seed.

The time required to reproduce the forest after it is cut off varies according to the differences of soil and the habit or character of different kinds of trees. In the fertile lands of Salem County, and in other parts of the state, trees will continue growing, and the value of a tract of woodland will go on increasing for a hundred years or more. But in some parts of the forest about Ringwood, and in other portions of the mountain region of northern New Jersey, the trees reach their culmination, or condition of greatest value, within twenty-five years after the former growth has been cut off, and it is then best to cut them again. Some tracts which have been standing for thirty-five years are no better now, the owners say, than they were ten years ago.

When the perpetuation of the forest is desired, it is best to cut it off a little before the trees reach maturity, as the succeeding coppice growth after young trees have been cut off is much more vigorous and rapid than the process of reproduction after an old or mature forest has been removed. Each new growth of timber is apt to be somewhat different from the one which it succeeds. Some kinds of trees sprout from the stump more vigorously than others. Chestnut, for instance, usually sends up a greater number of sprouts than any other kind of timber which grows in the region under consideration, and cutting off a forest composed of Chestnut, Hickory, Ash, Oak and other kinds of trees will often increase the relative number of Chestnut trees.

FOREST PRODUCTS.—The chief products of the forests or woodlands of New Jersey are lumber, shingles and other building materials, timber for bridges and ships, wagons and carriages, telegraph poles, railroad ties, posts and fencing materials, staves and heads for barrels, tubs and pails, hoop-poles, and handles for axes, agricultural implements and umbrella-sticks. Baskets, wooden ladles and spoons and spools are sometimes manufactured in the state, and wood-pulp to be used in the manufacture of paper is made in small quantities. The use of wood for fuel is general though not universal in the state, and charcoal is made in some places.

As is well known, large quantities of White Cedar timber were formerly "mined," or taken from underground, in swamps in the southern part of the state, but in most of these the available supply is nearly exhausted, what remains being mostly too far underground to admit of its being raised and manufactured with profit, though logs are still sometimes taken out. The same industry was formerly carried on in some of the northern swamps, though less extensively than in the south, and logs are even now occasionally raised in the north for materials for tubs and pails. Dense swamps of Tamarack (*Larix Americana*) were formerly a prominent feature of the forests in some parts of northern New Jersey, but they have nearly all been cut off, and the Larch does not appear to have reproduced itself to any great extent.

In some parts of the state many Christmas trees are cut for the markets of the towns and cities, and the boughs of the Holly, with its bright green and unfading leaves and its beautiful red berries, are gathered in large quantities in the month of December and sold in Philadelphia and perhaps in other places. In the spring and summer there is a very considerable traffic in wild flowers and plants of various kinds from the woodlands of the state. Great quantities of Water Lilies and Azaleas are sold, with the Trailing Arbutus, Iris, Wild Violets, *Xerophyllum asphodeloides*, *Helonias bullata*, *Pyxidanthra barbulata*, *Arethusa bulbosa*, the Pogonias and Calopogons, Clethra, Swamp Magnolia and other flowers.

The oil of sassafras is sometimes distilled in places in the southern part of the state, where also quercitron, a preparation of Black Oak bark, for dyeing purposes, was formerly made in considerable quantities. This latter industry appears to have been relinquished several years ago.

ORIGINAL FOREST.—There is not much really original or primeval forest left standing in New Jersey. That is, there are few, if any, large tracts of forest that have not been cut off at some time since the settlement of the state by white men. There is a small piece of White Oak woods on the farm of Mr. Thomas Lawrence, near Hamburg, in Sussex County, which has never been cut. These trees cover a remarkable hill, or long, narrow ridge, which rises eighty or a hundred feet above the fertile valley of the Walkill River, and one would have to travel far to find a more interesting or attractive grove. Though they stand very near to the busy haunts of men, the great trees are populous with gray squirrels, who appear to have learned to feel entirely comfortable and secure among them.

Correspondence.

Rare Trees of Rhode Island.

To the Editor of GARDEN AND FOREST:

Sir.—There are very few acres of undisturbed forest land in Rhode Island. Most of the land now devoted to wood-growing has been subjected to one, two, or more choppings, either by culling the best trees or by clean cutting. Yet, while this general deforestation has been going on, many single trees and groups have been spared, some of which have attained a large growth and a fine development of shape. Such trees are now not only objects of beauty in themselves, but add greatly to the pleasing scenic effects of the grounds where they grow. The location of the state with reference to ocean currents, and its greatly varied surface and soil, afford favorable conditions for a larger number of tree species than are usually found in such a small territory. Certain localities show a mingling of two quite distinct floras, and this is seen in the tree growth as well as in smaller plant life. Among trees, I will refer to a few species which, although rare and local in the state, flourish well when found.

The Swamp Spanish Oak or Pin Oak (*Quercus palustris*) is found along streams and in low grounds in the southern part of the state. I have been unable to find any record of the natural growth of this Oak anywhere else so far east. Of the eleven or twelve species of Oak indigenous to this state, this is the most free and graceful in its habit of growth, and one of the most ornamental in its general appearance. In open ground it has a symmetrical, rounded head, without the stiffness of most of the Oaks. Its limbs, slender for an Oak, divide into spray-like branchlets, bearing deep-cut, wide-spreading, shining leaves, giving the tree a cheerful aspect. Overhanging a stream or pool, it assumes a somewhat one-sided, drooping habit, the branches often touching the water. This tree is found, here and there, on the borders of the Great Kingstown Swamp and on the margins of the Pawcatuck River.

Another species decidedly local in the state is the Post Oak or Box White Oak (*Quercus obtusiloba*). The only specimens of this Oak, so far reported in this state, are growing near the shore of the most northern arm of Wickford Harbor, North Kingstown. There are trees there of this kind, in the edge of a wood-lot, which are fifty or sixty feet high; but in the open ground they form low, wide-spreading heads, the limbs bending downwards, with the lower ones actually resting upon the ground. The obtuse-lobed, glossy leaves, overlapping each other from branch to branch, form a living thatch of notable beauty.

The Tulip-tree (*Liriodendron tulipifera*), although only local in the state, is found in groups in several of the towns in the central and south-western parts. It grows to fine proportions, and is occasionally planted as an ornamental tree.

The Black Walnut (*Juglans nigra*) has been reported as indigenous to the state, but this is doubtful. But trees of this species have grown to stately proportions around some of the old homesteads, and young trees are now in thrifty condition where they may have been self-planted.

The Persimmon (*Diospyros Virginiana*) has been growing in a locality where it is highly improbable that any white man planted it. It may have been introduced by the Indians and have become naturalized. A Persimmon, which was standing some years since, measured three feet eleven inches girth at base, and three feet at seven feet up, and tapered gradually to a height of more than forty feet. This tree is now dead.

I will close by reference to some noteworthy Sassafras trees. A tree of this species of remarkable size stands upon the Spring Brook Farm, in Cranston, two or three miles from Providence. It is in a field of several acres, which has been cultivated for more than a century. It was probably saved on account of its size and beauty. A careful measurement, six years ago, gave the following results: Girth, near the ground, fourteen feet three inches; two feet up, eleven feet ten and one-half inches, with little diminution in its size to the limbs, eleven feet up. The height, computed by ratio from its shadow, was forty-nine and one-half feet. The tree has lost some limbs and shows other signs of great age; but its massive trunk, with its deeply furrowed bark, is still unbroken. It is a grand old sentinel, that has put forth its jaunty blossoms at more than a hundred seed times, and dropped its beautiful leaves at more than a hundred harvests, in the ground over which it has watched.

A group—or, rather, an irregular row—of trees of this kind, numbering over sixty, stands by the side of a stone wall near by, probably the progeny of the patriarch tree in the field. The estimated average diameter of three trees, two feet from the

ground, is eight inches, and their height thirty feet. There is another notable group of these trees upon the peninsula known as Bullock's Point, a few miles below Providence, on Narragansett Bay. They grow among Cedars and Pitch Pines, but, from their spread and height, are evidently older than these. These trees number a dozen or more, and several of them are eight to ten feet in girth three feet from the ground and forty to fifty feet high.

The Sassafras tree is quite plentifully distributed throughout the state and many fine specimens may be seen by stone walls and in out-of-the-way places.

L. W. Russell.

Providence, R. I.

[Mr. Russell's communication is of special interest, as it records, for the first time, the presence in Rhode Island of the Post Oak (*Quercus obtusiloba*), the Pin Oak (*Quercus palustris*) and the Tulip tree. The Post Oak had not been detected before in New England, except on the Islands of Martha's Vineyard and Naushon, in Massachusetts; and the Pin Oak was not known east of the valley of the Connecticut River, although a common tree along the Sound-coast in eastern Connecticut, and occurring sparingly near Amherst, Massachusetts. The Tulip tree has not been reported before east of western New England. The Persimmon has been supposed generally to have been introduced into Rhode Island in recent years, but, as it is found growing spontaneously in Connecticut, near the Sound, it is, perhaps, not improbable that it extends also into that state.—Ed.]

The American Mistletoe.

To the Editor of GARDEN AND FOREST:

Sir.—Referring to what is said of the Mistletoe in your article entitled "Christmas Green," in the issue of GARDEN AND FOREST for December 19th, permit me to say that this plant is found only in a few scattered localities in southern New Jersey, though within the memory of some persons it was occasionally found on the yellow-drift formation in the north-eastern part of the state. It is not now abundant in any true sense of the word in any part of southern New Jersey, with the possible exception of the region which may be called the head waters of the Great Egg-Harbor River, where within a radius of say ten or twelve miles I have counted over forty trees, large and small, with from one to twenty-five bunches of Mistletoe upon each of them. There is not enough of it, even here, to permit of its being gathered, except to supply herbariums with specimens from New Jersey. The localities are usually too far separated, and too much concealed in the swamps, to tempt even the cupidity of those who make the gathering of Christmas greens a business; and where it is known to exist it is usually too highly prized as a curiosity by people in the locality to permit of its being wantonly destroyed.

It is not likely that its extermination will be caused by its reputed medicinal virtues, but it is to be feared that if the Black Gum should become marketable, the Mistletoe would quickly disappear from this part of New Jersey; for in this region it grows only upon one kind of tree, the Black or Sour Gum (*Nyssa sylvatica*). C. F. Parker, however, found it growing at Jackson, Camden County, New Jersey, on the Red Maple, which fact establishes the possibility of its being found on other deciduous-leaved trees. But though I have carefully searched Apple trees and Swamp or Red Maples for it, I have never found it on them in this locality; and I do not think there is any record of its being detected upon any of the dozen or more varieties of Oaks found on the yellow drift in New Jersey.

Mays Landing, N. J.

John E. Peters.

Shortia galacifolia.

To the Editor of GARDEN AND FOREST:

Sir.—In your interesting sketch of Shortia, published December 19th, you say that Mr. Hyams discovered, "with the aid of a correspondent, what a treasure he had."

As this whole discovery was under my eyes, I would like to say that to Mr. Joseph W. Congdon, then of Providence, now of Mariposa, California, the credit of the identification belongs. He came to my room and told me what he had found in Hyams' package, and had sent to Dr. Gray. An answer came from the latter, "If you think you have Shortia, send it on," or words to that effect. It was sent. Then came from Dr. Gray the characteristic postal, "It is so. Now let me sing my *nunc dimittis*!" I think this is worth preserving.

Providence, Rhode Island.

W. W. Bailey.

Periodical Literature.

A pleasing article on "Shakespeare's Trees," by Mr. Arthur Gaye, may be read in the *Gentleman's Magazine* for December. Knowing how rich are the great poet's plays in allusions to flowers, it is somewhat of a surprise to find that he paid much scantier attention to trees. But, in the author's words, "though it would not be right to say that his 'tongues in trees' are among the most important, or even the most discriminating of his utterances, yet, regarded as a *parergon*, as so much extra matter 'thrown in' where there was already an infinity of subjects treated, they are deserving of notice and often of admiration." As we naturally expect, the Oak stands first on the list of native trees which Shakespeare celebrated, and is often referred to in a way which showed that he had a keen sense for its distinctive peculiarities of form, as well as a knowledge of the exceptional strength and toughness of its wood. But to the Elm, almost as conspicuous a tree in Britain as the Oak, "Shakespeare has not done justice." He mentions it only twice, and in both cases, oddly enough, in figures of speech which contrast its sturdiness with the clinging habits of the Ivy. And "for the Beeches, which share with the Oaks the chief forest honors of the land, he has no word of admiration or even of recognition. They are utterly ignored"; and this although "the tree lends itself with such facility to poetical language and from the days of *sub tegmine fagi* has always been in request," and although Shakespeare "must often have traversed Buckinghamshire, with its far-stretching beechen groves." The Ash is perhaps the fourth tree in importance on English soil; yet the Ash, too, is ignored by the poet, who makes use of the word but once, and then to denote a spear. So, also, with the Birch. Its name also comes only once, and then to figure a switch!

On the other hand, we find, with perhaps as much surprise, the Cedar of Lebanon, no living specimen of which existed in England in Shakespeare's day, is frequently referred to in his plays, not merely as a symbol of pride and beauty, but in descriptions which would lead us to imagine that it was a familiar object to his eyes. The Pine he often mentions, and the Yew, the Cypress and the Willow, while the Sycamore (by which we must understand the Sycamore Maple) comes in for an almost undue share of his attention. The same is the case with the Elder, which he mentions seven or eight times. The Olive, Laurel and Bay appear of course—how could a poet do without them?—and the Hawthorne, the Crab-tree, the Box-tree, the Holly and the Hazle, while the Alder is not mentioned and the Lime or Linden only once. The most charming part of Mr. Gaye's little essay is perhaps the first page, where he pays a graceful tribute to the Autocrat of the Breakfast Table, recalls his "rapturous love of trees," and regrets that we have never had from his hand a chapter on Shakespearean dendrology.

In the *Nineteenth Century* for December we find a sensible and interesting chapter on "The Fruit-growing Revival" in England, by Mr. Frank A. Morgan, editor of the *Horticultural Times*. Mr. Morgan does not give way to the exuberant prophecies which some writers, taking up Mr. Gladstone's now famous piece of advice, have voiced with regard to fruit growing as a panacea for all the agricultural woes of England; but neither does he take the pessimistic, discouraging tone which others have adopted in consequence of the many failures which have followed upon first attempts in a new direction. Having studied the matter carefully and intelligently, he decides that the industry is rapidly developing, that probably the next five years will see an enormous increase in the present area of orchard land; and that so long as £8,000,000 sterling are annually paid to foreigners for fruit and garden produce, there is no real ground for any apprehension of overproduction. But, he adds, while "it will pay to grow good produce, it will not pay to raise common goods. . . . The causes of failure in fruit growing may be summed up in two words—ignorance and indolence. It is practically impossible to find an experienced and energetic fruit grower assert that he cannot make a living." Taking up the various kinds of fruit in turn, he gives sensible advice with regard to them, insisting, especially, that only a very few varieties—and those the very best—of each kind should be grown. But the most interesting part of his article to American readers is where he insists that the best English fruit is better than the best imported kinds, and that tradesmen, as well as the public, are well aware of the fact. "Who," he asks, "would buy a pound of Newtown Pippins (the best imported apple), when he can obtain the luscious Cox's Orange Pippin, or who would eat a Baldwin when a Blenheim Orange apple is available? The English fruit-

erers—not a class given to sentiment—are so conscious of this fact, that in London, at the present moment, nearly every American apple sold is labeled 'Choice English Fruit.' So with grapes, pears, plums, tomatoes, and even with walnuts and other kinds of nuts. . . . The buyers for the foreign restaurants . . . are as eager as other purchasers to obtain English fruit, and pay for it a much higher price than for foreign produce. The reason for this superiority of home grown produce I attribute to the fact that, though our climate is proverbially fickle, it is, on the whole, more equable, and the season is more prolonged, than that of foreign countries. Though, to use an old English proverb, 'We get our sun by installments,' old Sol lingers with us long enough to slowly, but surely, ripen our fruit; and it is this prolongation of sun heat that seems to render our English out-door fruit so full of rich juices—the very point in which the imported fruit is lacking." Those who have eaten American fruit in America and English fruit in England may not agree with Mr. Morgan in his conclusions. But the facts he gives are undoubtedly trustworthy, and if his anticipations with regard to the prospects of fruit culture in England are equally so, American producers may well fear some diminution in their export trade. The chief obstacle to the industry he finds in a fact which has no parallel with us and which may prove very difficult to overcome. Few English horticulturists are able to own their own land; few landlords are willing to cut up their large existing farms into the smaller holdings more suitable for fruit culture, or to rent them on long leases, with satisfactory guarantee against ultimate loss to the tenant on the orchards he may plant; and, meanwhile, men are naturally averse to putting their money permanently into ground which they hold on year-to-year leases, without any pledge securing its return to them in case of dispossession.

Notes.

M. Paillet, in *Revue Horticole*, finds saddle-grafting the most desirable with Rhododendrons.

Fifty-five distinct varieties of Pansies were shown not long ago at a meeting of the Wisconsin Horticultural Society by a single exhibitor—Mr. William Toole.

No less than 2,000 species of flowering plants have been collected at Mount Bair, Tonkin, by M. Balansa, a French explorer. Numerous species of Oak abound in the forests.

Near Philadelphia, on the 8th of January, fully-expanded blossoms were quite abundant on a *Fasminium nudiflorum*, which stands fully exposed towards the north and west, and buds were opening on a Japan Quince in a sheltered position near by.

M. André, commenting in the *Revue Horticole* upon the reprint of a catalogue published in 1790 by a French nursery-gardener, finds the fact interesting, that among the thirty varieties of Peach and sixty-one of Pear are found all the best and most popular varieties cultivated to-day, with the exception of those of American origin.

The *Revue Horticole* records the fact that a Nectarine tree at Montrouge, near Paris, bore the past season a crop of Peaches, but no Nectarines. This is not the first time that this has been observed, and it is not unusual to find an occasional Peach among Nectarines, a fact which seems to point pretty clearly to the varietal origin of this fruit.

Mr. T. S. Brandegee left San Francisco on the 3d instant for Magdalena Bay for the purpose of exploring the botany of Lower California. The plants of this whole region are as little known as those of any part of the North American Continent, and large collections and important results may be expected from Mr. Brandegee's investigation.

The Messrs. Veitch have imported from a French nurseryman specimens of a red-fruited Ivy, to which the name *Hedera aurentiaca* has been given! No fruit has yet been perfected on English soil, but, as a local journal says, if the variety fruits prolifically and is good in other respects, it should prove a welcome addition to the list of ornamental evergreen plants.

The cultivation of Pampas grass seems to be spreading in California. Formerly the only place where it was grown was Santa Barbara, but now large plantations may be found in many other neighborhoods. As the grass needs no treatment after cutting, but to be dried in the sun for a few days, the cost of harvesting is small and the profits proportionately large. A California journal declares that an acre of land will yield \$250 worth of plumes.

Few persons know that the fruit of the Horse-Chestnut has any economic value. But a recent report of the Agricultural Department in Washington states that a flour is prepared from it with which a paste is made for the use of bookbinders—the bitter taste preventing the attacks of insects which are often so destructive when a more palatable kind of paste is employed.

The fourth number of *Lindenia* contains portraits and descriptions of the following Orchids: *Liptotes bicolor*, introduced from Brazil in 1831, a species with white flowers, with a red lip tinged with violet; *Odontoglossum Halli*, a Peruvian species, which bears the name of its discoverer; it has yellow flowers spotted with brown; *Cypripedium Mastersianum* and *Vanda cœrulea*.

M. Ed. André publishes, in a recent issue of the *Revue Horticole*, a preliminary list, with characters, of the new species and varieties of Bromeliads—no less than eighty-three in number—discovered by him during his journey in South America in 1875 and 1876. An important work upon these plants, with figures and more detailed descriptions, is announced and may soon be expected.

The leaves of *Galax Aphylla* at this season are remarkably beautiful, and they are now gathered in considerable quantities on the mountains of western North Carolina and sent north to be used in winter decoration. Florists might make good use of them in certain arrangements. The leaves range in color from a bright, glossy green to deep crimson, maroon and dark bronze, and often richly variegated.

The State Horticultural Association of Oregon has prepared a bill for the creation of a State Board of Agriculture, which will be introduced in the coming session of the Legislature. It looks to the protection of the fruit industries of the state—directing that the Board shall have power to enforce certain restrictions, appoint an inspector of fruit-pests, etc.—and also to the advancement of horticulture in other ways.

A florist of this city recently exhibited in his window some flourishing plants of the common Red Clover (*Trifolium pratense*), almost every leaf of which had four, five or six leaflets. The leaves are much smaller than those usually seen when the plant has grown out-of-doors, but were proportionately more delicate and graceful on their long stalks; and, set in large silver bowls, the plants were ornamental enough to be prized at this season even apart from their significance as harbingers of good luck.

Mr. G. P. Rexford, of San Francisco, is preparing, under the direction of the Department of Agriculture, an exhibit of California-grown Figs, for the coming Paris Exposition. It is proposed to make the fact more generally known that the Smyrna Fig of commerce, as well as another choice variety, the White Adriatic, is successfully grown in California, and in order that the whole industry may be represented, not only dried fruit, but Figs crystallized, pickled and preserved by all methods, are to be included in the exhibit.

It has been established by ample proof that injury to plums can be prevented by spraying the trees early in the season with one of the arsenites, but no explanation has been made as to whether the adult beetles are destroyed, or whether the poison reaches the young larvæ. From a late bulletin issued by the Cornell College Experiment Station it would seem to be established that the adult beetles gnaw the surface of fruits for food as well as for oviposition. Besides this they eat freely of the leaves of the tree, so that the curculio is freely exposed to destruction, without reference to its habit of oviposition or to the fruit food of the larvæ.

On the 5th of January the Museum of Natural History in this city, which contains the Jesup Collection of American Woods, was for the first time opened in the evening, and hereafter it will not be closed on Saturdays until ten o'clock, and on Wednesdays will be closed at the usual hour, but re-opened between eight and ten o'clock. Of course it would have been better for the public, and especially for that portion of it which can derive the most practical good from such collections, had the authorities consented to open the Museum on Sundays; but while awaiting the time when this change must surely be made, its opening on two evenings each week is a distinct benefit.

An interesting little article in *Popular Gardening* tells us that the first green-house known to have been constructed in America was built in this city in 1764, on the grounds of Mr. James Beekman, a property which lay where Fifty-second Street now runs. It was a small rectangular building with no sky-lights, but a solid hipped roof, and walls formed by a suc-

cession of simple piers and large windows. The next form adopted for green-houses had a hood-like roof with slanting windows. This was followed by the lean-to—a house with a back wall about twelve feet in height and a front wall about four feet in height, with a slanting roof of glass. Two of these structures joined together give, of course, the form now commonly employed.

The most popular ornamental baskets for florists' use seem just now to be rather large and shallow ones, with tall handles, bent to a rectangular shape, which are covered, body and handle both, with folds of ribbon. It is a question whether it is as tasteful to use such an extent of color in connection with flowers as to use the simple, harmonious tone of uncolored straw. Nevertheless, the public always fancies new and "effective" arrangements, and when the color of the ribbon contrasts properly with that of the flowers, and too many bows and streamers are not employed, these baskets are distinctly better than many we have seen in recent years. The fashion seems to have come from France, where baskets of this kind are often used to contain two or three pots with growing plants, the pots themselves being covered from sight with trimmings of green. Something may be learned from Parisian florists as regards the number of blossoms which should be used. Too often in this country we see more blossoms and less foliage than is desirable, while in Paris, even when cut flowers are used, four or six fine specimens, relieved against a great mass of green, are preferred to a more compact display in which the beauty of individual flowers cannot be so well revealed.

The Garden (London) recently offered a series of prizes for collections of photographs of rural and horticultural subjects taken by amateurs. The result has just been announced, and a very large number of pictures seems to have been submitted, showing much diversity of subject matter. The first prize fell to the Earl of Annesley for a collection of "interesting garden subjects"; the second to Mr. Good, for "pretty garden plants and country houses," and the third to Mr. Murray, for "fine old Devonshire gardens and country houses, Cork-trees at Mount Edgcombe," and other similar subjects. A long list of minor prizes is also printed, and many of the photographs in question will be reproduced in the columns of *The Garden*. Some remarks appended by the editors to their list of prizes may well be quoted for the benefit of American photographers. Among the causes of failure they noted were: "The want of simple, natural ways of arranging cut flowers. The complex bundles generally seen look worse in a photograph than they actually are. The backgrounds, too, are not always considered in relation to the color of the flowers; a crowd of so-called 'artistic' objects around is fatal, as is the flower-jar all set over with a pattern. . . . Very common subjects now and then result in failure, as *Lilium auratum*, which has been so often well done. On the other hand, some beautiful common things are never done well—as the Apple, Pear or Thorn-tree in bloom, and many wild flowers."

"In Sweden," writes a correspondent of *The American Garden*, "railroad gardening has reached a considerable advancement far greater than it has in England. The state roads in particular have done much to adorn all their stations. The station buildings themselves, though unpretentious, are neat and tasteful in construction. The out-houses are always partially or wholly concealed, and are never unsightly even when most conspicuous. . . . An area of from two to four rods in width and from twice to ten times as long is devoted to the railroad gardens. The general plan of this ornamentation consists in planting so as to hide the outer boundary and in laying walks to various objects in such a manner as to represent a pleasure ground. The planting is always well done, mostly of native trees and bushes, and, better than all, the plants are cared for. At the larger stations these gardens are of considerable extent and form important openings in the city. The one about the central station at Stockholm is worthy the denomination of park. Between stations there are at short and regular intervals the residences of section overseers—the *banwakt*—about which are small and tidy kitchen gardens and beds of flowers and clumps of bushes. These houses are usually all of a pattern, small and attractive, and are furnished by the railroad company, along with a parcel of land for private use. The *banwakt* receives in addition a salary of 80 kroner (something over \$20 per month), and has free transportation on the road to and from market and is given his uniform. A certain portion of the road is allotted to his care, and in addition to duties connected with the track itself, he keeps the roadside tidy. American railways have too much land lying idle along their lines to allow of tidy roadsides."

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Arbor Day Tree-Planting.

TREE planting is, of course, not forestry, nor is there any close or necessary relation between them, but tree planting is itself a good thing if it is done intelligently. We need more trees, of the best and most suitable kinds, nearly everywhere in the settled portions of this country. If there is a fixed day for the work, at the proper season of the year, with ceremonies, social observances, and opportunity for "a few remarks," many persons are likely to plant a few trees who would not otherwise think of it. If good trees are selected, and they are handled with care and intelligence, both in the process of transplanting and afterward, we shall probably have, in the course of time, more good trees than now, and this is to be desired. A beautiful, graceful or majestic tree is a valuable possession for any community.

But the tree is not an end in itself. It does not exist for its own sake. It is valuable solely for its effect upon human health and human psychology, for its relations to the welfare of the men, women and children who see it. Whatever tends to implant or nourish right feeling about trees, or more intelligent regard for them than now prevails in this country, helps along a little the long, slow process of human development and elevation, which, with many fluctuations, goes on from age to age among the best races of mankind. The development of ideas connected with the subjects of forestry and landscape-art, and their continued discussion and illustration, are of value simply because they constitute a real and vital contribution to the sum of the forces by which human life is refined and strengthened, made more vital and interesting. This is an object in itself, and all means to this end are to be valued in proportion to their comparative efficiency.

The new interest in forestry and related subjects in this country is a natural development. It is time for it. It is an important next step in our national progress. The production among our people generally of a vital and intelligent appreciation of the true place of forestry and landscape-art among the forces which improve man-

kind would constitute a real advance in civilization. Whatever tends to increase popular interest in these subjects is to be encouraged, utilized and made more efficient. It is greatly to be desired that the people of this country should know more about trees, should think more intelligently of their varied relations to human life and welfare, and should become capable of deeper and keener delight in their exhaustless charm, and especially in their capabilities for the expression of ideas of beauty and of peace.

It is good to have people think and talk of these subjects until they shall be "in the air" everywhere. How to bring this about is a psychological problem, and most of our problems in this country are largely psychological. That is, they are questions of means and methods for the propagation of ideas—of the best way to go to work to produce the conditions of public intelligence, thought and feeling which we esteem desirable, and which will lead to more efficient action for right and noble ends. Arbor Day observances may be so managed that they shall be distinctly helpful. But all fine writing and long essays are a hindrance when we wish to accomplish anything. Tree-planting is a good object-lesson for the boys and girls of our country, if they learn to plant the trees properly, and with their own hands.

A general interest in trees, and in forestry and in landscape-art, would supply favorable conditions, soil and atmosphere for the development of just and rational taste regarding them, and of ability to deal with their problems successfully. Such results are impossible under conditions of national indifference and ignorance. A great musician could not be produced by a race which cared nothing for music. If all the men and women in this country who are working for any good object will help to make it the fashion to care about the subjects we have here discussed, they will find the material upon which they work, the minds of the American people, more tractable and responsive than they now are to all good and elevating influences.

Professor F. L. Harvey, in an address delivered in Bangor last month, gave the people of Maine some sound advice about the forest interests of the state which is of general application. The statement that "it is of the utmost concern to owners of timber lands, or those in any way connected with the lumber industry, that they inform themselves upon all matters relating to forest management and the care of lumber after it is cut, so that the greatest returns be realized from the money invested," may well be applied to lumbermen everywhere; and "the question for our lumbermen to solve, is whether they adopt the selfish policy of devastating forests for present gain, or whether, by proper care and management, and being satisfied with the annual growth, they will bequeath them to future generations with their original productiveness," is one which affects the whole country; or, at least, all that part of it east of the Rocky Mountains, where the control of the forests has now passed from the ownership of the government into that of private holders. The future, therefore, of all our eastern forests, is now in the hands of individuals, who are at liberty, of course, unless a very radical change in the control of private property in this country can be effected, to decide, each man for himself, whether he will turn his forest into money at once, or manage it in such a way that it will continue to be productive permanently to an amount equal to the annual increase of timber. That is, whether he shall manage his forest as a prudent farmer manages his land, and maintain and increase its productiveness. It must be remembered in this connection that the owner of a forest who allows it to be destroyed sacrifices one of the most permanently productive and stable of all properties; and sacrifices, moreover, the prospect for much larger returns in the future, when increased population and smaller forest areas in all parts of the world must inevitably increase the value of forest products.

Hints About Lawns.

TO one accustomed to the studious contemplation of natural scenery, there is apt to come, sometimes, the desire to possess some particular scene which has been found to affect the emotions—to own it as a pleasure and a means of refreshment to the mind through the eyes, as one might own a beautiful painting. The many practical conditions of life rarely permit the indulgence in such a luxury; but with the recurrence of the desire with each new experience, there comes to be an impulse that leads to the attempt to imitate certain elements of natural scenery in places in which it will be convenient to enjoy the result. There are many more who, while they are by no means students of Nature, yet have an instinctive appreciation of the beautiful and the picturesque in Nature; which manifests itself in the selection of their house sites, and in the general style at which they aim in their planting and other out-of-door work, rather than in the planning and carrying out of any consistent, complete ideal, or than in the imitation or perfecting of an existing natural scene.

There is, however, one type of natural scene, the beauty of which is so generally recognized, that every one who has the slightest opportunity desires to imitate it. It is that which is called a lawn.

Strictly speaking, the term lawn is applied to a natural opening, of limited extent, clothed with low verdure (grass or small bushes) and surrounded by woods dense enough to confine the eye. Its essential qualities are openness, breadth, seclusion and repose, together with a subtle combination of contrast (between its openness and the shady mystery of the wood) with harmony (the sense of seclusion being common to both).

In creating a lawn, considerable variation from the natural type is permissible, provided its essential qualities are preserved. For instance, the element of contrast with the wooded borders is heightened if the lawn is covered with an unbroken sweep of finely clipped turf, even though the lawn loses something of its charm of naturalness thereby. Likewise, it is not essential that the inclosing wood should be composed solely of large, tall trees, showing their trunks and with dark shadows under and behind them, nor that it should present a simple mass of foliage faced out or bottomed out with smaller trees and bushes, so that the interior of the wood is invisible; both of these conditions are common in Nature. Other minor features of woodland scenery may partially border a lawn, such as herbaceous plants, rocks, steep banks, or even water, but all such features should appear natural and subordinate. A lawn should have a moderately undulating surface, because a dead flat would be suggestive of artificiality. If a lawn is to be smoother than is natural, the turf must be kept short, preferably by the most natural means, as by the grazing of sheep. The difficulty of adjusting the planting of the borders of a lawn so that it will not be injured by the browsing of sheep or cattle has, however, led to the general use of the scythe and the lawn-mower, but the more natural way should be kept in mind and reverted to when practicable.

A lawn is often used, in connection with a house, as the foreground of a more extended, park-like opening or distant view. The extreme neatness usually desirable immediately about a house, suggests that that part of the lawn should be clipped, leaving those parts further away to be grazed. Such an arrangement is, in fact, common abroad, the pastured ground being cleverly separated from the clipped ground by a sunken wall (called a ha! ha!), or by a ditch with turfed slopes, deep enough to conceal a fence placed in the bottom, or by a river or elongated pool simulating a river. Even though the means of separation be visible, the disadvantage of the division in breaking the apparent continuity of the view may be, in a great measure, compensated for by the economy of pasturing over clipping and by the greater naturalness of the pastured lawn.

However intricate and irregular in shape a lawn may be, it should, as a general rule, have a predominating, central, unbroken area, in order to give it its characteristic qualities of breadth and repose.

The element of openness is essential. It is not uncommon to leave many existing trees scattered over a lawn or a single tree in the midst of it, or to plant trees promiscuously over it. This is usually done either from a love of trees as beautiful objects, or from the dread of a bare, unfurnished look. No greater mistake could be made.

It is with a lawn as with a picture. The subject of a picture should be at or near the centre, the composition should be such as to direct attention toward the subject, other objects shown should be subordinated to the subject, and there should be a border or frame to assist in confining the eye to

the picture itself. So in a lawn, the eye should rest at or near the centre instinctively and easily, and since the turf is the characteristic and valuable thing, no other object should be allowed so near the centre or be so conspicuous as to distract the mind from receiving the impression which the lawn is calculated to produce. It would be as reasonable to put a large yellow star in the middle of a picture as to have a fountain or bed of flowers or a specimen tree in the midst of a lawn.

While there certainly is, in the long run, a more refined and lasting enjoyment to be obtained from a lawn the borders of which are so planted as to appear absolutely natural, and which makes a complete scene in itself, yet a good deal of the value of a lawn—its suggestion of simple breadth and repose—may be retained, while a certain amount of gaiety of foliage and of flowers, of interest in specimen plants, and of beauty of constructive art, is associated with it in the same view as a foreground, but not as a part of the lawn. There would be a contrast which might enhance the effect of gaiety, but at the expense of the lawn, because the sensation of gaiety and the interest in the artificial objects would overwhelm the milder, shyer feelings properly to be derived from the contemplation of the lawn. The one tires, while the other refreshes, the mind.

A lawn is at its best when there is no evidence of the handiwork of man—no formality in the grading, none in the planting, no exotic plants, no fountain-jet or basin, no vase or statue, no nicely trimmed path, no fence or formal terrace. Such a lawn conveys the purest impression and gives the most lasting satisfaction. One who cultivates a taste for formality and things evidencing the skillfulness of man is apt to tire of any one object or composition of that kind. It is true that there is a certain kind of refreshment to be obtained from variety in such things, but it is a stimulating, nerve-consuming kind of refreshment, the opposite of that which is encouraged by repose. But to one who cultivates a taste for the beautiful and picturesque in Nature, a single, purely natural scene is never tiresome if seen again and again. The infinite variety in the details and in their disposition, the differences of aspect caused by changes of weather and by the seasons, by the growth of plants, by birds and other animal life—all are harmonious with the natural scene, are not conspicuous enough to injure any artistic impression which the scene may give, and yet make the scene endlessly interesting.

Too often a lawn is spoiled for the gratification of tastes and pleasures that have nothing to do with the true source of the enjoyment to be derived from looking at it. And it is usually done, too, under the mistaken idea of decorating or improving the appearance of the lawn. That is the pity of it. For instance, it is not an uncommon thing to see a formal bed of scarlet Geraniums in the midst of a lawn that would otherwise have had much suggestion of a natural breadth and repose. The bed of flowers may be a good thing in itself. It is bright and gay, enlivening and stimulating, and it is well set off by the surrounding turf, but the lawn is sacrificed to it—that which has a permanent worth is made to give way to that which has but a passing value, a source of endless satisfaction to a pretty toy of which every one soon tires. Again, consider the case of a lawn “decorated” with statuary. A beautiful nymph splashing in a fountain, were it not a very hackneyed idea, and where it is the work of a true artist, would be a most enjoyable and valuable possession; but a poor, cheap, painted, cast-iron imitation of such a piece of sculpture, placed so as to dominate a fine lawn, is a barbarism which it is hardly conceivable that any intelligent person could be guilty of. The same thing might be said of almost all the usual so-called “decorations” of lawns. To decorate the face of a beautiful woman with painted ornaments would not be one whit more savage. Our civilization is spotted all over with the relics of barbarism; good taste is always striving to get rid of them, and they should be particularly avoided when we set about making a natural lawn.

Brookline, Massachusetts.

J. C. Olmsted.

Autumn in Oregon.

A LARGE-LEAVED Maple (*Acer macrophyllum*) in the gulch above my house (the hills slope to the west) kept its leaves green this fall some six weeks longer than trees of the same species growing on lower land along the main creeks or in the gullies on the more open and exposed hillsides, and one to two weeks later than others growing in its own immediate vicinity. These leaves were green until the middle of November, while those of other Maples had begun to turn yellow by the first of October, were in a blaze of color by the 28th, and had mostly fallen from the trees by the 6th of November. Visiting this gulch November 18th, I found my Maple displaying a wealth of soft golden color that I have rarely seen equaled.

About its base, tall, straggling bushes of the Oregon Grape (*Berberis Aquifolium*) held their clear green, leathery, spinulose-toothed leaves, for these, too, like those of the bright and handsome Madroña, are persistent; but the Mock Orange (*Philadelphus Lewisii* (?)) and the little Snowberry (*Symphoricarpos*) had only a few pale, yellowish leaves remaining. The Ninebarks, too, were bare, excepting a few leaves on shoots of the present season. Some of the Hazels were still in full leaf, and, indeed, one bush was still fresh and green. Of course the Manzanitas (*Arctostaphylos pungens*, var. *platyphylla* (?)), near relatives of the Madroña, held their leaves—for these, too, are persistent. The little Tea brush, as we sometimes call *Ceanothus integerrimus*, still held many of its leaves; and the Rose bushes growing along the gulch were yet green, though in more exposed places the leaves of many of them were beautifully colored.

In southern Oregon—a region embracing that part of the state west of the Cascade Range and south of the Calapooya Mountains—we have many shrubs and trees, interesting by reason of their autumnal foliage, besides the large-leaved Maple and the shrubs already mentioned. Conspicuous among these is the large-flowering Dogwood (*Cornus Nuttallii*), which is very abundant here in the woods. The arrangement of the coloring on the leaves of this tree during the transition from its summer's green to its autumnal red is very fine, and is displayed in a great variety of forms. Later the color becomes more uniformly red, at which time the leaves are not nearly so pretty as they were before; but the tree—or shrub, it may be—then becomes a conspicuous feature in the landscape.

Even our two deciduous Oaks, *Quercus Kelloggii* and *Q. Garryana* (the Black Oak and the White Oak), often present great beauty in their autumnal foliage. This, it is true, does not occur on all the trees nor in every locality; it is observed most frequently on the more shrubby forms and on the hill-sides, where the leaves are well exposed to the sun. Our common Poison Oak (*Rhus diversiloba*) often ornaments whole hillsides in the fall with the rich coloring of its foliage. In moist and shady woods the Low Oregon Grape (*Berberis nervosa*), a much handsomer shrub, I think, than even the larger *B. Aquifolium*, often shows great beauty of coloring, though, to be sure, its leaves are evergreen. Sometimes a single leaflet, or part of a leaflet even, will be colored a deep shining red, while all the others are of their usual bright green. Again the coloring will be varied by a dash of bright yellow, or of orange, with a sprinkling of the red. Our common wild Blackberry (*Rubus ursinus*), growing in similar localities, often displays great beauty in the coloring of some of its leaves, though this plant usually keeps its leaves green throughout the year.

The Wild Grape (*Vitis Californica*) is very abundant here. In default of any support this plant will form clumps upon the ground; but, wherever it has the opportunity, will climb lofty trees; smaller trees it will frequently completely cover with a mass of foliage. In the fall these leaves become usually of a deep crimson color, but with an almost infinite variety of marking and mottlings, shades and tints.

But by far the richest, most varied, most beautiful and most profuse display of coloring in this region is seen in the dying leaves of the Vine-Maple (*Acer circinatum*). I should despair, however, of giving anything like an adequate description of these, and can only say that the leaves—delicate of texture and beautiful in form, borne on the branches of long, straggling stems, and thrust out, therefore, to long distances in every direction, often intersecting the foliage of other shrubs and trees, contrasting finely with these and with the much lighter and more uniformly colored foliage of its large-leaved relative, *Acer macrophyllum*—display the most beautiful and varied arrangement of the different tones of crimson and scarlet, of yellow and green, it is possible to conceive.

When these shrubs and trees are decked with their October coloring and scattered among huge Douglas Spruces, Yellow Pines (*Pinus ponderosa*) and White Firs (*Abies grandis*)—the most beautiful, to my thinking, of our Conifers—the effect is most pleasing, and it is often heightened by vines and trailing plants that carpet the ground on every side. Among these last are *Whipplea modesta*, *Linnæa borealis* and the Yerba Buena (*Micromeria Douglasii*).

We have here in the spring and in the summer a wealth of wild flowers, the ground in many places being literally covered with different species in succession. But as the season proceeds they disappear, and now one or two late-blooming Polygonums are about the only things left, except a few scattered individuals of a little Blepharipappus (*B. scaber*) and an occasional Monardella (*M. odoratissima* (?)), called Pennyroyal here, from the odor of its leaves.

But the vegetation has started finely again since the rains have come, and many species of plants that will not bloom until spring are now clothing the ground with a carpet of green.

During our mildest winters the wild strawberry blooms sparingly all winter; the same is true of a little Ranunculus, and the pretty little *Dentaria tenella* may nearly always be found blooming in January. In most places in the timber *Synthyris rotundifolia* always begins to bloom by the holidays, or a little later.

E. W. Hammond.

Wimer, Oregon, November 28th.

Foreign Correspondence.

London Letter.

THE nurseries of Messrs. Hugh Low & Co., of Clapton and Enfield, are amongst the most famous plant factories in the world. In England they have for many years held a position almost unique. Their trade is almost exclusively with other nurserymen, the hundreds of thousands of plants of all kinds annually grown there being dispatched every autumn to nurseries all over the British Isles, and even to America. The two nurseries contain glass structures, chiefly houses, which cover an area of upwards of 300,000 superficial feet. These are filled with enormous numbers of all kinds of ornamental plants, everything likely to sell, from fifty-guinea Orchids to sixpenny Genistas, being represented by hundreds, thousands or tens of thousands. Specialists the Messrs. Low & Co. certainly are, but they make a specialty of almost every good garden plant. The extent and work of this establishment are almost unknown outside what is termed the trade. I lately had an opportunity of inspecting the contents of both nurseries, and as these appear to me to be a sure index to the horticultural tastes in England at the present time, it seems proper to devote a letter to an account of some of the most noteworthy of the plants there.

The nurseries at Clapton are about five miles from the city. They were founded in 1820 by Francis Henschman. At that time New Holland plants were in high favor, and Henschman sent a collector to Australia to obtain plants and seeds. The Clapton Nurseries soon became famed for choice and new Australian plants. This expedition, alone, cost Henschman over £1,000. Mr. Hugh Low was at that time manager. He afterwards became sole owner, and continued to collect and cultivate Australian plants, Cape Heaths, and hard-wooded plants generally, until his death. His son, Stuart Henry Low, is the head of the present firm. He has made his nursery as famous for Orchids as his father did for New Holland plants. He was one of the first to send collectors for Orchids, and he has continued to employ a number of them, from whom enormous quantities of all kinds of Orchids are being constantly received, and not always alive, Mr. Low significantly remarked. The greater portion of the glass structures at Clapton are devoted exclusively to Orchids. Some idea of the magnitude of the collection may be obtained from the fact that five houses, each eighty feet long, and each containing nine feet width of staging, are filled with the following species of Cypripedium: *C. niveum*, *C. bellatulum*, *C. lævigatum*, *C. Haynaldianum*, *C. hirsutissimum*, *C. Sanderianum* and *C. Lawrencianum*. These are each represented by thousands of plants, all in perfect health, and mostly in five-inch pots. Of *C. Lawrencianum* there were probably 20,000 plants, and the richly variegated foliage of these fields of leaves was a glorious sight. *Cattleya Mossiæ* entirely filled a gigantic house 150 feet long, with fifteen feet width of staging. The display of bloom in this house when the plants are in full flower must be a grand picture. Another house, equally large, is filled to the door with healthy plants in all sizes of *Cattleya Gaskelliana*. Bushels of flowers were cut from these plants this autumn. There can be no question of the superior qualities of this species as a garden Orchid. The three kinds of *Cattleya* which I should be disposed to name as the best of all *Cattleyas* for the million are *C. Trianae*, *C. Mossiæ* and *C. Gaskelliana*. Thousands of plants of *Phalaenopsis amabilis*, *P. Schilleriana* (now a comparatively rare species in a wild state, I am told) and *P. grandiflora*; hundreds of the variety of the latter known as *aurea*, also of *P. denticulata* and *P. gloriosa*, all in good health, many of them recently imported. *Aërides expansum*, *Saccolabium guttatum*, *Cymbidium Lowianum*, *Dendrobium Brymerianum*, *D. suavisimum*, *D. Cambridgeanum*, *D. nobile* in variety, and many other species of *Dendrobium*; *Vanda Amesiana*, *Angraecum citratum*, *Lælia purpurata*, *Cattleya Mendelli*, *C. Gigas*; these were all represented by hundreds or thousands, mostly the latter. I have mentioned only those species which

are grown in these nurseries in surprisingly large quantities. The numbers given must not be taken as exaggerations; they are astonishingly large, but they represent the facts. The *Odontoglossums* at Clapton are almost as sand on the seashore. In their long houses they suggest huge beds of Leeks. A large house is filled with plants of *Cælogyne cristata*, some of them being very large specimens. They are planted out in beds, and apparently this treatment agrees with them. In addition to the above popular Orchids, Messrs. Low & Co. have a great number of varieties, *Cypripediums* being conspicuous amongst them. But units in such an immense collection do not get even passing notice from a visitor. The question one naturally asks on seeing these hundreds of thousands of plants, the bulk of which have closely followed after others which have been sold, is, What becomes of them all? It is almost distressing to have to admit that most of them must perish through improper treatment. If it were not so Messrs. Low & Co. would soon choke the horticultural world with Orchids.

But Orchids are only one of the specialties of this firm. Hard-wooded plants are grown in thousands, both at Clapton and Enfield. At the latter nursery there are about eleven acres covered with glass. The form, size, internal arrangement and general plan of this extent of plant houses are of the most perfect kind. The nursery is only young, but neither pains nor expense have been spared to make it capable of performing the work intended in the best and cheapest way. The houses are of great length and grouped in dozens. Each group has walls only on the outside, so that practically it may be called a large, low house, with ridge and furrow roof. Necessarily all the houses in the group are of the same temperature. It is only when looking below the stage that the absence of partition walls is seen; above the stage each division appears to be a house by itself.

Enfield is famous for its market gardens. It stands high and is practically in what we call the country. The growth made by the plants there is astonishing—in England, at any rate. Thus, Tea Roses only ten months old have shoots six to eight feet long, many of the plants having half a dozen such shoots. The plants are grafted in December and ready for sale by the following September. Clematis, the same age, were equally large. Amongst the plants grown for their flowers in winter I noted: *Acacia armata*, many thousands; *A. Drummondii*, hundreds; *Erica hyemalis*, *E. gracilis*, *E. persoluta alba*, Genistas, many thousands; *Polygala acuminata*, *Choisya ternata*, beautiful little pot-shrubs, well branched and full of flower buds; *Tremandras*, *Thibautia acuminata*, *Fabiana imbricata*, a first-rate pot plant, with white, tubular flowers, not unlike some *Ericas*; *Abutilons*, many fine varieties—Lemoine's, I believe—all in full flower at Christmas time; Ivy-leaved *Pelargoniums*, *Epiphyllums*, *Tecoma capensis*, with large heads of brilliant scarlet flowers, on plants about two feet high; *Gardenias*, *Callas* and *Daphne Indica*. These are all grown in very large quantities, few, if any, being in a larger pot than a six-inch. Of Palms, such as *Kentias*, *Latanias* and *Phoenix rupicola*, there are hundreds of thousands, from seedlings up to handsome table plants. *Lomaria gibba* is grown in thousands, and is one of the most popular of all Ferns for decorative work. *Cyperus distans* of gardens, which is *C. Meyenianus* of Kunth, the handsomest of all "grasses," as a pot plant fills an enormous house. *Celosia pyramidalis*, an improved strain, is here grown for the sake of its flowers in winter. The seeds are sown in July and by the middle of December the plants are in full flower. There were white, yellow, rose and crimson flowers amongst them. For cutting, I imagine, these plants must have great value in winter. *Bouvardias* are very largely grown, several large houses being filled with shapely, well flowered plants when I saw them. The best kinds were *Humboldtii corymbiflora*, *Jasminoides*, *President Cleveland*, *Dazzler* and *Maiden's Blush*. A house full of *Asparagus plumosus* was pointed out as "all we have left." For cutting, as well as a pot plant for table decoration, this graceful plant has very few equals. It is easily grown, easily multiplied, and stands much longer than any Fern. A large piece of naked land had just been cleared of dwarf Roses, most of which had gone to America. *Rhododendrons*, the Javanese kinds, are grown in large quantities, and many of them flower in midwinter. There can be no question as to the large place these plants are destined to soon fill in winter floral decorations.

I have only mentioned those plants which are grown in exceptionally large quantities, or which are comparatively unknown as useful winter-flowering plants. In America most things are done on a big scale, but I doubt if you have anything in the nature of a plant factory to compare with that of Messrs. Hugh Low & Co.

W. Watson.

Kew, December 28th, 1888.

New or Little Known Plants.

Ilex Amelanchier.

THIS shrub, of which our figure upon page 41 is the first which has been published, is one of the rarest and least known plants of eastern North America.

It is the *Ilex Amelanchier** of M. A. Curtis, who described it from specimens gathered by himself nearly thirty years ago in a swamp near Society Hill, in South Carolina, the only station in which this plant has been seen in recent times. A specimen of what is evidently the same plant is preserved in the Gray herbarium, labeled "*Prinos corymbosus*, Ph. Herb. Barton (from Bartram's Garden, from Machorin Rives)." No such name, however, was published by Pursh, and the source whence Bartram obtained his plant is, to say the least, vague. Another specimen of this plant in fruit is preserved in the Gray herbarium, labeled "Drummond in Herb. Hooker, Alabama or Covington." It is probable, therefore, that it will be found in other parts of the country besides the Society Hill swamp. This plant seems to be cultivated in England, as I possess a specimen made by Mr. Nicholson (No. 2,074 of the Kew Arboretum herbarium) without flowers or fruit, which clearly belongs here, although labeled *Prinos lanceolatus*, Pursh. *P. lanceolatus* is a very doubtful plant, entirely unknown to American botanists, and probably founded upon the figure in Hill's "Vegetable System," published in London in the middle of the last century. Pursh, however, who claims to have seen a specimen of this plant, describes it in his Flora, ascribing it to the low country of Carolina and Georgia, and his characters are copied by Chapman in the "Flora of the Southern States."

Our figure is prepared from one of Dr. Curtis' specimens, who described his plant as a shrub three to six feet high. It is to be hoped that its publication may draw the attention of botanists in the South Atlantic and Gulf States to this plant, and to the other southern species of the *Prinos* section of *Ilex*, which are still insufficiently represented in herbaria, and very imperfectly known. C. S. S.

Cultural Department.

Sub-irrigated Gardens.

IN the advertising of Florida as it has been carried on for a score of years, the practice has been to hold up the orange as the leading attraction, while market-gardening is made to figure as a secondary industry, a degree less genteel than orange growing, but a very convenient resource for meeting current expenses "while the grove is coming into bearing." However the other industrial resources of Florida may stand the test of experience, candor compels me to say that market-gardening in this state, as a rule, is as precarious an industry as can be engaged in. In the neighborhood of the leading winter resorts, where there is a good local demand, vegetable-growing may prove profitable, especially if no severe frosts occur in winter. Strawberries pay well where they are grown systematically, as at Lawtey, and good shipping facilities are at hand; but as a rule, market-gardeners hardly recover expenses.

With natural waste, stealage and high freight-rates, the net returns from market-gardening seldom exceed the expenses of packing and production. Other obstacles which are encountered alike by those who grow vegetables for marketing or home consumption, are found in the chances of severe frosts in winter and drought in early spring, the latter amounting almost to a certainty. In the southern half of the peninsula danger from frost need hardly be taken into account, but in the northern half, winter gardens, which are the only ones planted for profit, are constantly in peril.

Droughts in Florida are particularly trying on cultivated plants whose feeding roots are within a foot or two of the surface. The soil in nearly all parts of the state is sandy, and lacks the capillarity by which soils of firm texture are enabled to withstand droughts. This evil is increased by tillage, which sepa-

*"*Ilex Amelanchier*. M. A. Curtis. Leaves oblong, barely acute at each end, serrulate, pubescent, and finely reticulate beneath; fruiting pedicels solitary, as long as the petioles; drupe large, red; nutlets strongly three-ribbed on the back; calyx-teeth acute. Leaves about two inches long, one inch wide. Drupe three to four lines in diameter."

rates the coarse particles still more from each other, and it is lessened by admixture of such substances as lime and muck. On wild vegetation, growing on undisturbed land, drought seems to inflict less damage than it does in other states. Without pausing to consider these seemingly contradictory phenomena, it suffices to say that the spring drought in Florida is an obstacle that cannot be overcome or counteracted except by some system of irrigation.

may be termed intensive gardening, and in localities where there is good demand for garden produce. It is a modification of Mr. A. N. Cole's system—an adaptation of it to sandy land, the principle involved being the retention of water supply just beneath the roots, so that by capillary action it may readily be supplied to them as needed. The first essential is an abundant supply of water, as from an artesian well, and the second is a subterranean reservoir or trench which will retain



Fig. 88.—*Ilex Amelanchier*.—See page 40.

In a soil so porous as that of Florida surface irrigation is impracticable. Windmills and other mechanical means of raising water are too expensive, except in peculiarly favorable locations. Artesian wells are most satisfactory, but they are not for poor men; and after a flow of water is obtained there arises the problem of distributing it to best advantage.

On the eastern coast of Florida, at Daytona and a few other places, there has come into use within two or three years a system of sub-irrigation, which answers admirably for what

a small quantity of water, and allow an excess, as from heavy rainfall, to escape.

The productiveness of the first gardens thus irrigated was so surprising that last winter a stock company was formed, with a capital of \$50,000, for the establishment of an extensive garden at Ormond. In their construction parallel trenches are dug two hundred feet long by four feet wide and twenty-two inches deep, they being sixteen feet apart between sides and ends. A thin mortar is then prepared, composed of one part

Portland cement and seven parts sand, which is poured over the bottom within a rough curbing of loose boards. After being smoothed to a level by drawing a short piece of timber over it, this bed is allowed three days to harden. Then a border is made all around by pouring the same kind of mortar between two courses of boards four inches wide, set on edge one inch apart, the space within the border measuring two hundred feet long by three feet wide. After the sides have been left three days longer to harden, the inner boards are removed and the whole inner surface receives a thin coat of pure cement in order that it may be water-tight.

At either end of the cemented bottom are set wooden boxes six inches square, rising six inches above the surface of the ground. Through these the gardener may see how much water is in the trench, and regulate the supply accordingly. Next to these are laid lengthwise of the cemented bottom five courses of narrow inch boards. Crosswise of these a second layer of boards is put on closer together than the first. Then Palmetto leaves are laid over the boards and the trench is filled in with earth. The water from the well is led through the garden in two-inch pipes and distributed to the beds in half-inch pipes, which open through faucets in one of the boxes that lead to the bottom of each bed.

It is found that by keeping up the supply of water in the trenches the ground over and between them is kept sufficiently moist in the driest weather, and that a most luxuriant growth of vegetables can be obtained. In order to economize space, different kinds of vegetables are planted in alternate rows—for example, several rows of Beets, Radishes and Lettuce between two rows of Cabbages. A close succession is kept up also, the intention being to have the ground constantly and fully occupied with the most profitable varieties. The cost of such beds is considerable, but it is found that one measuring four by fifty feet can be prepared for \$15 or \$20, and this affords a garden spot sixteen by sixty-six feet in area, on which may be grown a very large quantity of vegetables of quality and size not obtainable in any ordinary garden. An acre of ground thus prepared costs \$1,000, but it is believed that it will produce to the value of \$3,000 in a year. The length of the growing season in Florida is greatly in favor of this system, and it is not improbable that it will come into general use in localities where there is large demand for fresh vegetables in winter and spring. It is, of course, equally well adapted for flower-gardens.

Jacksonville, Fla.

A. H. Curtiss.

The Relation Between Blossoming and the Tubers in the Potato.

THE following abstract from *Annales Agronomiques* of a paper by Dr. E. Wollny has, perhaps, a practical as well as a botanical interest. Whatever may be the case in Germany, the flowering of the Potato is usually abundant here, but in a large portion of our best varieties no fruit is produced. It is not probable that the removal of the flowers or such varieties would in any way increase the development of tubers. If, however, the removal of the young tubers as they appear would increase the vigor of the growth of the flowers, this fact might be of advantage to those who are trying to produce new varieties from seed. It is now almost impossible to secure seedlings from some of our choice varieties, although they blossom freely. Some investigations by Dr. B. D. Halsted seem to indicate that failure to set fruit is due to defective or imperfectly developed pollen. It might be worth while to remove the young tubers from some of these varieties as they appear, in order to ascertain whether this treatment would encourage greater vigor in the development of the pollen, and the consequent production of seed.

In the climate of Germany the blooming of different varieties of Potatoes is very much restricted. Most of the varieties do not flower, excepting here and there in the course of years; a small number only flower regularly and bear fruit. It is not so in Chili, the habitat of the Potato. There it flowers abundantly, but the tubers remain small, while in the temperate zone the formation of the tubers is favored at the expense of fertilization.

This fact seems to indicate a sort of balance between the two modes of reproduction by the tubers, and by the seeds: the energy of the one seems to bring about the decadence of the other. In fact, Knight and Langenthal have found that they may increase the blooming by detaching the young

tubers as they appear. Inversely, they found that suppressing the flowers favored the development of the tubers of many varieties. An anonymous English author has obtained by this method an increase in harvest of 2,670 pounds per acre.

Wollny recognizes that, from his experiments, the development of the flower is prejudicial to that of the tubers. Experiments were conducted in 1886 on many varieties that produce flowers. Four plots were planted with each variety, one acting as a duplicate or control, being left to itself; the inflorescence on the other three was cut at three different periods. The inflorescence oftenest cut off produced the crop of greatest weight; it also exercised an influence on the number as well as size of the tubers. However, the early varieties, and the plants which had not been topped till late, gave a contrary result, one crop being poor, probably because there remained some little time between the operation and the maturity of the tubers, and the season had been especially dry from July 14th to August 25th.

These experiments enable us to understand why the Potato does not thrive alike in Chili and Germany. It is probable that dryness and sunlight induce bloom, and humidity, and a sky more or less cloudy, the formation of tubers. In fact, in dry years a great number of varieties flower, while the same varieties do not bloom when the weather is moist and the sky is obscure.

The influence of light upon the production of flowers is a fact that has been long known, and very recently Sachs has shown that it is the chemical rays which provoke flowering. Plants of *Nasturtium*, a flowering plant of the first class, produced no flowers behind a screen of a solution of sulphate of quinine. But it seems to us that it is necessary to divide the problem into two, and to distinguish one immediate influence and another indirect influence, the effect of which is itself accumulated by heredity, in order to become a race characteristic. These two features necessarily combine, and act in the same way in our country. We do not think, however, that these things are brought about by purely physical influence.

There are, in fact, many examples of plants being reproduced artificially or naturally by budding, root-grafting, tubers, etc., and which in flowering do not produce fruit, or which, producing fruits, are none the less sterile, as seeds are not formed in them. *Lysimachia nummularia*, a creeping plant; the Tarragon, which flowers but does not set seed; *Garlic rocambole*, which produces bulbs in place of flowers; a variety of *Ficaria ranunculoides*, which produces tubercles in the axils of the leaves; and Sugar-cane and Bananas, which are nearly always sterile.

Rose Notes.

JANUARY is one of the most critical months of the year to the Rose-grower, not only because the flowers are in greater demand at that season than at any other during the winter, but also on account of the weather, which in this latitude is usually severe and frequently dull. It therefore becomes necessary to exercise greater care in watering, as excessive moisture, either at the root or in the air, proves injurious, the diminished sunshine rendering the evaporation much slower than during the autumn months.

As to ventilation, it may be repeated that fresh air, carefully admitted, is one of the most valuable aids to the Rose-grower, but no hard-and-fast rule can be laid down for this operation, as it depends entirely on the condition of the weather. Similar advice may be offered in regard to firing, as this part of the work also needs careful handling to keep an even temperature of from 55° to 58° at night, this being found most satisfactory for an assortment of varieties. More Roses are injured by too high a temperature than by allowing the heat to fall a few degrees below the standard mentioned. It should be remembered that the original species, from which our fine varieties have been derived, were found in temperate climates, and it is only reasonable to suppose that their offspring will flourish under somewhat similar conditions as to temperature, although some allowance should be made for the extra stimulation required for the production of a succession of flowers at this season.

The effect, also, of any previous error in management, will be more noticeable at this time. Such mistakes, for instance, as the dangerous plan of running the houses at a specially high temperature just before the holiday season, to open an extra quantity of flowers, is a practice almost invariably followed by so great a falling off in the succeeding crop as to more than counterbalance the advantage gained.

Where a stock of young plants has been secured from early cuttings, some of them may now be ready for repotting, and

this operation should be attended to as soon as the roots are in a condition to require it, for when the plants are allowed to become stunted much valuable time is lost while they are recovering their vigor, and in some cases permanent injury follows.

Unless already provided for, no time should now be lost before putting in Rose-cuttings for the stock of next season, so that the plants may be in readiness for timely planting. It has been often proved that while a good crop of Roses may sometimes be secured from late planting, it is far preferable to have a strong and healthy growth and well-established plants before the dark days of early winter set in.

Holmesburg, Pa.

W. H. Taplin.

ately light loam on shallow benches, on which the depth of soil is from four to five inches.

Philadelphia, Pa.

Polyantha Rose, Mme. Georges Pernet.—The Polyantha Rose is year by year claiming more attention from American Rose-growers, and, as many of us think, quite justly; we doubt, though, if any considerable number of the Rose-loving public appreciate as they should its sterling merits. The dwarf Polyanthas are perfectly hardy, and will endure many degrees below zero with but slight protection. For the edging of beds or for running lines, they have no superior. Several introductions of late years in this class have evidently the blood of the Tea Rose in their veins. A question may be raised as to the



Fig. 89.—The Banyan Tree in the Botanic Garden, Calcutta.—See page 44.

The Hybrid Tea Rose, Puritan.—This Rose, like many other new varieties, was presented to the American trade with the highest testimonials, but the result, as is well known, has been a disappointment in a majority of cases, even in the hands of growers successful with other kinds. It would be both unwise and unfair to condemn a new Rose before a careful and thorough test had been made of its capabilities, but in the case of the Puritan a test of three seasons' duration has not proved it to be a commercial success, and though it may be an exceptionally fine variety in Europe, it does not seem to be adapted to our climate, at least as a forcing Rose. One great objection to it is its tendency to produce a large percentage of unformed flowers during the winter months, though this trouble has been partially removed by grafting it on Manetti, by which means a more vigorous growth and better flowers have been secured than when the Rose is grown on its own roots. But even under the most favorable circumstances, the large proportion of knotty, greenish-colored flowers has been a noticeable feature in a house planted with the Puritan.

Another objection to this Rose urged by some lovers of the beautiful, is that the growth and flower stems are so erect and coarse as to give a very stiff effect unless most carefully arranged, though it must be admitted even by these critics that a large bunch of long-stemmed Puritans loosely arranged in a vase is very beautiful indeed.

One point in favor of the Puritan is that it is an excellent keeper, retaining its freshness after cutting for as long a time as any variety with which we are familiar. In regard to treatment, it may be said that in the establishment of its introducer (where probably as good a result has been obtained with the Puritan as anywhere in this country) it is planted in moder-

ately light loam on shallow benches, on which the depth of soil is from four to five inches. W. Philadelphia, Pa. **Polyantha Rose, Mme. Georges Pernet.**—The Polyantha Rose is year by year claiming more attention from American Rose-growers, and, as many of us think, quite justly; we doubt, though, if any considerable number of the Rose-loving public appreciate as they should its sterling merits. The dwarf Polyanthas are perfectly hardy, and will endure many degrees below zero with but slight protection. For the edging of beds or for running lines, they have no superior. Several introductions of late years in this class have evidently the blood of the Tea Rose in their veins. A question may be raised as to the advisability of infusing the blood of *Rosa Indica* into these plants, for it at once lessens the hardness of varieties thus produced, and also, in great measure, destroys the simple charm of their flowers by producing varieties that are types of neither class; too large for Polyanthas and very insignificant as Teas. One of the most distinct and beautiful sorts introduced so far is Madame Georges Pernet, an exquisite shell-pink in color, often deepening to a rich crimson at the centre; larger than others of the dwarf section, but retaining the original flat, open form of the family. It is wonderfully profuse in the production of its clustered flowers, and all who see it are captivated by its simplicity and the richness of its coloring.

Richmond, Indiana.

E. G. Hill.

Orchid Notes.

Lælia anceps Dawsoni.—Ever since this, the gem of all the white varieties of this species, made its appearance in European gardens, it has been the admiration of Orchid lovers. Some twenty years have now elapsed since its introduction, and during that period importers have failed in their many efforts to obtain a supply, consequently it still remains a very rare plant. They have, however, been successful in discovering several white forms which are very beautiful, but the variety under note has not yet been equaled for form and loveliness. The whole flower is large and round, its sepals and petals being of the purest white, the latter being remarkable for their extraordinary breadth, having a lip blotched with rich purple, and the throat handsomely veined with the same color. A specimen with a dozen flowers is now adorning the Cattleya house of Mr. F. L. Ames, at North Easton, Massachusetts.

Summit, N. J.

A. D.

Phalænopsis gloriosa.—This is one of the latest additions to this beautiful genus. It is presumed to be a natural hybrid between *P. amabilis* and *P. grandiflora*, its habit and inflorescence assuming a character intermediate between these two species. It appears to be a very robust grower, and excepting in this respect it is by no means an improvement on either of its supposed parents. But not so with the hybrids of *P. Schilleriana* and *P. amabilis*, namely, *P. casta* and *P. leucorrhoda*. These are among the most beautiful of the whole genus, the former having bronzy green leaves, while the latter has the marbled leaves of *P. Schilleriana*. They vary little in the inflorescence, the flowers resembling those of *P. amabilis* in form, being pure white, with the base of the segments tinged with rosy lilac, and the lip beautifully speckled and marbled with purple. Some fine examples of these are now in full beauty here, bearing many flowered branching spikes. A rare variety of *P. leucorrhoda* (var. *alba*) is also in flower. This plant varies from the type in the color of its flowers, which are almost white. Another beautiful hybrid *Phalænopsis* is *P. intermedia Brymeriana*. This is a rare kind, differing from the type in its long, narrow leaves, which are pale green and speckled. The flower spike is deep green and more in the way of *P. rosea*; the flowers are white, suffused near the centre with rose, while the lip is a rich amethyst color. The handsomest and most interesting hybrid at present in flower here is *P. Harriettia*, a hybrid between *P. amabilis* and *P. violacea*, and previously noted in these columns. This plant improves greatly in size and color each year as it gets stronger.

Kenwood, N. Y.

F. Goldring.

Zygopetalum Mackayi.—This is by no means a new or expensive plant, having been introduced from Brazil in 1825. I consider it one of the very best amongst the autumn and winter flowering Orchids. It grows and flowers profusely under green-house treatment, not requiring as much heat as some of the other species of this genus. If grown in too warm a temperature the leaves are very liable to become spotted, which detracts very much from the beauty of the plant. For florists' purposes, like filling a large centre piece for table decoration, three or four spikes of this plant in the centre with other Orchids surrounding them would make a fine show. The flower-stalk or raceme grows from one to two feet in height, with large, purplish blue and white flowers, which emit a very delicate fragrance. The cultivation of this Orchid is very simple, for it will grow equally well in either rough loam or peat-soil if it only has good drainage. The pot should be about half full of crocks to secure that result. It should have plenty of water when in active growth, and even when dormant should be kept moderately moist.

Rochester, N. Y.

Geo. Savage.

Plant Notes.

The Banyan Tree.

A REPRESENTATION of one of the most remarkable trees now known appears in our illustration upon page 43. It is the great Banyan tree in the Botanic Gardens upon the banks of the Hoogly, below Calcutta, and the only survivor of many hurricanes among the large trees which long made this garden famous. It is believed to be only a few years more than a century since the seed from which this tree sprang was dropped by a passing bird into the crown of a wild Date Palm. The main trunk is now, however, according to the latest statistics which have been published in regard to this tree, forty-two feet in circumference; there are two hundred and thirty-two additional trunks, many of them eight or ten feet in circumference, and the branches extend over an area eight hundred and fifty feet in circumference, and form a dense canopy of perpetual verdure, through which the sun never penetrates.

The Banyan (*Ficus Indica*), like many species of the genus, springs from seed dropped upon the bark or in the crown of some other tree. The young plant as it grows sends down its roots, which finally reach the earth, and, increasing in vigor, finish by strangling their host. These roots grow together and form the nucleus of the main stem of the future giant. The branches send down to the ground in turn roots which, in time, become trunks, and so the tree goes on, spreading farther and farther, until it may, in time, cover acres of ground with its branches and afford shelter to thousands of men. The famous Banyan upon the banks of the Nerbaddo, beneath which Alexander the Great is said to have camped, once sheltered—if the story is a true one—7,000 men; and in the present century, although much reduced by the washing away of some of its trunks by floods, this tree has measured nearly 2,000 feet in circumference and has had more than 3,000 stems.

The tree in the Calcutta garden has been well cared for, and every effort has been made to induce it to develop new trunks to support the gigantic limbs which spread out horizontally about ten feet from the ground, as appears from the following extract from Hooker's "Himalayan Journals," published in 1855, in which a most interesting account of this tree may be found: "The props are induced to sprout by wet clay and moss tied to the branches, beneath which a little pot of water is hung, and after they have made some progress they are inclosed in bamboo tubes, and so coaxed down to the ground. They are mere slender whip-cords before reaching the earth, where they root, remaining very lax for several months, but gradually, as they grow and swell to the size of cables, they tighten, and eventually become very tense. This is a curious phenomenon, and so rapid that it appears to be due to the rooting part dragging down the aerial. The branch, meanwhile, continues to grow outwards, and, being supplied by the new support, thickens beyond it, whence the props always start outwards from the ground towards the circumference of the tree."

The Banyan, as this particular species of the Fig is called, although several others (including the Florida species figured upon page 128 of our first volume) spread by supports developed from aerial roots, has large coriaceous, dark green leaves, five to six inches long by three or four inches broad, and somewhat pubescent on both surfaces. The figs are the size of cherries.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

IV.—THE DESTINATION OF THE LIQUIDS ABSORBED BY ROOTS.—EVAPORATION OF WATER FROM LEAVES.—INTERRUPTION OF THE WATER CURRENT.—EXTENT OF ROOT SYSTEM.

SOME very interesting facts appear when we compare the amount of roots in any given plant with the spread of foliage. One of the earliest recorded comparisons is that of Hales, in 1731, who gives the following figures in regard to Sunflower, three and one-half feet high. There were "eight main roots reaching fifteen inches deep, and sideways from the stem; it had, besides, a very thick bush of lateral roots, which extended every way in a hemisphere about nine inches from the stem and main roots." Adding together all the different measurements, he found the roots were no less than 1,448 feet in length, and the entire surface to be 2,286 square inches, or about sixteen square feet. The leaves of the same plant measured 5,616 square inches, or about thirty-nine square feet.

Recent estimates give the following ratios of the parts below ground to those above ground:

Silver Fir,	169:100
Norway Spruce,	267:100
Scotch Pine,	477:100
Hales' ratio would be for the Sunflower,	41:100

But from what was shown in the last paper, these figures are very misleading, since they do not take into account the surface of the root-hairs in the case of the Sunflower. In *Abies pectinata* and some other Gymnosperms, no perfect root-hairs are discoverable; the work of absorption is here* carried on by the delicate cells just behind the tip, which are sometimes branched, but do not take on the regular forms of ordinary root-hairs. When root-hairs are present in abundance, as in the Sunflower and by far the greater number of all our plants, the absorbing surface is surprisingly increased. Estimates of the amount of increase can be only approximate, but the following are given by authors: In some instances the surface is five times, and, in others, fifteen times greater than without them. It should be borne in mind that roots of some plants, especially trees, run through the ground to very great distances, such as those commonly planted for shade.

The absorbing rootlets, with their zones of absorbing cells, lie far away from the base of the trunk, and extend even beyond the eaves of the canopy of foliage, where it would seem as if the supply of water during a rain might be shed rather more abundantly. In any event, the absurdity of watering a shade tree near the trunk in time of drought is apparent. The strong root-branches near the trunk are for mechanical support, and take no part in the process of absorption from the soil, except to transfer what the rootlets far remote from them take in.

THE PATH OF TRANSFER.—The dilute aqueous solutions from the soil absorbed by the rootlets are carried to the leaves.

* There is possibly another mode in which these rootlets absorb nutriment from the soil. This will be considered later.

This transfer in our woody plants is effected wholly through the younger woody part of the stem, as will presently be seen, but in our herbaceous plants the transfer is through the cells of soft tissues, especially those which are unhardened elements, answering to what is true wood in our woody plants.

When a girdle of bark is removed from the trunk of a forest tree the leaves remain for a time, frequently for a season, or even more, about as fresh as ever; but as the wood begins to yield to the invasion of decay, the transfer of liquids from the roots to the leaves is more or less completely checked, and the tree dies. On the other hand, if, after having built up a staging around a tree to give it enough support to keep it in place, we should cut out all the wood of the trunk, leaving the bark, the transfer of liquids from the roots would be checked at once and the withering of the leaves would follow in a single day. Thus, by these two experiments, it is easy to prove that the path of readiest transfer of liquids from the roots is in the woody part of a tree trunk. This transfer is, in no sense, a circulation.

STOMATA, OR BREATHING-PORES OF LEAVES.—The leaves are practically continuous in their tissues with the fabric of the twigs, and, therefore, with the branches and main stem, just as the main stem is continuous with the main trunk and larger divisions of the roots and these latter with the rootlets. There is an unbroken connection between the rootlets, with their absorbing cells in the ground, and the thin tissues of the leaves exposed to the air. Now, from the thin tissues of the leaves water evaporates.

The external surfaces of the leaf are waterproofed by a substance known as cutin, which covers every part of the exterior, except at certain openings, chiefly on the under side, known as breathing-pores or stomata. These are so numerous in a single leaf as to be counted by hundreds of thousands.

They are, in fact, delicately-balanced valves of very minute size, which are so perfectly governed in their working that they can control the amount of water which is lost by evaporation through the otherwise impermeable covering of the leaf surface. The relations which these bear in point of number and method of construction to the peculiar surroundings of swamp and desert plants, are among the most interesting in the whole range of exquisite adaptations among plants. It is enough to say, at present, that the amount of water lost by evaporation, under ordinary conditions, is not larger than the roots can readily supply. When a greater demand is made on the roots than they can meet, the deficiency is revealed promptly by the wilting of the lower leaves and afterwards by those higher up on the stem. By this wilting the amount of evaporation is temporarily lessened, and thus a chance is afforded for the loss to be made good.

Recalling what was pointed out in the third paper of this series, namely, that the water throughout the plant is practically continuous, surrounding, as it does, in the form of films, each structural molecule of the whole plant, the current of water to meet that which is lost by evaporation through the stomata is uninterrupted as long as the supply from the roots holds good. But when the soil is relatively cold, the current is checked and the leaves wilt, as can be easily shown by a simple experiment. But the most common interruption is, of course, caused by too great dryness of the soil. Soil may and frequently does appear dry, and yet may have plenty of water clinging to its particles, affording an adequate supply for the plant, but when a certain limit of dryness beyond this is passed, the plant feels it and shows it. By the wilting of the lower and afterwards of the upper leaves, the evaporation is checked, and unless the interruption is too long continued, the current can be resumed when more water is supplied to the soil.

When a branch is cut off the current is arrested at once, and is not resumed completely, even if the cut end is plunged instantly in water. But it is an interesting fact that the leaves keep fresh longer if the branch is *cut off under water*; in this case, interruption of the current, even for an instant, is avoided; the continuity of the water system in the plant is unbroken. It is possible, in this way, to keep some branches fresh until decay of the cut surface begins.

It is said by Mr. K. Miyabe to be a common practice in Japan to cut with care flowering branches of ornamental shrubs and trees for decorative purposes, and to char the cut ends quickly and thoroughly before placing them in the water of the vase. By this simple plan, which prevents the attacks of fungi, causing decay, the branches remain fresh for a longer time than in any other way. Repetitions of this practice in Cambridge, last summer, showed great differences in this respect between different plants.

A modification of the practice of cutting off branches under water, to make them keep longer unwilted, is easily managed, namely, by making a second cut after the piece is put in water. The amount of water lost by evaporation differs according to various circumstances, such as the temperature of the air, the amount of moisture in the air, and so on, but the following figures may be of interest, although they are, at best, only rough estimates. Professor Prestwich, quoted by Rolleston, states that a tree of average size gives off two and one-half gallons of water per diem.

Hartig gives, as his estimate, about three pounds to an average tree of twenty years' standing.

Hales found that the Sunflower previously referred to in this paper, gave off about a pound and a third every day.

Evaporation of water from the leaves concentrates the dilute solutions of mineral matters brought up from the soil, (2) it drains the soil to a certain extent, and lastly (3), it adds a certain amount of moisture to the air. But these effects on the plant, the soil and the air have so many practical bearings, that they must be deferred for special consideration.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

The Forests and Woodlands of New Jersey.*—II.

A PURE FOREST.—There is a pure forest of Pitch Pine (*Pinus rigida*) near Lakewood, in Ocean County.† The trees are fifty or sixty feet high, and they average about ten inches through. No underbrush grows among them, nor anything but moss. The ground on which they stand was cultivated a half a century ago, and this piece of forest shows that under favorable conditions trees grow much faster than most persons believe. The land here would have very little value for any other use, and this is true of a great deal of land in southern New Jersey. It cannot be made so valuable in any other way as by perpetuating forest growth upon it. Few things would be of greater benefit to this region than the recognition by its land-owners of the fact that Pitch Pine is a good crop.

CHANGES IN THE WOODLANDS.—There has not been much change in the condition of the woodlands of New Jersey during recent years, except what has been produced by the fluctuation which is always going on in the local industries in different parts of the state. As a consequence of this fluctuation there is some variation in the market for fuel and other products of the forest. In some districts of northern New Jersey lime-burning has been actively carried on for the last few years, and wherever this is the case it creates a demand for wood, which gives employment to many men as wood-cutters and teamsters, and considerable tracts of timber are cut off which would otherwise be allowed to stand longer. The profitability of forest-lands thus depends so largely upon local conditions that no general statement can be made regarding it. The establishment of a lime-kiln or other wood-consuming industry may render investments in forest-lands in its immediate vicinity profitable when they would not have been so without it. Considerable movements of the population of some portions of the mountain region in the northern part of the state have sometimes resulted from such changes in local industries which depend more or less directly on the supply of fuel and other forest-products. Between Deckertown and Brick House, and in other parts of this hill-country, there are hundreds of places still plainly marked by old Apple and Cherry trees, or by the mounds where the chimneys have crumbled down, where once stood the cabins of woodsmen. A new forest growth crowds and chokes the fruit-trees planted by these transient settlers, and vigorous Oaks and Chestnuts are growing in the very places where once the fire burned bright on the family hearth. An old resident of that part of the state told me he remembered when those woods were full of people, and mentioned having once been present at a Democratic mass-meeting at a remote point which he named, when there were hundreds in attendance; and he added, by way of emphasis, "Where are those Democrats now?"

BEAUTIFUL SCENERY.—There is a great deal of beautiful scenery in northern New Jersey, and more and more of the people of New York City will doubtless go to this region to live. Many thousands of them have already established their homes for the summer, or for the whole year, in the highlands of this state which lie nearest the great town; but the movement will go on increasing, and the beautiful hill-country, which is still further away, is certain to attract multitudes of

*From advance sheets of the Report of the Geological Survey of New Jersey.

†An illustration of the Lakewood forest appeared in this journal, on page 164 of Volume I.

men and women who value the healthful conditions of life in a region of hills and forests. All such persons have, whether they think about it or not, a vital interest in the treatment of forest-lands and trees, and in the diffusion of knowledge and the development of intelligent sentiment regarding these subjects. Unless thought and intelligence are applied to these matters, the beauty which now attracts people to these regions will be in a great measure destroyed by the advent and operations of a considerable population.

THE SOUTHERN PINE BARRENS.—The southern part of the state is rather monotonous in appearance, and in winter it is desolate looking and uninviting. But the winter is short here, and during the remainder of the year the Pine country is to the botanist one of the most attractive and interesting regions of the United States. There are many beautiful and interesting plants here, some of them extremely local, and others very rare. The queer little Fern, the *Schizæa pusilla*, is found nowhere else in the world, I believe, and many southern plants are found here which go no further north, while, on the other hand, many plants come down from the north as far as this, but are not found farther south, so that the flora of the region is remarkably rich, copious and interesting.

It is probable that the next few years will bring increasing changes in the woodlands of this part of the state. The chief value of the region depends upon its climate and upon the sanitary influences of its Pine forests. There is probably no part of the world which is healthful for everybody. I have known people who received decided benefit by removal from southern New Jersey to northern New England. But there are many thousands of persons in New England who are oppressed and depressed by the rigor of the northern winter who would be greatly benefited by removal to southern New Jersey, and some of them would live many years longer in this salubrious region than they are likely to do if they remain in their northern homes. Many such persons have already come here from Maine, Massachusetts, New Hampshire, New York and other states, most of them going into the towns to live. But the true place for such health-seekers is in the Pine woods.

The poorest people cannot well come, for there would be no way for them to make a living. The land in southern New Jersey is not rich, and some capital is required for successful farming here. It is never wise to go to a new or unknown region to live without some direct personal examination of the country and its resources. It is not judicious to make a change by which so much is placed at risk on the strength of any report whatever—not even on the one which I am now writing. I wish merely to point out the fact that during the next few years there is likely to be a gradual and considerable increase in the demand for forest lands in southern New Jersey and a consequent advance in prices. The people who should come here from the states farther north are those who have sufficient means to live without any very profitable industry; whose investments yield an income which will support them, or nearly support them, and whose health would be improved by living here. For such persons fruit-raising, gardening or farming in this region would be a most healthful and pleasant recreation—if they like that kind of work. But the real reason for their coming here is to be found in the comparative mildness of the winters, in the soft yet bracing atmosphere, and especially in the great number of days in the year when any man or woman who can be out of bed can live out-of-doors.

The woods of southern New Jersey should not be cut off. The land now in forest ought never to be cultivated—not much of it. The whole Pine region ought to be gradually filled up by a population able to live without much general agriculture. The country is naturally fitted to be a great sanitarium, and there will soon be an imperative need that the people who are to live here shall learn what are the true uses of the forests, and how they can be permanently preserved and made most valuable to their owners.

Franklin Falls, N. H.

J. B. Harrison.

Correspondence.

A Horticultural Register.

To the Editor of GARDEN AND FOREST:

Sir,—I read with interest the remarks on nomenclature by Mr. R. J. Halliday at the Florists' Convention in New York, and the editorial remarks on the subject in your paper. This is a movement in the right direction, and I hope the committee appointed to determine names by which flowers shall be known will be successful.

While approving everything done in this direction at the convention, I wish to submit a supplemental suggestion.

When the names have been definitely fixed they should be registered, with Number, Name, Description and History, in a book, or series of volumes, to be called the *American Horticultural Register*.

In this register should be recorded, first, the names of all varieties of flowers, fruits and plants which are now cultivated, to be followed with new varieties as they are originated and found to be worthy of propagation. This register should be authorized by the association, and kept by, or at the office of, GARDEN AND FOREST, and new varieties could be submitted and recorded, and a certificate be furnished the originator. A separate series of numbers should be devoted to each flower; fruit or plant—for instance, make a separate list of Roses, Chrysanthemums, Pansies, Apples, Pears, Grapes, Ferns, and then number each list separately, commencing each with number one, and continuing the lists and numbers as new varieties are offered for registration.

Every one can see the advantages of a system of this kind, without enlarging upon them.

The system of registering fine live stock is well known, different registers being opened for the various kinds, such as trotting-horses and thoroughbreds, short horns and Jerseys, and so on. Flowers, fruit and plants can all be as well included in one register.

Some of the numbers of such numerous families of flowers and fruits as Roses, Chrysanthemums, Grapes, might become so familiar as to be used in some cases in place of names. Any one knowing anything about trotting horses knows that Hambletonian 10 is Rysdyk's Hambletonian.

The American Trotting Register is kept by John H. Wallace, of New York, editor of *Wallace's Monthly*, under the supervision of the National Association of Trotting Horse Breeders, and a fee is charged for registration, which, I suppose, pays all expenses of keeping the register.

Walnut Creek, California.

A. L. Bancroft.

[Our correspondent hardly needs to be reminded that herd-books and stud-books are prepared for purposes quite distinct from those which it is proposed to secure by this system of plant-registration. Individual animals are registered in order that they may be identified, that their pedigree may be established, and that purity of blood may be maintained in a given breed or strain of live stock. In the case of plants, however, where a single registration is made for all the individuals of a given variety, and where the parentage of a plant is often unknown and always of secondary importance, it is difficult to see how a register would prevent the evils complained of. The concerted action of florists and nurserymen to prevent "substitutions," and to insist upon the abolition of duplicate names in the trade, is one step in the right direction, and the organization of some authoritative body, who shall issue certificates for plants and fruits of merit, and to whom appeal can be made in cases of doubtful identity, is another.—Ed.]

Fruits for Cold Climates.

To the Editor of GARDEN AND FOREST:

Sir.—Under this title some late articles from Vermont have been extremely interesting to western people, as showing how the question of adapting Russian fruits to American conditions looks to one in the far north-east. But some of the views must be profoundly modified to suit the longitude of Iowa.

The writer truly says, "In the prairie states intense summer heat and drought and the fatal sap blight must be encountered." Then he adds: "The fruits of the Russian and Asiatic Steppes furnish the best material to meet these contingencies." In this last statement the writer has certainly been misled by incautious statements. The best and most conservative horticulturists of the prairie states are not satisfied with the past performance of Russian fruits, nor hopeful of their future success here.

The Russian apples, from which most has been hoped, have developed in the prairie states three serious (and with most varieties fatal) defects, (1) winter-killing, (2) sap blight and (3) unfruitfulness, to say nothing of the poor quality and early decay of most of the fruit produced.

During the season just past the sap blight has ruined some varieties upon which the highest hopes had hitherto been built. This disease has made our nurseries and orchards of Russian Apples look like a typical case of measles after the

disease has "come out." I have lately attended a meeting of the Horticultural Society of eastern Iowa and the meeting of the society of western Iowa, and failed to hear even one variety of Russian Apples—or any other Russian fruit—commended as reliable for general cultivation in Iowa.

Regarding Russian Pears and stone fruits, no man can say that any one variety has yet shown reasonable ground to expect of it permanent usefulness in any single region of the west. The truth is that experience on the prairies has thus far failed to justify the expectations raised by the over-hopeful introducers of Russian fruits. The failures have not all been proclaimed. We are awaiting further trials, but without enthusiasm.

It would be interesting to know upon what authority Dr. Hoskins bases his belief that "The Russian tree fruits are undoubtedly of hybrid origin; . . . in the valley of the Volga and the Steppe region the influence of north Asia stock preponderates." De Candolle, who had been supposed very high authority, takes a diametrically opposite view, saying of the Apple: "The lack of communication with Asia before the Aryan invasion, makes it probable that the tree was indigenous in Europe, as in Anatolia, the south of the Caucasus and northern Russia, and that its cultivation began early everywhere."

The names of a large portion of the Russian fruits received in the west indicate a German origin.

Des Moines, Iowa, December 24th, 1888.

C. L. Watrous.

Periodical Literature.

A supplement published with the Christmas number of the *American Florist* gives one a good chance to see the average level attained by our florists in the preparation of "set pieces" and floral decorations for public and domestic buildings on festal occasions. It contains more than seventy pictures of such designs, ranging from small baskets and bouquets to altar decorations, including a number of arrangements for funerals and weddings. In many cases great ingenuity is shown in the application of flowers to would-be decorative purposes; but, unfortunately, in many instances it is ingenuity misapplied. In one picture we see an upright piano swathed with roses in a way that could hardly be improved upon, if it is assumed that so to enwrap a piece of furniture is a task that good taste can sanction. And the artist who constructed the "Funeral Design of Jacob's Ladder, or the Golden Stairs," or the "Floral Table," or huge "Floral Butterfly," must have possessed a degree of skill which might profitably have been devoted to a better purpose. Among the worst things in the collection are those which show the manner in which certain public monuments had been treated on Decoration Day—notably the Farragut statue on Madison Square, where "the old Salamander" is made to look ridiculous with a huge wreath encircling his body, while the sculptured base is entirely concealed by ugly constructions representing ladders, swords, cannon and a steamship at sea. Some of the chancel and staircase arrangements of foliage plants, on the other hand, are very good; and nothing in the shape of a set piece could be better than the "Trinity Cross," composed chiefly of Lilies and very graceful in shape. A simple and appropriate funeral wreath is one formed of four Palm branches held together by two bunches of Lilies-of-the-Valley, and some of the little baskets filled with only one or two kinds of flowers are also pretty. But too many of the baskets shown are far too elaborate for their purpose, and we find that even the perverted taste for baskets in the form of shoes, hats and other objects wholly inappropriate for association with flowers, still persists. On the whole, the collection of pictures proves that good taste is by no means absent in this community, which uses cut flowers more profusely than any other in the world, but that there is still great room for improvement, and much need for the cultivation of greater simplicity and a truer appreciation of what the beauty of flowers really is.

It appears from an interesting article published in the December number of the *Druggist's Bulletin* that the annual crop of the American Ginseng-root, which for the last twenty years has amounted, on an average, to 400,000 pounds, is all exported to China. The first shipments are said to have been made in the year 1718 through the agency of the French missionaries in China. The American Ginseng (*Aralia quinquefolia*) grows in the dense forests from Canada to the high mountains of Carolina and Tennessee, and from Maine to the Mississippi. It has a stout root, three to six inches in length, divided into two lobes at the base, which is usually harvested before

the ripening of the seed, a practice which is gradually exterminating the plant. The demand, however, is steadily increasing, while the production in late years is falling off, so that the price at the present time has risen to two dollars and a half a pound. The maximum export of 600,000 pounds was reached in 1860, since which time it has gradually diminished, and is now lower than the average of the last forty years; and it seems to be only a question of time when the Ginseng will be exterminated, unless the time of gathering the roots can be regulated so that the seeds may ripen and fall before the roots are dug.

Various attempts have been made to cultivate the Ginseng, especially in New York, Pennsylvania and Wisconsin, but no satisfactory results have yet been reached. Large roots, which are the only ones that find a ready sale at remunerative prices, have only been produced from plants grown naturally in the shade of dense forests. As is well known, the roots of the Ginseng have no medical value whatever, and their use by the Chinese from time immemorial seems based upon some popular superstition in regard to this plant. But whether it is valuable or not, it is an important article of export, for which there is, and probably always will be, an active demand; and it seems for the interest of the communities in which this plant grows to prevent its extermination by legislation, for the same reason and in the same manner that game is protected during a certain part of each year.

In a late number of *Nature* it is stated that at the meeting of the Scientific Committee of the Royal Horticultural Society on November 13th, Mr. Henslow showed specimens of several species of plants which are propagated by cleistogamous flower-buds. By that means, while retaining a dwarf habit, they are able to multiply very rapidly, and to extend over considerable areas in a tennis-lawn. Although none of them are perennials, they remain so reduced in size that they are not exterminated by the mowing-machine periodically cutting them down. The result is that each species has more or less covered certain patches of ground, to the almost entire exclusion of everything else. The plants in question are *Cerastium glomeratum*, *Montia fontana*, *Trifolium procumbens*, *Sagina procumbens*, *Alchemilla arvensis*, *Veronica arvensis* and *Poa annua*. Mr. Henslow added that he had observed, many years ago, *Trifolium subterraneum* flourishing in the same way in the close-cut grass in Kew Gardens, on the site of the present rockery.

Recent Plant Portraits.

PINUS LARICIO, *Gardeners' Chronicle*, December 15th; a portrait of the specimen growing in Kew Gardens near the principal entrance, and planted by R. A. Salisbury in 1814.

SATYRIUM CARNIUM, *Gardeners' Chronicle*, December 15th.

FICUS ROXBURGHII, *Gardeners' Chronicle*, December 15th; an admirable reproduction of the frontispiece to Dr. King's monograph of the south Asia Figs, showing the curious way in which the abundant fruit of this species is produced. "*Ficus Roxburghii*," to quote from the columns of our contemporary, "is a native of the lower and outer Himalayas from Nepal to Bhotan, being found at elevations of from 1,000 to 3,000 feet. It is a tree from fifteen to twenty-five feet in height, and with a wide, spreading head. The leaves are large, measuring from one to one and a half feet in length, and from twelve to fifteen inches in breadth. The most striking feature in the tree is, however, the great abundance of its handsome, russet-red figs. These figs, in shape and size, much resemble Dutch turnips. They are carried in enormous bunches on the stem, especially near its base, and smaller bunches on the main branches. The mass of figs borne at the collar of the stem on this singular tree at the time when it was photographed, as Dr. King informs us, was about a hundred weight. The fruit, however, although eaten by the unfastidious Indian laborer, is quite unpalatable to a European, being insipid and sloppy."

ARBUTUS ANRACHNE, *Gardeners' Chronicle*, December 22d; a view of a fine specimen tree in Kew Gardens.

STAPELIA GIGANTEA, *Gardeners' Chronicle*, December 22d.

LODOICEA SEYCHELLARUM, *Gardeners' Chronicle*, December 22d; a figure showing the method of germination of this plant—the so-called "Double Cocoanut."

PASSION FLOWER, WOODHATCH HYBRID, *Gardeners' Chronicle*, December 22d; a hybrid raised in an English garden between *P. racemosa* and *P. quadrangularis*.

CRATÆGUS MEXICANA, var. CARRIERI, *Gardeners' Chronicle*, December 22d; from a specimen in Mr. Gumbleton's garden, near Cork, in Ireland.

Notes.

More than twenty million pounds of raisins were packed in California last year.

Tomatoes growing in the open air were picked fresh from gardens in Santa Rosa, California, on Christmas day.

Small Holly-trees three or four feet high were imported from England for holiday decorations, and are still seen in many windows in this city. They were, in most cases, symmetrical and well formed, superior both in berry and foliage to the loose Holly imported in crates. In addition to the ordinary form were shapely little trees with variegated foliage and golden berries.

The range of the Post Oak (*Quercus obtusiloba*) may be extended eastward to Brewster, on the border of Chatham and Harwich, in Massachusetts, where Professor Farlow informs us that he has detected this tree in what is the only station reported for it on the mainland of Massachusetts. This, Professor Farlow tells us, is also the most eastern station of *Lachnanthes tinctoria* known.

Professor Church has recently given an account of his analysis of the tubers of *Stachys tubifera*, the new Japanese vegetable, from which it appears that they contain 78 per cent. of water, 1.5 per cent. of albuminoids, 1.7 per cent. of non-albuminoids, 16.6 per cent. of sugar, .7 per cent. of fibre, .1 per cent. of ash, .2 per cent. of fat, with a trace only of starch. A comparison of this analysis with that of the Potato shows a much larger amount of water, and rather more flesh-forming albuminoids than are found in the Potato, and that the sugar replaces the starch, which the analysis of the Potato shows to be 15 per cent.

A correspondent calls our attention to an error in the account of the "Washington Oak at Fishkill," published in our issue of December 19th, 1888. William Denning was described as Washington's Adjutant-General, upon authority which seemed adequate, and without reference to the rolls of the Colonial Army. It appears, however, upon further investigation, that Mr. Denning held no commission in the army, although as a patriotic citizen of Orange County in this state, eager to aid in supplying the army, his relations with the headquarters during Washington's residence in Newburgh were, his grand-daughter informs us, intimate and cordial.

Herr Max Leichtlin writes to *The Garden* that the fungus disease which has caused such serious damage to Christmas Roses in Europe is probably induced by a disregard of the natural conditions under which these plants have been produced. In their wild haunts they thrive in shady nooks in loamy soil, with no other added nourishment than the decaying leaves supply. In cultivation they are often kept in sandy soil that has been highly manured, and planted in the open sun. The remedy is to wash off the roots, replant in a border which has been filled in for a foot with fresh loam, and which is shaded for a portion of the time at least, in mid-day; then mulch with half-decayed leaves and let the plants alone.

A tersely written Bulletin from the California Board of Forestry calls the attention of the citizens of that state, and especially of the farmers and irrigators, to the dangers that threaten their interests from the destruction of mountain-forests. The wasteful and ruinous methods of cutting timber, the increasing damage by fire, land-laws that invite fraud, the neglect of the school forest-lands, all combine to rob the people of their rights. The Board asks the people to urge upon Congress to withdraw all Government timber-lands in the state of California from sale or entry, and to insist that certain lands be maintained permanently in forest to guarantee verdure on the water-sheds and preserve the springs and streams.

Of tomatoes there were packed last season 3,319,437 cases of two dozen tins each, or a total of 79,666,488 cans, costing at points of production about \$6,000,000, and reaching consumers at a total expense of \$8,000,000. The total pack in 1887 was 2,817,048 cases. The canning industry has grown rapidly in the Western and Southern States, largely reducing the demand upon Baltimore, Philadelphia and New York for such goods. In a few years each section of the country bids fair to supply its wants from home canneries. The leading points of production are Maryland and Virginia, credited with 1,118,733 cases; New Jersey, 788,363; Delaware, 227,030; New York, 197,432; Western States, 796,599; Eastern States, 43,360; Canada, 73,990.

Baron Eggers, well known for his botanical explorations in Saint Thomas, San Domingo, and more recently in the Bahama Islands, is about to engage in an examination of the flora of the high mountain ranges of the eastern part of the Island of Cuba, first made known by Charles Wright twenty-five years ago. Some of the highest summits of Cuba reach an elevation of about 9,000 feet, and as these mountains have only been partially explored, Baron Eggers may be expected to add a considerable number of species to the Cuba flora. Baron Eggers, who may be addressed to the care of Messrs. Brooks Brothers & Co., Santiago de Cuba, will be prepared to furnish sets of Cuban plants for ten dollars the 100 specimens, delivered in this city.

A correspondent in Germantown sends us a box of the deliciously fragrant flowers of *Chimonanthus*, the east Asian representative of our *Calycanthus*, or Sweet Shrub. The flowers of *Chimonanthus* are rarely seen in this climate in good condition, as they appear in January, and are destroyed by cold as soon as they open, in ordinary seasons. The flowers are pale yellow or nearly white, and purple on the inner face of the petals. They appear before the leaves. If this shrub, which is quite hardy here, is planted at the north, a very sheltered spot near a building should be selected for it, in order to secure as much protection as possible for the flowers. *Chimonanthus* in the extreme Southern States is one of the most delightful winter-blooming shrubs which can be planted in a garden.

A correspondent of the *Independent*, writing from Orleans, Illinois, makes a strong plea for the Barberry as a hedge-plant. "Planted in hedges," he truthfully explains, "the Barberry is a bower of beauty from the time its pendulous racemes of yellow bells swing in the spring sunshine throughout the winter, when the scarlet berries blush under veils of snow and sleet." Moreover, the Barberry has practical value as well as beauty to recommend it. It "makes a sauce which rivals the Cranberry in excellence, . . . and has sufficient juice to make most delicious jelly, especially if mixed with apple juice, which relieves the tartness and enhances the beauty of the color." The bark, too, we are told, is useful for tanning purposes, the roots for dyeing yellow, and the berries as a source whence malic acid may be extracted.

"The fundamental difference," says a recent writer on Japan, "between Japanese and foreign methods of adjusting culled flowers has often been remarked. With us the general idea is to produce a bouquet in which the richest variety of color can be obtained—a sort of crush-concert of hues in which individual form and beauty are almost lost. The Japanese florist, on the other hand, prefers to display the natural lines of stems and branches, and to exhibit the subtle shapes and colors of each bud and blossom in an open and well-balanced composition. The same subordination of color to form and the same simple naturalness as opposed to ostentatious artificiality, are to be observed in even the minutest details of Japanese gardening. Grouped masses of similar flowers are not wanting in some parts of the native gardens, but there is no attempt to arrange them into color patterns and geometrical designs.

We referred not long ago to the fact that perfume making from fresh flowers was becoming an established industry in our Southern States. A recent letter to the New York *Tribune* describes some of the processes employed in Florida, and declares that their results are so excellent that "now it is claimed that attar-of-rose can be made in Florida with as much success as in the gardens of Bulgaria." The two chief processes used are distillation, and absorption, or "enfleurage," the latter being resorted to in the case of the more delicate flowers, whose perfume is found to be injured by heat. It is based on the "established law of affinity which hydro-carbons have for perfumes. When these have been highly purified they catch, and in catching concentrate and intensify, the odors communicated to them." A perfume factory where this process is used contains multitudes of wooden frames with rims about three inches in depth, in which are set several sheets of glass. Each sheet of glass is spread with a layer of pure fat, and over this fat are sprinkled the petals from which the odor is to be obtained. The sheets are piled closely on one another in the frame, the frame is slid into a tight-fitting box, and in a short time the fat absorbs all the odor. The fat is then cut up into small squares and immersed in alcohol, when "the delicate essence at once parts from its coarser companion, and, uniting itself to the alcohol, is fit for the market." Another method is to strew the petals on cloths saturated with oil, and when the odor has been absorbed, to put the cloths in a press and squeeze out the impregnated oil.

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The Nation's Forests.

THE first step in the effort to provide for the conservation of the forests on the national domain should be the withdrawal from sale of all forest-lands belonging to the nation. It will not be necessary to preserve and maintain all these forests permanently, but the extent of forest-territory which will be required by a practical plan of forest-preservation and management for our Western mountain regions cannot be at once precisely determined. A thorough examination of these regions, and of the agricultural country depending upon them for its water supply, will be necessary, in order to show what forests must be retained, and what tracts of timber can be put upon the market without injury to the important interests involved. Until such an examination has been made, none of the forest-lands now belonging to the United States should be sold.

The second step should be to commit to the United States army the care and guardianship of the forests belonging to the nation. There is in time of peace no other work of national defense or protection so important as this which the army can perform, and it is plain that under existing conditions the forests on the national domain will not be—indeed cannot be—adequately guarded and protected by any other means. The measures which have been tried, including those now in operation, or nominally in operation, have proved almost entirely ineffective. The forests on the public lands are pillaged by settlers, and by the employees of railroad and mining companies, without scruple or limit. Other instruments will have to be employed if the forests are to be preserved. Their complete and final destruction, with that of the soil which sustains them, is, under the present system, or want of system, only a question of time, and of a very short time.

The officers of the United States army are educated by the nation for its service, and they constitute a body of men not equaled by any other in our country in their equipment for guarding and protecting the great forest-regions belonging to the nation. They possess every kind of fitness for this work in greater degree than any other class of men, and if authorized by law to undertake this service

they would have the power and the means necessary for its performance, while everybody else is at present inevitably powerless and incapable. As there is likely to be very little work for the army hereafter in the care of the Indians, it will be available for this service of guarding the national forests. The work can be done well by the army, and it would cost nothing, or very little, while any other plan would necessarily be both ineffective and costly. This guardianship and defense of the nation's forests by the army of the nation should be continued and maintained until a sufficient number of adequately trained and equipped foresters has been provided by the national government for the administration of a complete and permanent system and policy for the management of the forests on the public domain.

This brings us to consider the third step. This should be the appointment, by the President, of a Commission to make a thorough examination of the condition of the forests belonging to the nation, and of their relation to the agricultural interests of the regions through which the streams flow which have their sources in these forests, and to report, with the facts observed, a comprehensive plan for the preservation and management of the public forests, including a system for the training, by the government, of a sufficient number of foresters for the national forest service.

The Commission should determine what portions of the existing forests on the public domain should be permanently preserved, and in what manner the remainder should be disposed of. The national forests can be so managed that they will be perpetually reproduced, and will yield forever an abundant supply of timber for the inhabitants of the adjacent country, and a revenue which will more than sustain the cost of the forest service. A National School of Forestry should be established at a suitable place in one of the great mountain forests on the public lands, and its equipment should be as thorough and adequate for its purpose as is that of the National Military Academy at West Point.

THE "Elizabethan home" has long been a synonym in American ears for all that is most beautiful in domestic architecture, and, at the same time, most comfortable and home-like. But exact observation and clear judgment have less to do with this feeling than traditional sentiment and the reports of tourists enchanted by the picturesque accessories of English country dwellings. The following description—quoted from the pages of the *American Architect and Building News*, where a recent address by the English architect, Mr. J. A. Gotch, is discussed—gives a more exact idea of Elizabethan architecture than those that are commonly presented to us.

"In planning these homes nearly everything was sacrificed to show. People who lived contentedly with their dogs in rooms carpeted with rushes, which were changed once a week, could hardly be expected to be very squeamish in regard to niceties of arrangement, and it is common to find the bedrooms opening from each other after the fashion of a New York tenement-house, without any corridor for reaching them separately, while in some very magnificent mansions the suites of rooms allotted to visitors could only be reached from the reception-rooms by crossing the court, which, it is needless to say, had no provision for sheltering from the rain or snow the festal clothes of the persons who walked through it. So inconveniently planned, according to our notions, are the Elizabethan mansions in this respect, that they can hardly be used at all by a modern family. One or two of them have been remodeled by the rather heroic treatment of building a corridor around the court-yard, like a cloister, so as to reach the farther bedrooms without going through all the others, but this darkens half the windows, besides spoiling the court. In other cases a portion of the house has been rebuilt, at a great expense, according to our ideas, but most of the Elizabethan palaces, splendid as they once were, have been allowed to go to ruin, simply from the impossibility of utilizing them for a modern family without very costly alterations. Even the reception-rooms, magnificent as they are, accord ill with the

habits of the present representatives of the families which built them. . . . In a few instances, as at Hatfield House, Lord Salisbury's favorite residence, the ancient mansions will probably be kept in habitable condition for many years longer; but the great majority, like Haddon Hall, the most beautiful of all, will inevitably be abandoned, sooner or later, by their owners, from the impossibility of being comfortable in them, and they will fall, one after another, into decay. Whether this will be a great loss to architecture is not altogether certain. The plans have been recorded in many books, so that we shall not lose the recollection of their stately and picturesque arrangement, but the details of the designs are rarely of a very high order of merit. The rich ceilings made of plaster modeled by hand are often the best portions. . . . But the wood-work is no better than that done now, while the carving, both on wood and stone, is of little value, either in design or in execution, and would hardly be noticeable except for the lavishness with which it is used. . . . Moreover, the houses of that period contained glaring faults. Symmetry being, in the minds of the architects of that time, necessary to correct taste, windows and bays were distributed almost without regard to the interior planning, and a bay illumining a great gallery might be balanced by one of equal size in the buttery. Where real windows could not be used, false ones were put in without compunction to preserve the symmetry of the composition, and Cobham Hall, one of the best examples, is . . . 'riddled' with sham windows, put in with real mullions and transoms and glazed, but closed behind the glass with a wall."

These facts are familiar to all who have really studied Elizabethan and Jacobean architecture. Nevertheless, an unreasonable admiration for it still persists in the minds of the public. Knowing that these houses have incomparable dignity and picturesqueness when seen in a general view amid the surroundings with which the passage of centuries has beautified them, even Americans often seem to think that there can be no more certain way of securing a beautiful and comfortable home than by imitating them as closely as possible. We do not say that the actual attempt is very often made, but it is occasionally made in a more or less ambitious and conscientious way; and we could point to one house at least—one of the very costliest country homes ever erected in this country—which has been copied room for room and stone for stone from an Elizabethan prototype. It should be needless to explain, now that our own domestic architecture has developed types of genuine beauty and of complete appropriateness to our own wants, that such efforts must be mistakes both from the æsthetic and from the practical point of view. If the ancient homes of England are proving themselves uncomfortable for habitation even in England, how shall they meet the needs of this country—how shall they suit our habits of life, which differ still more from those of the sixteenth century Englishman than do those of his descendants of to-day? Nor does a really cultivated taste find, as Mr. Gotch confesses, much to admire in the heavy, monotonous, and often clumsy and unrefined decorative motives, which were employed by the architects of the English Renaissance—their work in this direction is, in truth, far inferior, both in design and in execution, to the best that American architects now produce. And, of course, the general and, so to say, superficial charm which old English homes possess in their original situations, is entirely lost when they are transplanted to alien climes and deprived of all historic associations.

Since it was announced that certain improvements would necessitate the destruction of the thirteen trees planted on Washington Heights, in this city, by Alexander Hamilton, to commemorate the original states of the Union, much interest has been felt for their preservation, and a movement has been started to purchase enough land about them for a small park. The trees are Liquidambars, and, although they are called a grove in the newspapers, they really form a dense clump. They all stand within an area fifteen feet square, which means that they were too closely planted to permit of a healthful growth. Several of them are so choked and crowded that at this age their trunks are not more than six or eight inches in diameter, while the

trunks of the larger ones are about two feet in diameter. Even the best of them have no symmetrical development, and the tops of most of them show considerable dead-wood. We are not likely to have too many small parks, and it will be fortunate if some of the land about these trees can be devoted to public use. But apart from their historical associations these Liquidambars have no great value. Many single trees are better worth saving, and, indeed, if Alexander Hamilton had planted one tree where he planted the thirteen, it would now cast nearly as large a shadow as they do and it would be much more likely to survive another century.

White Huckleberries.

IN GARDEN AND FOREST of January 2d there was a notice of the occurrence of a form of *Gaylussacia resinosa* with white fruit in New Jersey. A similar case is known to me at Shelburne, New Hampshire, where a few bushes of *Vaccinium Canadense* bore flesh-colored or pinkish berries, instead of the usual deep-blue fruit. The flesh-colored berries were found at the same spot in two successive seasons, but I have no means of ascertaining whether their occurrence has been noticed for a greater length of time. In the berries both from New Jersey and New Hampshire we have simply albino forms not depending on the growth of a fungus; certainly in the case of the New Hampshire plants, which I examined carefully.

In Germany, however, there has been observed a white-fruited form of the common Blueberry, or *Heidelbeere* of the Germans, which is due to a fungus growth. As long ago as 1859 it was described by Döll under the name of *Vaccinium Myrtilus* var. *leuocarpon*, but, in 1879, Schroeter discovered that the white color was due to the growth of a fungus which he called *Peziza baccarum*, which, in its mature or ascospore form, consists of a small cup on a slender but comparatively long stalk which springs from a small, hard nodule, the sclerotium. Woronin, in a very interesting paper in the Memoirs of the St. Petersburg Academy, beautifully illustrated, as are all his writings, has recently given a full account of similar white berries found by him in Finland on *Vaccinium Vitis-Idæa*, *V. Oxycoccus* and *V. uliginosum*, three species also found in the United States, and of the fungi which produce the white color.

Woronin considers that the fungi on the different *Vaccinia* above named, although closely related, really belong to four distinct species of *Sclerotinia*. The hard nodules, or sclerotia, are found in the berries late in the season, and the cup-like, mature form is produced early in the spring from the *sclerotia* in the berries which have lain on the ground during the winter. The ripe ascospores in the cups germinate at once, and the germinal tubes make their way into the young stems of the *Vaccinia* in the neighborhood. They penetrate to the woody bundle at first, and afterwards produce a cushion-like mass of filaments under the epidermis, from which grow chains of necklace-like filaments, which cover the surfaces of some of the upper leaves and the young shoots and exhale an odor of almonds. Each joint of the filaments ultimately becomes separated from its neighbors by a peculiar structure, called by Woronin a *disjunctor*, and they fall apart and constitute what are called by botanists the conidial spores. The conidial spores, which mature at the end of May or early in June, are, through the agency mainly of flies and bees, carried to the pistils of the opening flowers. Those which are deposited on the stigmas produce long tubes, which, somewhat like pollen-tubes, traverse the styles, but, unlike pollen-tubes, do not attach themselves to the ovules, but make their way into the placentas. The mycelial tubes then grow and cause an atrophy of the young seeds and internal portions of the berries, although their general size and shape are comparatively unchanged. The tubes finally become indurated and form a compact mass, and the berries blacken and fall.

It is highly probable that we have similar diseases of Huckleberries and Blueberries in this country, and Woronin suggests that it is possible that the disease of the Cranberry, *Vaccinium macrocarpon*, in the United States, may also be due to the growth of some species of *Sclerotinia*, to which genus he refers the fungi described in his memoir. He also mentions similar sclerotoid forms on Cherries, berries of the European Mountain Ash, and a few other plants, and considers that it is probable that the common mould of Plums, *Oidium fructigenum*, is connected with some hitherto unknown sclerotium. W. G. Farlow.

Japanese Gardening.—I.

ONE of the best accounts of the aims and results of Japanese landscape gardening that have ever been written in English was published in a periodical which seldom comes beneath the eyes of the general public—the *Transactions of the Asiatic Society of Japan*. Therefore, although it bears date as long ago as November, 1886, a brief summary of it may not be unacceptable. It is itself, however, so condensed, as well as so full of varied and interesting information, that I can do no more than select passages here and there, with the confession that almost all those omitted are of equal value.

"Landscape gardening as practiced in Europe," says the author—Mr. J. Conder, a Fellow of the Royal Institute of British Architects—"is subjected to greater formalities of design than in Japan, and in theory it harmonizes less closely with the features and disposition of real scenery. It is more of a science and less of a fine art." Even in our most naturally designed gardens a certain element of formality is prescribed by the canons of European taste. "Houses being objects exhibiting formal and geometrical lines, it is maintained that such lines should be repeated to a greater or less extent in the adjoining garden, in order to produce an approximate combination." And this feeling expresses itself in details as well as in the general scheme; "trees and shrubs are often selected for their uniformity in size and shape, and grouped in equidistant rows and phalanxes," while it is unnecessary to refer to our use of formal flower beds and minor features. The Japanese have attained to no such skill in the cultivation of exotic plants as has been attained in Europe, "but the absence of such artificial refinements is considerably to the advantage" of landscape gardening as a fine art. "Constructing only with the materials native to the country, the designer is able to follow consistently the arrangements suggested by nature, the landscapes he seeks to reproduce being in all cases identical with the natural types that are familiar to him." As regards scale, the gardens of Japan are far less imposing than those of Europe. "There is little here to compare in gardens to our spacious English parks. . . . The Japanese artist confines himself to narrower and humbler lines, but it must be recognized that within his limits he produces results unrivaled in natural beauty and loveliness. . . . Unnatural regularity is generally most studiously avoided, but the variety obtained is the result of well considered arrangement, and by no means that of hazard."

The theory of the art, like so many other intellectual things, was derived from China, but greater simplicity prevails in Japanese developmets. "It is usual to divide garden compositions into three styles expressive of their general character, . . . the Finished, or labored style, Intermediate style, and Free, or bold style. In practice these styles are not sharply divided, but a garden, according to its rough or elaborated character, may generally be classed under one of the three heads, . . . and it is an important law that whatever character is decided upon should be consistently followed throughout." The Finished, or elaborate style, is the one least commonly employed. "There are other guiding principles, . . . such as suitability in character to the pursuits and rank of the proprietor . . . and the expression . . . of some predominating sentiment. The garden is regarded as a poem or picture intended to arouse particular associations and inspire some worthy sentiment. . . . If, for instance, a garden be designed for a poet or philosopher, its general disposition should express dignified seclusion, solitude, virtue, or self-abnegation." It is difficult for us, with our less strongly poetic temperament, to sympathize with such aims or even to see how they can be effectually carried out or clearly understood. But to the Japanese the thing seems clear and simple enough, and with the following paragraph even Europeans should be in heartiest accord: Gardens, it is said, should be undertaken from a genuine love of nature "and with a desire of enjoying the beauties of natural

scenery, and should be so arranged that the four seasons may each contribute in turn to their artistic excellence. They should be pleasant retreats for hours of leisure and idleness; and as one writer has poetically expressed it, 'places to stroll in when aroused from sleep.' . . . In western designs the idea of displaying wealth and luxury is paramount, and our gardens are principally regarded as resorts for the pleasures of society and fashion; whereas in Japanese gardens the prevailing intention is rather that of a place exempt from public haunts and fitted for unrestrained ease and meditation." Such ideas as The Happiness of Retirement, Modesty, Peace, Gentleness and Chastity, Connubial Felicity and Old Age, the Japanese strive to express in their arrangements. In part their success depends upon the emotions naturally excited by scenery of various kinds, but in part upon traditional historical or philosophical meanings which are associated with many of the arrangements adopted, and, of course, cannot be understood by foreigners.

Passing from theory to practice, Mr. Conder notes that the first step in the artist's education is to visit good scenery and make notes and sketches. These, of course, "cannot be closely followed in preparing designs, but will supply suggestions and lead to originality in composition. . . . Before proceeding to execute a landscape-garden a careful survey of the site and its surroundings is necessary. If it be a bare and level area, the designer is free to arrange his composition in any way that he may please according to its size, bearing in mind the locality and surroundings, and the character of garden suited to the particular proprietor. But if it be a site possessing natural facilities, such as fine trees in prominent positions, hillocks, a stream, or even a natural cascade, the artist will consider how such natural features can be utilized and worked into his design. . . . A neighboring view may be cleverly taken advantage of, and the garden so arranged as to harmonize with it, the distant landscape when seen from the rooms of the house actually appearing to form part of the whole composition. Aspect must be considered as well as prospect. . . . Great care is recommended in considering the scale of a garden. If a small garden be arranged on the same plan as one of a larger model, it will look weak and unsatisfactory; and . . . if a large garden be designed upon the lines of a smaller model, it will lose all its grandeur. . . . For example, the arrangement of two or three large rocks in front of a clump of fine trees in a large garden will look more imposing than a greater number of smaller ones. Multiplicity of detail within small compass is, however, necessary in a little garden, in order to give it interest and add to its apparent scale. . . . A garden is, above all, a place for summer enjoyment, . . . and must therefore, by all means, look cool and refreshing; but such coolness is not produced by planting trees too densely and crowding the area with many objects. A few masses of foliage, judiciously arranged in the background, may be made to impart a fresh and cool effect. The presence or suggestion of water is necessary; but it must be remembered that clean, shallow and running water looks much cooler than deep, stagnant or weed-covered pools. The total absence of litter and untidiness, added to the presence of water, produces the most refreshing effect. A garden, therefore, should have large, open spaces, cleanly kept, with stretches of white sand or gravel in the foreground and moss in the background. . . . In large compositions the distribution of areas and contours demands the first attention. In some cases advantage will be taken of natural elevations and depressions in the ground. Sometimes a site may possess a stream, cascade or natural inlet of water. Supposing no such facilities exist, the aspect and prospect which the plot possesses will be carefully studied, and the best positions for hill and dale, lake and waterfall, determined. It often happens that water cannot be obtained; and if the character of the scene to be represented requires it, it is not unusual to arrange the hills, rocks and plants in such a way that the idea of water may be suggested. Sometimes a stretch of bare, beaten, brown earth or of well-raked sand will indicate a lake or sea, and a meandering, pebbly bed a river, the surrounding rocks, plants and piles further assisting the delusion." No rules strictly direct such arrangements, yet several general guiding principles are respected, for a Japanese garden is "more than an artistic disposition of trees, flowers, shrubs and stones. It is a real picture composition, intended to represent some imaginary landscape. . . . The principle of suggesting to the imagination the idea of space by means of blanks and obliterations, so common in Japanese pictorial art, is followed also in horticultural compositions. A hill, it is said, should never be constructed touching an outer fence or boundary; a space behind it, however small, produces an

idea of greater extension of the garden. By a similar theory the spaces immediately behind the nearer hills should be left open and not filled with detail. There are five principal hills specified for gardens. . . . in the Finished style. Hill No. 1 forms the most central feature of the nearer distance. . . . As it represents a near mountain of considerable size, it should have broad and sweeping sides, and may have a pathway and a little house or pavilion upon it. Hill No. 2 should be placed adjacently to No. 1, a cascade and rocks often dividing the space between the two. It is secondary to No. 1, and should be somewhat smaller and of different character. Hill No. 3 is placed upon the other side of No. 1 near the base of its broad slope and more in the foreground; it suggests the idea of a lower hill divided from the main mountain by a depression. This depression may be supposed to be occupied by a hamlet, road or stream, in which case its sides should be clothed with a few thick-foliaged trees or shrubs to add to the impression of a sheltered and inhabited dale. No. 4 is a small hill generally introduced into the near foreground; it should have none of the characteristics of a large mountain, should be low, rounded and covered with much detail in the form of stones, shrubs and flowers. Hill No. 5 is in the remotest part of the garden, and, as it represents a distant mountain, it should be steep and mysterious without much detail."

This, then, in general terms, is the scheme upon which a Japanese constructs one type of garden, varying it, of course, in multitudinous ways to suit the suggestions of the site or the leanings of his individual taste. It may seem at first thought as though, while avoiding artificiality in one direction, the artist who works thus falls into it in another direction—our idea of a "natural" landscape arrangement is certainly not the wholesale creation of features which sometimes are not even suggested by the site, nor the simulating in miniature of large natural forms, nor the effort to make sand or gravel do duty for water or small shrubs produce the effect of trees. Could anything, we ask ourselves, be more unnatural than a small garden designed to imitate an expanse of mountain scenery, with bare earth instead of living water for its lakes and streams?

But it seems to me, after much reading upon the subject, that the Japanese aim is not more wholly different from ours than is the spirit in which this people looks at works of gardening art. It is often said that they have less imagination than Occidentals; but the statement refers merely to abstract imagination, so to say—to metaphysical, spiritual imagination. As regards material imagination—the picture-making power of the eye, the ability to recognize, appreciate and enjoy the beauty and sentiment of a thing which is not actually imitated or even portrayed in art, but merely suggested—the case is exactly the reverse. Here the Oriental imagination is much stronger than our own. Whether we try, in our garden arrangements, to be formal and architectural, or natural and free, we demand that the desired effect shall be actually, practically, materially obtained, that the things we see shall be literally themselves, and depend not at all for their significance upon the imaginative faculties of the observer. The Japanese, on the other hand, never desires anything but a strictly natural effect; but he is content that it shall be suggested rather than displayed. The elements before him are valued less for themselves than for their power to act upon his imagination and recall the forms of beauty which they typify rather than reproduce. We demand in a natural garden that it shall be a beautiful passage of scenery. The Japanese demands that it shall suggest a beautiful passage of scenery. His garden is to him less a landscape, properly so called, than a picture of a landscape; and he does not see anything more unnatural in a small picture composed of piles of earth, rocks and shrubs representing mountains, trees and lakes, than we see in a small painting on canvas when it represents similar objects. We know that an adequate statue of a man can be made within the compass of a few inches, and never think of questioning its truth or "naturalness" because of its size. It does not purport to be the man, but merely suggests the man, and our imagination accepts it without thought of its discrepancies in size and color. Thus the Japanese looks upon his little studies of mountain scenery, and finds them as thoroughly natural as works of art can be.

How soon an Occidental can learn to assume his standpoint, how thoroughly he can learn to appreciate the suggestive beauty of Japanese gardens—these are questions, of course, with regard to which only travelers can speak, and Mr. Conder does not touch upon them.

New York.

M. G. van Rensselaer.

New or Little Known Plants.

Berberis Thunbergii.

ALTHOUGH one of the earliest Japanese plants known to botanists, having been collected by Thunberg, one of the first Europeans to explore the botany of Japan, *Berberis Thunbergii* has found its way into western gardens only within the last few years. Thunberg considered it identical with *B. Cretica* of south-eastern Europe, which, perhaps, is nothing more than a geographical form of the widely distributed and very variable *B. vulgaris*; while some later botanists have referred it to *B. Chinensis* of northern China, a very different plant, with slender pendulous branches, and long, drooping racemes of flowers and fruits. *Berberis Thunbergii* is, nevertheless, one of the best marked and most distinct of all the Barberries now found in gardens. It forms in cultivation a dense, although graceful, bush, some three feet high by four or five feet in diameter. The branches are stout, pendulous towards the extremities, deeply grooved, covered with bright red bark, and armed with simple, straight spines, half an inch long. The leaves are deciduous, tufted along the entire length of the branches, obovate or spatulate, rounded at the apex, quite entire, bright green above, paler on the lower surface. The flowers, which are produced in the greatest profusion along the whole length of the stems, are solitary or in pairs, or rarely in few-flowered umbels. They are rather large, with three or four acute red sepals and pale straw colored petals, sometimes streaked with red, and are almost odorless. The fruit is bright red, a quarter to half an inch long, elliptical, or nearly globose. It possesses an insipid and very disagreeable flavor, and remains upon the branches bright and fresh through the winter, and until the appearance of the new foliage in the spring. The leaves of this plant late in the autumn are tinged with brilliant shades of orange and scarlet.

Berberis Thunbergii was sent several years ago to the Arnold Arboretum from St. Petersburg, and is now often seen in American gardens. It has much to recommend it—hardiness, free and rapid growth, neat and graceful habit and foliage, brilliant autumn coloring, and showy and persistent fruit; and few shrubs are better suited to form low masses of foliage, or for dwarf hedges. It is not particular as to soil, and, like the other Barberries, is easily increased by division, from cuttings and from seed.

Our illustration upon page 55 represents a well grown specimen of *Berberis Thunbergii* in a garden near Boston, and shows the habit of the plant; while Mr. Faxon's drawing upon page 53 makes known to persons unfamiliar with them the foliage, flowers and fruit of this species, of which an excellent colored figure was published in the *Botanical Magazine* for 1882, t. 6, 646.

C. S. S.

Cultural Department.

The Propagation of *Rhododendron maximum*.

Sir.—In 1885 a distinguished landscape-gardener remarked that whoever would produce *Rhododendron maximum* so cheaply that it could be freely used, would render a service to all planters, and this suggested some extended experiments at the Shady Hill Nurseries.

First, fresh seed of this *Rhododendron* were planted in boxes of carefully prepared soil in February. They came up promptly and abundantly, but difficulties began at once. This plant, when first germinated, and for some time afterwards, is the most delicate little atom of vegetable life that can be conceived of. It is exceedingly small, and is as transparent as water, of which, with a very thin film of more solid substance to inclose it, it seems largely composed. This delicacy of structure exposes it to the attacks of a minute fungus, which often kills a box of several thousand little seedlings in a single day. To save them from this devouring enemy, which always appears as soon as the plants do, it is necessary to transplant them into fresh earth immediately after the seeds germinate. This was done three times, and then the plants became a total loss from the persistent attacks of this fungus. We

transplanted many thousands, and finally, after the most patient and painstaking efforts, continued through two winters, saw all our labor end in failure.

The prime conditions necessary for the healthy growth of the seedlings of this species are, evidently, absolutely perfect drainage, plenty of fresh air, and a rather deep shade. The green-house did not supply these conditions. Then a bright thought occurred to one of the men watching the experiments, by which we hoped to supply the exact conditions of nature and let nature take all the care of the plants.

In April, 1887, we planted plenty of seed of this plant on the surface of old, mossy logs, which lay half submerged in the water of a springy bog, at the foot of a mountain. These logs soaked up water from below, and were never dry, even in summer. They were also in a rather deep shade, as tall trees stood about them on all sides. I had often noticed small plants of different *Ericacea* in abundance on top of much decayed stumps in such places, so that I planted the seed with some hope.

In November, 1887, the logs were covered with multitudes of little plants of our *Rhododendron*, but pitiful looking things they were. In size from one-sixteenth to one-eighth of an inch high, and still so watery and transparent that we had no expectation of their ability to survive the winter.

time, they can be grown rapidly and successfully. Four years ago Mr. Jackson Dawson, in an address before the Massachusetts Horticultural Society, explained in detail the method he has practiced with uniform success. The seed is sown in earthen pans early in January, in a soil of peat, loam and sand in equal parts. The sand should be sharp, but fine and clean, and entirely without iron or clay. Over the broken crocks, which should fill one-third of the pan, a covering of sphagnum or coarse siftings of peat is placed, and upon this two inches of the prepared soil is sifted, and then well firmed and watered gently. As soon as the soil is settled the seed can be sown quite thickly. It should then be covered with the slightest possible sprinkling of soil, after which a covering of fine sphagnum is put over it, a gentle syringing is given, and the pans are placed in a temperature of seventy degrees. After sowing, the seed should on no account be allowed to get dry; but at the same time saturation should be avoided. It will usually come up in from two to three weeks, and as soon as the first seedlings are seen the coarsest of the moss should be gradually removed, and when the seed is fairly up a slight sifting



Fig. 90.—*Berberis Thunbergii*.—See page 52.

In November last the seedlings were, to our surprise, half an inch high, with leathery leaves, and were safe and solid, and from that time on we knew it was plain sailing. This is a slow but a sure and an easy way to make this magnificent native *Rhododendron* as cheap as any ordinary shrub, and I hope it will be put in use by many nurserymen.

Somerville, Mass.

F. L. Temple.

[It is true that success in growing *Rhododendrons* from seed is almost impossible when they are started in a house devoted to a mixed collection of plants which require treatment entirely different from that needed by the delicate seedlings of the different species of *Rhododendron*. The device of our correspondent bridges over the most dangerous period in the growth of the seedlings, and when time is no object and where one has a swamp filled with moss-covered and decayed logs no doubt large numbers can be produced in this manner. But nurserymen are not always the fortunate possessors of swamp-land, and besides this, they are obliged to raise stock more quickly than is possible by the swamp-method. Although the seeds of *Rhododendrons* are very minute, and the plants in the first six months of their existence require the most delicate handling, yet if a house is devoted exclusively to their propagation, so that they can be watched and watered, shaded and transplanted at precisely the proper

of fresh soil among the young plants will help to strengthen them. As soon as they have made the first rough leaf, they should be pricked off thickly in boxes or pans of fresh soil prepared as for the seed, carefully syringed, and kept growing in a high temperature and moist atmosphere. Such delicate seedlings as *Rhododendrons* at this stage should never be transplanted in a shed or room where there is any draught, but always in a close, moist atmosphere, as the roots are so delicate that only a moment's drying makes them almost worthless. After five or six weeks the plants will have covered the surface of the ground, when they will again need transplanting, this time half an inch apart, and otherwise should be treated as before, always having fresh soil and clean boxes at each transplanting. At this stage, if everything has been carefully attended to, they will grow very rapidly, and will soon need transplanting the third time, and, if properly cared for, may be set two inches or more apart.

This frequent transplanting in fresh soil each time keeps the plants from damping and lays the foundation for a vigorous plant for the future. If *Rhododendron* seedlings are left long in the seed-box or pan, they are apt to be attacked by a minute fungus, which will often carry off

thousands in a night. The best remedy, at the first signs of its appearance, is to sift heated sand amongst the young seedlings, using a very fine sieve. This looks like heroic treatment for plants of this tender age, but it is very effective in destroying the fungus, and does not injure the young plants. About the first of September more air and less moisture may be given, so as to harden the plants preparatory to their removal to winter quarters, which should be a deep frame or pit in some sheltered situation. They may be put in this pit the first of October; or sooner, if the house is needed for other purposes. In this pit they should have plenty of air every pleasant day, but should be covered every night to keep them from frost as long as possible. This can readily be done in most seasons up to the middle of December or the first of January by a single mat; they can then be covered with mats or meadow hay, and will need to be uncovered only once in every two weeks for an hour or so to guard against damp or excessive moisture, which often will induce a growth or fungus even in a cold pit if it is kept long without airing. In the spring, about the first of May, the young plants can be transplanted into well-prepared beds of peaty soil, or a light, sandy loam of good depth. If dry weather sets in, they will require plenty of water, as they are not deep-rooted at this time; if water is handy, a good syringing may be given every evening as soon as the sun begins to leave the bed, until the middle of August, when all moisture should be withheld, so that the plants may ripen well before winter sets in. If they have been well cared for, they will be from six to seven inches high at the end of the second season.

At the approach of cold weather a slight covering of leaves between the young plants with Pine boughs or coarse meadow hay, over the tops, to keep the sun off, will carry the plants through the winter in safety. The following spring they may be planted in the nursery, where they can remain until used. The same treatment will apply to Azaleas, Kalmias, and other Ericaceous plants, only the Azaleas grow much more rapidly than the others, and at the end of the second season such species as *A. mollis* and *A. calendulacea* should have quite a number of flower-buds on them, while the Rhododendrons will not show signs of flowering until the fourth or fifth year.—Ed.]

The Fruit Garden.

MULCHING STRAWBERRIES IN WINTER.—Much has been written about this, and no one doubts the benefit of it. In northern Vermont, however, we can pretty safely depend upon a snow mulch from December 1st to April. This winter is an exception. We have had no snow yet, to amount to anything, and in the middle of January our roads are bare, and as smooth as the best Macadam. The fields have but a sprinkling of snow, and the strong Strawberry plants stick up through it; but though somewhat seared, they seem yet little the worse for the exposure. As regards material, the ideal mulch for almost everything is evergreen boughs; but it is not often practicable to get enough of them. Oat, wheat and rye straw are used, and the last is best of the three; but better still is bean straw. If evenly applied, it is not beaten down by the snow so as to smother or rot the plants, and it holds even the lightest snow in its open meshes, thus utilizing to the utmost all that comes.

PROTECTION OF TREES FROM MICE.—Binding the trunks with tarred paper is what is commonly advised for this purpose; but the paper is apt not to give complete protection near the ground. It also costs more and does not last so long as the laths and barrel staves that I have used for many years. These are cut in two in the middle, driven or pressed slightly into the soil, and tied with a single turn of strong cotton twine. They may be left on the year around, and in the fall are utilized by the codlin worms as an apparently safe retreat. But late in the fall they are tied again, being reversed, so that the spun-up worms are left exposed to a cold world, and are cleaned off very quickly by the birds. Quarter-inch board is preferable to barrel staves, on account of the bilge-curve of the latter, which does not allow them to be turned; but if the strings are cut a few days in advance, and the staves laid on the ground so that the inner sides are exposed, the birds will clean off the worms in a short time.

WHEN TO PRUNE.—It has a smart, snappy sound to say "prune when your knife is sharp," and for such pruning as may be easily done with a knife, it is well enough. But for the larger limbs that must often be amputated, pruning when your saw is sharp will not answer always and everywhere. Where all trees are so hardy that a cut, however large, never blackens or "bleeds," one may prune at any time with safety, while trees are not in leaf. But in the northern tier of states there are many trees planted that are more or less injured in their wood by hard winters. Such trees are best pruned after the severe weather is over, but then as early as possible, so that the wound will get pretty dry before the sap starts. This will not always prevent "bleeding" when a tree has been much hurt by low temperature, but it is the best that can be done for them.

WHAT TO APPLY TO THE CUTS.—I have tried grafting-wax, both solid and liquid, and various cements. Wax cleaves or crumbles off too soon. The best cement I have used is made by boiling pine-tar slowly for three or four hours, adding half a pound of beeswax to a quart of the tar. Have ready some dry and finely-sifted clay, and when the mixture of tar and wax is partially cold, stir into the above named quantity about twelve ounces of the clay, continuing the stirring until the mixture is so stiff, and so nearly cool, that the clay will not settle. This is soft enough in mild weather to be easily applied with a knife or spatula. But of late I have found that any thick ochreous paint, put on with a brush, answers every purpose, and can be applied faster and more easily than anything else. On large wounds it may need renewing, and if a red paint is used they are more easily seen.

CUTTING AND KEEPING CIONS.—I have always been best satisfied with the growth of cions cut in the fall. This, I know, is not so necessary in milder localities, but I believe it is best everywhere. It is often said that cions should be cut from bearing trees; and many believe that this favors early fruiting of the graft. I wish I could see some proof of so easy a method of bringing late-bearers forward. I think, if one is sure of the variety, there is no good reason why the cions may not be taken from the youngest trees—even from the nursery. To keep them well over winter, it is usually advised to pack them in damp moss or sand. It is difficult to get moss just right in dampness, and sand endangers the sharpness of the knife in grafting. The very best packing material is green-wood sawdust, just as it comes from the log. Cions nicely tied in bundles and labeled securely, and so packed, firmly compressing the sawdust under, over, around and between the bundles, well covered and kept cool, will come out in the spring in perfect condition.

Newport, Vt.

T. H. Hoskins.

Orchid Notes.

The most conspicuous objects in the cool house at present are specimens of *Ada aurantiaca*, the showiest of all cool Orchids, excepting *Epidendrum vitellinum*. It grows in masses, with tapering bulbs and narrow, deeply channeled, dark green leaves about one foot high. The distichous racemes spring from the base of the bulbs, bearing about a score of reddish orange flowers, in which the segments are compressed near the base and spreading at the apex. The whole flower is from one to two inches long, according to the variety. This is a strong grower and may always be depended upon to give a good crop of bloom. It requires an open soil with good drainage, and should have a plentiful supply of water at all seasons. Near the Ada and helping to relieve its brilliant hues, are plants of the Lily-of-the-Valley Orchid (*Odontoglossum bulchellum*). This is a most attractive species, growing in dense masses, with ancipitous, shiny bulbs and long, grassy leaves. The half pendulous racemes bear about a dozen flowers, which are pure white, excepting the prominent golden crest. They last a long time in perfection, and their usefulness as cut flowers is greatly enhanced by a delightful Hyacinth fragrance. Some three or four varieties of this species are known, the best being probably a very large form called Dormannianum. *Maxillaria picta* should be grown, if only for its powerful aromatic fragrance. This is a dwarf kind, with tapering, yellowish and furrowed bulbs and short, leathery leaves. The single-flowered scapes spring in abundance from the base of the bulbs—more than a score from one bulb. The flowers are cream colored, dotted with purple and chocolate. It does well in a cool house, with a good rest, after growth is finished.

Odontoglossum triumphans is a showy Orchid introduced nearly fifty years ago from New Granada, where it is met with in dense forests, in company with *O. Pescatorei*, but it is not at all plentiful. The bulbs are ovoid, compressed, and attain a good

size; the deep green leaves are about one foot long. The arching racemes bear from twelve to twenty flowers of good substance, and about three inches across, golden yellow, heavily blotched and barred with cinnamon brown and margined with pale yellow. The lip and column are pure white, with one large irregular blotch of yellowish brown on the anterior lobe. This is a handsome Orchid and a few plants will be found very useful to brighten the more sober tints of the varieties of *O. crispum*. It is robust and free growing, requiring an open soil with good drainage and a liberal supply of water at all seasons.

Lycaste lanipes.—Though not a showy Orchid this will be found very useful for cutting, as it produces abundant flowers from the base of the matured bulbs, and lasts a long time in perfection. In habit it resembles the well-known *L. Skinneri*; but the bulbs are larger and the leaves are of leathery texture. The creamy white flowers are four to five inches across, with a pure white lip beautifully fringed along its margin. It should be grown in a rich, open soil, in an intermediate temperature,

This is a very strong and free growing species, of noble appearance, with thick, fleshy stems, bearing broad, distichous leaves about two feet long, from the axils of which spring stout racemes two feet long, bearing a dozen large, greenish white flowers with a cordate, cuspidate lip of ivory white, and lasting about six weeks. This grand Orchid will repay liberal cultivation, as it delights in a rich soil kept open with nodules of charcoal. The roots quickly fill the pot, when the plant will be benefited with weak liquid manure. The best plants I have yet seen are growing among a collection of Palms and foliage plants and receiving the same treatment. The best form is *Superba*, a great improvement on the type, but unfortunately it is somewhat rare. A small growing and free flowering variety is named *Virens*. This is a very inferior form, but is often grown for its floriferous qualities.

Among the many choice varieties of *Lælia anceps*, *Hilli* and *Veitchi* may be noted as of especial merit. The former has large flowers of good substance, pure white tinged with pale



Fig. 91.—*Berberis Thunbergii*.—See page 52.

kept moderately dry after the bulbs are matured. It is a native of Guayaquil.

Angræcum sesquipedale.—This is an interesting and very striking Orchid introduced some sixty years ago from Madagascar, where it luxuriates on large trees with a maximum of heat and moisture at all seasons. It is a large plant, with broad, distichous, dark green leaves, very stiff and leathery. The large, star-like flowers are borne on axillary racemes, usually three in number, about eight inches across, very fleshy and ivory white. The cuspidate lip terminates in a spur or tail sometimes eighteen inches long. The flowers last about three weeks if kept somewhat cool and dry. This Orchid does well in a pot filled with large lumps of charcoal and a plentiful supply of sphagnum. It should be in the warmest house, and abundantly supplied with water during the growing season, and at no time allowed to become dry, or the loss of the bottom leaves will result. A fine variety of this called *Majus* comes into flower somewhat later, is more robust in growth, and the flowers measure fully eleven inches across.

Another fine Orchid flowering at this season is *A. eburneum*, which comes from the same locality as the plant last mentioned.

purple. The side and front lobes of the lip are broadly margined with amethyst purple, while the crest is a pale yellow. In *Veitchi* the segments of the flowers are narrow and smaller, pure white, with side and anterior lobes of the lip finely streaked and spotted with pale rose purple.

F. Goldring.
Kenwood, N. Y.

Ostrowskia magnifica.—The Garden contains a capital figure of this handsome new Campanulaceous plant. Herr Max Leichtlin, to whom horticulturists are indebted for the possession of living plants of it, has already stated that it is easy to grow, is as hardy as a weed, and thrives in any soil. It has erect stems about a yard high, with toothed, oblong leaves in whorls and a terminal head of flowers, each on a long stalk, semi-nodding, bell-shaped, four inches across, two inches deep, the corolla lobed and spreading, the stamens and stigma as in *Platycodon*. The color is purplish-lilac, with darker veins. It was discovered by Dr. Albert Regel in eastern Bokhara in 1884, and flowered for the first time in cultivation with Max Leichtlin in 1877.

Senecio Ghiesbreghtii.—In addition to its usefulness as a large, winter flowering shrub for the conservatory, this handsome Rag-wort may be grown in eight-inch pots, when its

stem attains a height of about two feet, with large, handsome foliage, and enormous heads of yellow flowers, which last a month or more. The plant is as easy to grow as *Paulownia imperialis*, but it is not quite as hardy.

Kew.

W. Watson.

A hardy shrub with beautiful foliage just now is the *Andromeda Catesbaei*. Its stems are deep green, its leaves a dark bronze, while its racemes of flower-buds, which are already a half inch in length, in preparation for spring, are of a rosy red color.

Germantown.

Joseph Meehan

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

V.—SOME OF THE EFFECTS OF EVAPORATION FROM THE LEAVES ON (1) THE PLANT, (2) THE SOIL, (3) THE ATMOSPHERE.

EFFECTS OF EVAPORATION FROM THE LEAVES ON THE PLANT ITSELF.—The amount of water which the plant loses by means of the leaves is, as we have seen, relatively large. Since, of course, it is only the water which escapes, the mineral matters which the root-hairs brought in with the water must remain behind. Therefore, the primary effect of the evaporation from the leaves is concentration of dilute solutions. The amount of mineral matter existing in leaves in autumn is appreciably greater than in the early summer before the work of concentration has proceeded far. The simplest experiment to prove this is the combustion of a leaf plucked from the tree in late spring or in early summer, and one taken from the tree just before the close of the season. The latter leaves a larger amount of ash, or incombustible matter, behind, than the former. Concentration by evaporation is an important factor in nutrition, as we shall see in a later paper.

EFFECTS OF EVAPORATION ON THE SOIL.—The only question to be considered with respect to this is, can the amount of evaporation sensibly affect the amount of water in a saturated soil? In other words, would it be possible to employ any plants for drainage purposes? The answer to this is not yet quite clear, for the experiments upon the subject have not been long enough continued, and in many instances they lack scientific accuracy, not so much in the manner in which the details have been stated, as in the disregard of disturbing conditions. The most interesting instances are those of the planting of Blue Gum, a species of *Eucalyptus*. This tree has long possessed a certain reputation for its supposed power to destroy, or at least to mitigate, the effects of miasm originating in marshes. It should be stated at the outset that the leaves yield a product known as eucalyptol, having more or less decided antiseptic qualities. As the distinctive odor of this substance is given off by crushing or by bending the leaf, or even by rapidly moving the leaf, especially on exposure to the sun's rays, it has been believed by some writers that the effects in reducing the deleterious influence of marsh-miasm may be wholly attributed to the eucalyptol-like volatile matter. But the plant has remarkable powers of giving off water in the state of vapor. The amount has been variously stated by different authors, but a fair average of the results of experiments on *Eucalyptus globulus* would make it not far from two quarts of water daily for every square yard of leaves. This amount, though large, would be considered by some engineers as too small to be a very efficient agent in the drainage of swampy ground, but, as may be seen by the accounts of success in the Roman Campagna,* especially at the "Three Fountains," there are plainly two sides to this question. A quotation from a work not readily accessible to the readers of this journal will indicate that in the country of which the species of *Eucalyptus* are natives, remarkable effects are attributed to the odorous emanations from them.

"That these enormous giants exercise an influence on the climate of the district cannot be doubted, the whole atmosphere being impregnated with a pleasant aromatic odour issuing from them. The odour is especially noticeable in the early morning, and it produces an agreeable feeling of invigoration, accompanied with a desire for exercise. The inhabitants of the locality all enjoy excellent health, and strict inquiries revealed the fact that no severe illness had occurred in the Karri District within the memory of the oldest inhabitant, while invalid visitors almost invariably improved in health."—Rattray and Mill's "Forestry and Forest-Products," 1885. From E. J. C. Brace's Prize Essay on *Eucalyptus* Plantations, p. 237.

Other plants, notably the common Sunflower, have been mentioned in connection with this matter of draining swampy land, and good effects have been obtained where the task im-

posed upon the plants has not been wholly out of proportion to the extent of foliage. In a detailed consideration of this question, which the present paper cannot attempt, attention should be directed (1) to the mechanical effect produced by the larger roots, serving, as they do, about the same office as the branches and twigs in an ordinary "brush drain," and (2) to the action of leafy branches in intercepting currents of air, both of which have a bearing on the hygienic improvement of wet land.

EFFECTS ON THE AIR OF EVAPORATION FROM THE LEAVES.—Every one knows that the atmosphere possesses the power, varying with the temperature, of taking up water and retaining it in the form of vapor. The total amount at any time is its absolute humidity.

When at any given time the atmosphere has taken up all the moisture that can be retained at that temperature, it is said to be saturated. Any proportional part of this amount expressed in percentage is its relative humidity.

Observers have shown that the absolute humidity of the atmosphere in a forest is hardly greater than that of the air over open ground. But, on the other hand, the relative humidity is not far from six per cent. higher in the former than in the latter case. Can a forest, by this slight difference in the amount of moisture which its atmosphere contains, or by the innumerable points of contact presented by the leaves, or by the cooling effect of evaporation from the leaves, affect the precipitation of rain at any time? Or, to make the question more general, do forests affect rainfall? This question, like almost any about which not enough is known, has provoked discussions which have been unnecessarily acrimonious. Even the highest authorities are very far from agreement in this matter. Ebermeyer, a distinguished and critical student of the subject, wrote thus in 1873:

"Forests increase the annual relative moisture of the air, but this influence is much more noticeable at high elevations than at low elevations. The precipitation of moisture (dew, cloud, rain, snow) takes place more readily on this account in wooded than in treeless regions, and the frequency and intensity of these precipitations increase with elevations above the surface of the sea. Moisture descends more readily and freely upon a wooded than upon a treeless mountain of the same height. Forests affect rainfall only so far as they increase the relative amount of water held in the air, and thus bring the relative amount nearer the point of saturation; thus, with fall of temperature in the forest, a part of the moisture is easily precipitated. . . . Forests make the climate of a country moister, and especially so in the summer."

Some later investigations in Bohemia, in European and Asiatic Russia, and in India, point in the same direction, but in our own country numerous comparisons may be fairly interpreted in exactly the other way. The question waits for further facts.

THE PRESSURE EXERTED BY SAP.—When a branch is cut in one of the early days of spring there is generally a flow of liquid from the cut surface which varies in amount during different periods of the twenty-four hours. An experimenter in the last century showed that this flow from the cut surface is not passive, but that the liquid is forced out, and he proved by a pressure gauge that the amount of pressure was very great. Similar experiments have been repeated both in Europe and in this country with substantially the same results. Some of the more interesting here were undertaken at the Massachusetts Agricultural College, in 1873, and showed that the pressure might amount to even three atmospheres. The food stored in the tissues of most of our forest trees during the summer is in the form of starch; this is converted, toward the end of winter, into some sort of sugar, thus passing into solution. This complex solution, together with the crude liquids brought in through the roots from the soil, constitutes the sap as it flows from a wound. The factors determining the pressure are (1) the osmotic force previously described and (2) the expansion of the air in the air-spaces of the woody tissues. At nightfall, or with a reduction of temperature, the pressure ceases or becomes negative—that is, there is an actual suction into the plant.

There are one or two phenomena observed in the flow of sap, which are as yet unexplained.

WATER-PORES.—On the tips of the young leaves of some plants, in warm mornings, drops of water can be seen, which seem at first like drops of dew, but immediately on their removal other drops take their place. In some cases, particularly in plants of the Calla Lily family, these drops follow one another rapidly, and the water may even escape in the form of a fine jet. The pores through which this water is forced are somewhat like stomata, or breathing-pores, but they are not in any sense true valves.

Cambridge, Mass.

George Lincoln Goodale.

* Chambers' Journal, 108, 193.

The Forest.

The Forests and Woodlands of New Jersey.—III.

TREATMENT OF HILL-SLOPES.—Some broad, beautiful slopes and hill-sides on the New Jersey side of the Delaware River have been irretrievably ruined by most unintelligent management. They were originally covered with a heavy growth of trees, and were thus protected from destructive washing and land-slides. There was an obvious and imperative necessity that such land should be left permanently under forest conditions. This could easily have been done without restricting in the slightest degree its productiveness. All the timber that it would yield could have been cut off when the crop would best meet the demands of the market, without any interference with the conditions required for the perpetual reproduction of the forest. It was only necessary to protect these steep tracts from fire and from pasturage. The ruin of such slopes is caused more frequently by pasturing them than in any other way. The woods are thus finally killed out, and then the soil begins to wash away where the strongest currents of water descend. Small gullies are found at first; and as the strong, elastic network of living roots decays, huge slices of the surface of the hill-side begin to slip down, and there is soon an unsightly mound at the foot of the slope, where the soil of broad and fertile acres has been deposited, or it has all gone into the river below.

Some such declivities are destroyed by the attempt to cultivate them, but this is idiotic and suicidal. When land is so steep that it must inevitably wash away and be destroyed whenever the forest is removed, the collective intelligence of the community should interfere if the individual owner is incapable of taking care of his own possessions. In many instances the injury to such hill-slopes, once started, extends to other farms, and destroys lands that were in their own conditions protected and safe.

Because such destruction of fertile and valuable land goes on in detail, a little here and a little there, nobody thinks about it. But along every considerable river flowing through a hill-country the permanent damage and loss of value amounts to hundreds of thousands of dollars. If the land thus destroyed along the whole length of the stream were carried out from one place it would make a great sensation. People would think about it, and something might be done to prevent it. In every region of steep, rolling land or hill-slopes, where the soil has any considerable fertility, the same process of destruction is constantly going on, and the owners of the land accept such ruin as if it were wrought by the direct act of God, or the resistless processes of nature, whereas it is caused solely by their own lack of intelligence. It is entirely unnecessary, and a very slight exercise of thought and judgment would suffice to prevent it.

PROFITS FROM WOODLAND.—The profit from woodland is varied greatly by different conditions, such as distance from market, facility of transportation, the relation of supply to demand, and other causes. In some parts of the state, as in Salem County, many owners think their woodlands yield no profit whatever. Some of them say that they keep their lands in forest only because the wood would not pay the cost of cutting it off. Others say there is no profit or benefit beyond the mere convenience of being able to go out and cut a sill or post when they want one; and some say that they preserve their woods for considerations of sentiment alone—that they like to see the trees, and to walk among them sometimes.

Estimates of the amount of profit from forest-lands vary, from nothing, as above, to ten per cent. of their value or of the whole sum invested. In some regions, where the soil is good and the growth of timber is consequently rapid, and where some local industry supplies a brisk market near at hand, some owners think their woodlands yield a profit of ten per cent. In other parts of the state, where all the conditions are less favorable, profits are estimated at one, two, three, four, five and six per cent. But the truth appears to be that there is very little accurate knowledge on the subject. I have found the widest possible differences between the estimates of men living in the same neighborhood, and even in regard to the same tract of woodland; some intelligent and experienced woodsmen affirming that it was worth six per cent., while others said of the same land that it would not be worth having as a source of income, even as a gift, and that woodland is an undesirable kind of property.

Very few, if any, owners have kept such accounts of the yield of the various products of their woodlands as would be necessary for the determination of the question of the amount of profit. The amounts named above are estimated only. It

would of course be of great service to the country if a few owners would keep accurate records of all cost and expenditures, on the one hand, for certain definite measured areas of forest, and, on the other, a complete account of all receipts of every kind. This would have to be continued at least through the whole term of the life of one generation of trees—that is, from the time when one growth of the timber is cut off until the next growth reaches maturity, and is, in its turn, all cut off and marketed. Such a record would have great interest and value as a contribution to our knowledge of economic forestry. Who will begin and continue it?

FOREST-FIRES.—Forest-fires are the greatest cause of injury to the forests and woodlands of New Jersey. In all parts of the state where there are large tracts of woodland the value of this kind of property as an investment has been seriously diminished by the liability to great damage or almost complete destruction of the woods by fires. Each successive burning of a forest impoverishes the soil more and more, and its capacity for reproducing a valuable growth of timber is thus gradually diminished, and in time almost completely destroyed. If any plan could be devised for the effectual protection of the woodlands of the state from fire their value would at once be greatly increased. The question how to defend the forests from fire is in this state, as in some other parts of our country, the most urgent of all our forestry problems. It does not seem likely that we shall obtain much help from legislation.

A considerable proportion of the most destructive fires are started by sparks from railway locomotives. There are several kinds of spark-arresting appliances which would, in part at least, prevent the escape of burning cinders from the engines, but the railroad people object to their use on the ground that they lessen the speed of their trains. Some of the railroad companies keep the whole breadth of their "right of way" clear of trees and bushes, and plow a narrow strip at the edge of it, on each side. This is a valuable precaution, and doubtless prevents many fires. But a high wind sometimes carries sparks beyond this barrier into the dry woods, and thousands of acres are burned over before the fire runs its course. In such cases it would be a good plan for the owners of forest-lands on each side of the railroad to clear a narrow zone all along the front of their property, and plow it every year, so as to prevent the possibility, under ordinary conditions, of fire being blown into the woods from passing engines.

This suggests the only means for preventing the unlimited or indefinite extension of forest-fires which would be at once practicable and effective. This is the plan of clearing and plowing narrow lanes through all large bodies of forest, at regular distances apart, at every mile, for instance, crossing each other at right angles, thus dividing the woodlands into protected blocks, each a square mile in area. The wood thus cut out, when not too remote from market, would probably pay the cost of the work of clearing these lanes at first; but where this is not the case, the expenditure would be returned many times over in the rapid increase in value of the woodlands of the state which would result from their comparative security from the ravages of fire. It is often observed that an old woods-road, having only the breadth of a single wagon-track, is sufficient to stop the progress of a forest-fire, and it is altogether probable that a lane, forty or fifty feet wide, kept clear of trees and bushes, and with one-half of its breadth plowed every year, would nearly always be found an effective barrier. If this should prove to be true in practice, then a system of such lanes, crossing the woods in opposite directions a mile apart, would have the effect of confining each particular fire within the limits of the square mile on which it is started, and the damage in each case would be comparatively slight. The proper breadth for such lanes, and their number, would be determined by practical experiment, as their value would be demonstrated by use.

The greatest obstacle in the way of the adoption of such a plan for forest protection is probably a certain indisposition on the part of the owners of woodlands to do new and untried things, a kind of inertia which is common to all classes and conditions of men. If some energetic owner of a large tract of woodland would put this plan into operation, his example would probably soon be imitated by others. It would be comparatively easy of application in the level regions of southern New Jersey, but its use would be more difficult in the mountains and highlands of the northern part of the state. Until some such practical method is adopted the progressive devastation and ruin of the forests in this state by fire will probably proceed unchecked.

Franklin Falls, N. H.

J. B. Harrison.

The Western New York Horticultural Society.

Annual Meeting at Rochester.

THIS Society is one of the strongest in the country, and its deliberations have always been of the highest order. The meeting last week was equal in every respect to the best that have preceded it, and it might well serve as a model for similar gatherings. It was well attended by intelligent and interested members and visitors. The papers were carefully prepared by experts in the subjects treated. The discussions were always pithy and practical. Business was dispatched with rare order and promptness. Each session began at the precise moment named on the schedule, and the interest never flagged for an instant until the close. Our report of the meeting is necessarily limited to a condensed summary of some of the addresses and discussions, but the proceedings were instructive from beginning to end. The venerable Patrick Barry, who for twenty years has served most efficiently as President of the Society, was unable to preside; but he sent a donation of \$2,000 as the nucleus of a fund whose income is to be used for the Society, under direction of the Executive Committee. Mr. W. C. Barry presided and read the President's Address, which was a record of horticultural progress during the year, and in spite of the depressed prices of staple fruits, it was hopeful in tone, as the following extract will show:

We hear a good deal about low prices, overproduction of fruits, and all that. This is nothing new; the same cry was not uncommon twenty or thirty years ago. In my opinion, prospects were never better. The consumption of fruits is increasing wonderfully all over the world, but it is natural that as we advance more regard should be paid to the quality of fruits and the manner in which they are placed in the market. The slovenly fruit-grower must go!

THE CHAUTAUQUA VINEYARDS.

This was the subject of a paper by Mr. A. S. Watson, who described the Chautauqua Vineyard district as extending for about forty miles along the south-easterly shore of Lake Erie, and towards the south reaching half way up the range of hills whose summits are from three and a half to five miles from the lake-shore, to which they run parallel. The surface of the district is gently rolling or level and never precipitous, and no section of the country of equal width can show greater diversity of soil. The strip along the lake is a sandy loam, easy to cultivate, quickly responding to fertilizers, and generally underlaid with clay. It varies from half a mile to a mile in width. It is considered inferior for farming purposes, is cheaper than the adjacent land, and its merits for grape-growing have been but recently recognized. Its advantages are ease of cultivation and capacity to withstand drought, while grape posts are more durable here than in the gravelly loam. Grapes produced here have a finer bloom, more compact clusters and better keeping qualities, but are later in maturing than on the next belt. The vines, too, are less susceptible to winter injury. South of this is a strip of gravelly loam, a stronger soil, more valuable for farm crops. It is a warm soil, and the rapid growth of weeds makes it more difficult of cultivation. It yields enormous crops of fruit and is more susceptible to the effects of drought. It matures crops earlier, and, therefore, is preferable for early varieties. Still south of this on the hill-slopes is a narrower strip, with a soil principally of clay, and the few vineyards planted here produce a good yield of excellent quality. The Catawba, Delaware and Isabella do better on this land than they do nearer the lake. The soil is not easily tilled, but the grapes have a beautiful bloom, ripen early, and have the best keeping qualities. Nine-tenths of the land in these three belts is well adapted to vineyard planting, but not one acre in forty is yet planted, and scarcely two-thirds of the vines planted have come into bearing. That is, thirty-nine-fortieths of the land is now devoted to farm crops, and the visitor riding along one of the perfect roads that traverse the district would naturally inquire, "Where are the Chautauqua vineyards?" And yet 700 car-loads of grapes were shipped from this region last season, which paid \$100,000 in freights to the railroads. Two and a half million ten-pound baskets were required to market the crop, and they cost \$75,000. For the young vineyards fifty car-loads of wire

will be needed next spring, \$5,000 worth of manilla rope will be needed for tying the vines, and about ten million vines will be propagated. The Concord leads all other varieties, largely in the number propagated, and following this in the order of recognized merit come Worden, Moore's Early, Pocklington, Niagara, Delaware, Brighton, Agawam, Lindley, Salem and Catawba. A new variety, the Moyer, is attracting much attention. It is hardy and healthy, resembling the Delaware in foliage, size and quality of fruit, and is earlier than Moore's Early. A large percentage of the labor in the Chautauqua vineyards is done by women and girls. Tying up the vines in spring, and harvesting the crop in the fine autumn weather, is invigorating rather than exhausting work, and of the thousands of women and girls who begin to gather the crop in September and continue the work for six weeks or two months, few leave without gaining in strength, and from fifteen to thirty pounds in weight. Several vineyards are successfully managed by women. It would seem that for women left with families and a capital of from \$2,500 to \$5,000, and dependent upon the income secured from this investment and upon their own resources for a livelihood, no more promising occupation can be suggested. A vineyard of five or six acres, in full bearing, with a comfortable cottage and packing house, can be secured for \$2,500.

FERTILIZERS.

Professor Caldwell, of Cornell University, began by stating that if dilute manure-water or water in which the three most important elements of plant-food—potash, phosphoric acid and some compound of nitrogen—had been dissolved, were passed through a stratum of pure, clean sand, it would come out as rich in all these ingredients as when it was poured upon the surface; but that if the same water was filtered through ordinary tillable loam, it would be found almost colorless and odorless, and analysis would show that the nitrogen, phosphoric acid and potash had been taken up and were held by the soil. Now, if clear water should be again poured through this soil scarcely any of the sulphate of ammonia, the phosphate or the potash would be removed. It would require 100 gallons of pure water to wash out of the soil what was left there by passing through it a single gallon containing this fertilizing material in solution. This property by which plant-food is fixed in the soil is of great advantage, and enables the farmer or gardener to manure when he will, with the assurance that the land will hold the plant-food till it is needed by the plant. For, although it cannot be washed out by water, the plant carries its own solvent, or the key to unlock what has been fixed in the soil for its use. A solution of plant-food can easily be too rich for the plant's use, but we need not fear, under ordinary conditions, any excess of fertilizer, for, when locked in the soil, it is only delivered to the plant in such quantities as are required. One form of nitrogen, however, and the form which it generally passes into when taken by the plant—namely, the nitrates—is not fixed in the soil, but can be dissolved out by rain so as to pass off in the drainage-water. The natural caution, therefore, in case the nitrates are used, is to apply them when the plants need them. That is, do not top-dress with nitrates in autumn for spring crops, and use small and frequent applications rather than apply the entire amount needed at once. While in a general way the farmer can put all the manure he has to spare on his land or in it, and then forget it till the crop comes to take it as necessity requires, with nitrogen he must be watchful, and always have a plant ready to catch it when nitrification takes place.

Professor Caldwell was followed by Joseph Harris, who made a most suggestive address, in which he urged upon fruit growers and gardeners the advantages of using more nitrogen and using nitrates as the cheapest and most available forms of this element. Gardeners, he said, should use more commercial fertilizers, instead of bidding against each other for stable manure, which is a by-product, with a price controlled entirely by the demand. The profit of using nitrogen, for example, depends upon the value of the crop. Consumers refused to take the chemists' valuation of food stuffs, but consulted their tastes. For the support of life the carbohydrates in corn might be worth as much as the same nutrients in peaches. But while these elements in corn were worth \$30 a ton, they were worth \$500 a ton in peaches. It might not pay to use nitrate of soda on meadows when the carbohydrates in hay were worth \$30 a ton, and yet it might be profitable to use nitrate on strawberries where these nutrients were worth \$750 a ton. It had been stated that nitrates would not pay in the peach orchard, and they would not pay when other crops were grown among the trees. Indeed, it was conceivable that nitrates might injure the peach crop where they were

allowed to encourage a rank growth of weeds, which drank up the moisture needed by the trees. He had used nitrates with success for peaches. He did not believe they encouraged a weak, spongy growth of the trees that would suffer in winter. If applied early, the trees would make a strong, early growth, which enables them to ripen their wood well and produce abundant fruit buds. As fruits and vegetables are improved in quality they need richer land, just as improved varieties of live stock repay for the best of treatment. Beyond any question, early vegetables need nitrates before the warm weather comes, when nitrification goes on more rapidly in the soil. As a matter of practice, he found no loss from applying the nitrates he needed at a single application, for summer rains did not fall in sufficient abundance to wash the fertilizer out through the drains. The so-called "complete fertilizers" in the market did not contain enough nitrogen in available forms, and as it had not been demonstrated that plants took up this element to any great extent in other forms than that of nitrates, he advised the use of nitrates directly, and, fortunately, nitrogen could be bought more cheaply in this form than in any other. He did not counsel the indiscriminate use of nitrate of soda, although he used it largely and with profit. But he thought that no gardener or fruit-grower could afford to neglect making a careful trial of this fertilizer.

FUNGUS DISEASES OF PLANTS.

Professor A. N. Prentiss, of Cornell University, in his report as chairman of the Committee on Botany, gave a summary of the losses to fruit growers in the different counties from plant diseases. These losses were comparatively light during the past year, and yet in the aggregate they amounted to hundreds of thousands of dollars. Professor Prentiss considers these diseases more dangerous foes than destructive insects. Concerning a large proportion of them our information is limited, and we have few remedies that can be trusted. Not only is the fruit destroyed by parasitic fungi, but the plants and trees are robbed of the vitality necessary to the production of remunerative crops. Decreased vigor in the plant means lessened profit from its fruit. Careful study and experiment in this special field by men of scientific training, is one of the most urgent needs of horticulture. Recent investigation of the black rot of the Grape by agents of the general Government seem to prove that copper sulphate can be successfully used as a preventive of this disease, and the same substance will check the growth of the downy mildew of the Grape leaf. Flowers of sulphur is the best known remedy for the powdery mildew of the vine. The apple fruit-scab not only disfigures the fruit and often makes a large proportion of it unmarketable, but the same fungus attacks the leaf, weakening the tree, so that even if the fruit escapes the scab it is small and imperfect. Experiments by Mr. E. S. Goff point to spraying with a solution of soda hyposulphite and potassium sulphide as hopeful treatment of this fungus. But for black knot in the Plum, which has caused the total loss of many orchards, cutting away the affected parts as soon as the disease appears, and burning them, is the only safe course known. It is now agreed that Pear blight is a bacterial disease, but no remedy has been suggested for it except the amputation of the affected limbs. Peach yellows is the cause of loss beyond computation every year, but almost nothing is known of its origin or character, and no remedy for it has been found. Professor Prentiss continued through a long list of rusts and blights which preyed upon small fruits, chiefly to enforce the lesson that research of the most thorough and patient kind is needed before fruit growers will be able to meet these diseases with any feeling of confidence that their ravages can be arrested or controlled.

THE CULTIVATION OF THE PLUM FOR MARKET.

Mr. S. D. Willard, of Geneva, read a most instructive paper on this subject, in which he insisted that success can only be gained when good trees of varieties suited to a particular location are selected; when these varieties are adapted to the local market; when the orchard is carefully cultivated and liberally fed, and when constant watchfulness is exercised against the attacks of insects and diseases. The Plum is capricious in its likes and dislikes, and very often a variety which does well in one locality will fail a few miles away on soil of apparently the same kind. Markets are quite as variable. In one, Damsons are more highly prized than choicer sorts, while in a neighboring town colored varieties are required to the exclusion of all others. The selection of varieties therefore depends on the proper solution of very many problems, and yet these points which are vital to success must be settled beforehand by the planter from such observations and information as are within his reach. To the inquiry, then,

what varieties should be planted for profitable orchard culture, Mr. Willard can only reply that the Lombard, Reine Claude, Quackenboss, Bradshaw, Purple Egg, Gueii, German Prune, French Damson, Peter's Yellow Gage and Copper have proved among the best for his soil and market, while of the newer sorts Stanton is one of much promise.

Against the curculio the jarring process has proved satisfactory. If spraying with the arsenites is tried, care should be taken to use a solution as weak as possible, because the foliage of the Plum is easily injured. The green aphid is often more destructive than the curculio even, sometimes defoliating entire orchards. Professor Cook feels certain, however, that the kerosene emulsion dashed forcibly upon the tree by a pump through one of the new spraying nozzles will overcome this pest. The orchard should be carefully inspected as often as twice a year for the black knot, and on its first appearance the limb should be cut off far below the diseased point. Good culture and an enriched soil will prove helpful against leaf blight. The plum is perishable, so that careful preparation for market is essential, and when the fruit is to be sold from retail stands it should be picked with stems adhering, closely sorted and carefully laid in five to eight pound baskets. Other things being equal, a clay loam is the best soil for Plums. Cultivation of the orchard should begin early and should not be deep. The new growth of thrifty trees should be cut back to one-half every year in vigorous trees, and no thinning out of the branches is needed. For home use Mr. Willard named as choice varieties, M'Laughlin, Reine Claude, Washington, Bradshaw, Peter's Yellow Gage and Stanton. The productive life of a Plum-tree averages from fifteen to eighteen years, but the Lombard, under proper cultivation, might last twenty-five years.

CANNING AND EVAPORATING FRUIT.

Mr. S. G. Curtice read a paper on the canning industry, which began in a small way a little more than thirty years ago, and has grown so rapidly that now fruits and vegetables are put up in this way not only for western mining camps and for winter use, but they are so cheaply and successfully preserved that they compete at seaside resorts and many other places with green fruits and vegetables in their season. No accurate data as to the total amount of business done by the canneries of the country are available, but the estimates made were so enormous that Mr. Curtice refrained from giving the approximate figures. In his own establishment last year \$236,000 were paid for fruits, \$70,000 for tin, \$14,500 for sugar and \$68,000 for labor. As to complaints of the overproduction of fruits, Mr. Curtice said that he never could obtain as much as he wanted of choice kinds—fruits of a particular color or flavor. He had given \$80 for the fruit on a single White Cherry tree, and more profit was often realized by the owners of a few trees in a city lot of Rochester than was yielded by many acres of farm land.

The evaporating industry is still younger, having begun in western New York some fifteen years ago. Mr. M. J. Doyle, who read a paper on this subject, stated that within forty miles of Rochester there were nearly 2,000 fruit evaporators, besides many small dry-houses on farms, and the business was still rapidly growing. Of apples alone, 25,000,000 pounds were evaporated here, and the total dried product of all kinds of fruits amounted to 37,750,000 pounds, for which producers received \$1,485,000. More than 4,000,000 pounds of dried fruit were exported from this region last year, and Rochester fruit is in demand at such remote markets as Australia.

NEW VEGETABLES.

Mr. E. S. Goff made a report on the new vegetables offered by the leading seedsmen of the country last spring and tested at the Geneva Experiment Station. Of Beets, Lentz Turnip (Bragg) is a strain of the old Bassano, as early as the earliest; the New Market Garden (Iowa Seed Company), a short, conical variety, of large size and quick growth, is not as early as Egyptian or Eclipse, but yields a larger crop than either. Mitchell's Perfected Carrot (Gregory) is hardly distinct from the Coreless Red, but it is worth notice as being of good size, fine form, almost as thick at the bottom as at the top, and without the pithy core found in most of the larger varieties. Among several excellent new varieties of Cabbage, Marvin's Savoy (Hallock) yielded twelve heads from twelve plants averaging nine inches in diameter and weighing six pounds each. This is an extraordinary production for the Savoys, which are decidedly superior to common cabbages in table qualities. Dreer's Earliest Snowstorm and Gilt Edge Snowball (Thorburn) lead the list of Cauliflowers in point of productiveness and neatness of the heads. None of the Sweet Corns were superior to older sorts, but the Ruby Sugar (Rawson), a tall variety

which continued to furnish boiling ears of the sweetest quality from August 10th until frost came on October 11th, would be a valuable acquisition but for one fault. Many of the ears have a dark red cob, the juice of which produces an almost indelible stain upon table linen or upon the hands. Emerald Gem (Henderson) and Perfection (Livingston) were the finest Musk Melons tested, all things considered. Two new Okras proved desirable varieties for the Northern States. These were Little Gem (Dreer) and New Dwarf Density (Thorburn). Both were early, dwarf and bore fruit of uniform size. Child's Celestial Pepper (Gregory) is distinct and attractive, remarkably productive, and as the plant bears both red and yellow peppers at the same time, it is quite ornamental. Among Squashes, the Sibley (Sibley & Rawson) and the White Chestnut (Gregory) are valuable additions to the old list, and the former is likely to prove a formidable rival of the Hubbard. Probably the most important novelty of the year is the Dwarf Champion Tomato (Henderson). The plant is dwarf and compact, with foliage little subject to rust, and fruit is smooth, uniform in size and of excellent quality. Of eighteen new varieties of Potato tested, the Rural New Yorker No. 2 gave the largest yield. *Stachys tuberosa*, the so-called new vegetable from northern Africa, was tested, and yielded small, fleshy tubers, which only attained the size of acorns. Its table qualities were not tried.

Besides the papers already mentioned, Mr. Geo. B. Ellwanger contributed one on "Hardy Herbaceous Plants;" Mr. George Savage read one on "Roses for Winter Forcing;" Mr. William Webster spoke of "Improvements in Farmers' Homes;" Mr. Charles S. Little discussed the "Cultivation of Aquatic Plants," and Professor A. J. Cook gave a practical address on "Insecticides."

The exhibition of fruit was notably good. Ellwanger & Barry alone showed sixty-three varieties of apples and thirty-six varieties of pears, while other members contributed almost as many more. No finer Fameuse, Fallawater or King apples were ever seen, and the plates of Anjou, Winter Nelis and other pears could hardly be excelled. One Anjou pear weighed twelve ounces. Mr. Barry showed eighteen varieties of hardy grapes, among them early varieties, like Brighton, and all were in capital condition. Several of Roger's Hybrids, Eumelan, Niagara, Jefferson and Vergennes, were included in the collection. Grapes have kept so well this year, that Catawbas were selling in Rochester for a lower price than at any time since they first ripened.

Cook's fruit-gatherer is a new machine, which was strongly recommended to all who have orchards of any considerable extent. Not only are apples and pears gathered much more cheaply with this implement—for about one-half the cost of hand-picking—but much time is saved, which is an important item. Apples often increase in size just as they approach the ripening point, and the gain in quantity, not to speak of quality, when the fruit is allowed to remain until its full growth is reached, is worth considering. This machine does its work so rapidly that the fruit-grower can wait until the fruit matures before beginning to harvest the crop, and several members asserted that such an implement is as necessary to Apple-growers as is a mowing-machine or reaper to farmers.

As an evidence of increasing interest in Peach culture in western New York, it was stated that Mr. J. F. White, of Mount Morris, has an orchard of 22,000 trees, covering 145 acres. The varieties with which Mr. White has had the most success are Waterloo, Alexander, Early Rivers, Mountain Rose (the earliest freestone), Fosters, Early Crawford, Oldmixon and Late Crawford.

Notes.

Erica carnea and *Daphne Mezereum* were blooming in the open ground in the Arnold Arboretum on the 19th of January.

The bean of the *Soja hispida* is in as great demand in Japan as our garden Beans are here; but though it has been introduced, and re-introduced, over and over again, to American gardens, it fails to meet popular appreciation. A little money buys a good deal in Japan, but the crop of Soja Beans in Japan last year is represented by \$20,000,000.

A remarkable Orchid, still in bloom at Rose Hill nurseries, is a white variety of *Lalia Pattinii*, so-called. There is some uncertainty as to the identity of this plant; it is supposed by some authorities to be a winter-blooming form of *Cattleya Skinneri*, which it strongly resembles. The colored variety was introduced some two or three years ago, but this white form appeared in a consignment imported by Messrs. Siebrecht & Wadley.

The showy Yellow Broom (*Genista*) is now being grown largely for Easter decorations, and increased demand is reported. Pot-plants, well grown, make a mass of bloom highly effective among other plants, and it usually pays the grower better to sell it in this form than to cut the flowers.

Under the modest title of Botanical Notes, Mrs. Mary K. Curran, the curator of the botanical section of the California Academy of Sciences, contributes to its Proceedings a paper (now issued separately) containing a large amount of varied and important information upon a number of California plants, derived, for the most part, from personal observations made in the field.

Styrax Obassia has not yet, we believe, flowered in American gardens, though the plant itself has been considerably distributed. The leaves are as large as those of the Witch-Hazel, and the flowers are of corresponding size. Like the ordinary Snowdrop-tree or Halesia, to which it is related, the flowers are white, with the addition of a grateful perfume. It flowered last year in England.

The cork trade in Spain was unusually good last year, the exportation to other parts of the Continent, as well as to England and America, having been greater than for several years past. The demand has been the greatest for the superior kinds of corks, such as those for champagne bottles. Gerona is the most important centre in Spain for the production of cork, hundreds of cork manufactories being scattered over the province. In the town of Palamos there are forty. From St. Felin de Guixols it is reported that the Cork trees have been suffering from the attacks of a pest which threatened to destroy them. A voracious caterpillar or worm has been attacking the Cork forests in millions during the past year or two. In a very short space of time it stripped the trees of all their leaves completely. These worms are now in their turn said to be attacked and devoured "by another insect, a species of beetle of a dark green color, and armed with a horn, with which it cuts the worms up. Still another insect, in the form of a crab (*cangrejo*), pursues the worms and destroys them; and thirdly, when the caterpillar has passed through its metamorphosis, and the butterflies have deposited their eggs, a third insect, until now unknown, attacks and pierces the bags containing the new germs, and destroys them; all of which will contribute, no doubt, to the complete extinction of these destructive caterpillars."

The competition annually opened to young designers by the Architectural League of New York dealt this year with "A Tomb for a Distinguished Architect." The competitive drawings have recently been displayed at the exhibition held by the League, and it was pleasant to see how much good taste, as well as scholarly accomplishment, they revealed. The design by Mr. Brite of this city, which gained the gold medal, was adapted to a site such as frequently presents itself in American cemeteries—a low hill-side crowned with trees; and his scheme showed an Ionic façade with angle-piers and two intermediate columns—behind which stood a large sarcophagus—fronting on a finely designed platform, with encircling seats backed by a retaining wall against the sloping bank. The silver medal fell to Mr. Enders, of Chicago, who showed a charmingly simple and dignified isolated mausoleum, without columns, but with steps and a seat-encircled platform in front. Both these designs, and all the best ones among the seventeen that were shown, adhered to classic types—a noteworthy and a promising fact in these days when Romanesque art so strongly attracts our artists. Although Romanesque art is undoubtedly better fitted than any other for many kinds of modern buildings, it is difficult to secure with it just that expression of combined dignity, refinement, quietness, simplicity and delicacy which is especially desirable in a tomb. Nor does an adherence to classic types necessitate monotony in form or feature. The drawings now in question were sufficient to refute such an idea, for there was much diversity, even between those which were most "scholarly." When we reflect that no work had been admitted into this competition by men more than twenty-one years of age, its results were extremely promising; and for several of the designs one may heartily wish realization in more solid material than pen and paper. Still more interesting than any one of them, however, was a design not in the competition, which had been prepared by Mr. St. Gaudens and Mr. Page Brown. It showed a temple-like structure with a projecting pediment borne by twelve caryatids, arranged in three rows of four each, which had been given the shape of winged angels. Here, Christian sentiment had been significantly displayed; yet the result was truly classic in feeling, and, executed as this sculptor could execute it, would be of wonderful beauty.

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The Administration of Public Parks.

THERE has, of late years, been a gratifying growth of the sentiment in behalf of public parks in American cities. It is coming to be recognized that a city can hardly possess a more attractive feature than a good system of public parks, and often, even in cities of the second or third rank in respect to population, the foremost talent in the landscape-creative art has been secured to make designs for the great public grounds which, in beauty and in adaptation to their various purposes, can be approached by only a few of the most famous parks of Europe.

When, however, we reflect upon the kind of maintenance our parks receive, the prospect is not cheering. Important works of this kind have been sadly damaged and mutilated, and in some cases almost irretrievably injured, by failure in administration and management. The constant change in our system of municipal government is usually responsible for this. The lack of permanence in administration is our great bane. Lines of policy are entered upon, and after they are well under way they are abandoned at a great sacrifice, usually for no other reason than that they were instituted by another set of men, to whom their successors are opposed on grounds that have nothing whatever to do with the matter in hand. Good housekeeping, either on a municipal or a domestic basis, cannot be expected where there is an unceasing change of servants. The best artist may be engaged to report a project for a public park or system of parks. After a careful study of the situation he submits the plan best calculated to meet the topographical conditions and correspond to the peculiar needs of the population. The plan is accepted, the work is taken in hand, and all goes well for a time, when suddenly the authorities in charge of the work are replaced by other men. This change may come from political motives, it may be due to that spirit of false economy that every now and then pushes forward and aims its blundering blows at precisely the points where they will effect the greatest waste, but a

revolution of policy is threatened. Possibly the tact and skill of the artist whose design is imperiled may avert the calamity; there may be a man or two among the new authorities who recognize that, having given a lifetime to the study of such questions, he is most competent to speak, and they are therefore guided by his judgment, and have the character to influence their associates. But the average local politician is not of this stamp. His ignorance is paralleled by his conceit, and he deems himself competent to pronounce with positiveness upon any question presented to him. The danger is aggravated by the prevailing ignorance regarding the purpose of a park. One man has the idea that it must be a centre for all sorts of noisy sports, for festivities of the brass band, fireworks and barbecue order. Another's idea is that of a "pretty" place, a huge flower garden, spangled with gay exotics, striped with ribbon-borders, and beds of brick-colored geraniums uttering their chromatic shrieks on every hand. The true conception of a park—that of a place where the urban inhabitants can, to the fullest extent, obtain the genuine recreation coming from the peaceful enjoyment of an idealized rural landscape, in rest-giving contrast to their wonted existence amidst the city's turmoil—is farthest from their minds, and they will exert all their influence for the incorporation of their favorite discordant features in the scheme. In these ways the purpose of many a nobly conceived public park is threatened with perversion.

How can these defects best be remedied? Of course the greatest safeguard lies in the appreciation of the work by the public itself, for whose benefit the park is created. Once let the design be fully realized, and the public use of the park in the ways originally contemplated would be so thorough, and the enjoyment of it so complete, that any departure from the true purpose would be met by such an expression of sentiment that the desecration would be practically impossible. But, unfortunately, of all art processes, that of landscape-making is the slowest in its consummation, and it is during its successive creative stages that the danger is most threatening.

The landscape-gardener has a task more difficult than that of other artists. His imagination must grasp the available materials and estimate their potentialities, and then, taking a bold leap into the future, he must form in his mind a picture of the ultimate scene to be unfolded, and must dispose his materials so as to develop this ideal through slow natural processes. Besides the ultimate picture broadly conceived so as to present the greatest beauty at all hours of the day and every day in the year, he must also form an idea of the progressive aspects of his creation as the years go on, until the result is achieved, which, with proper care, will endure for centuries. In other artistic activity, realization follows close upon the heels of conception, but the finished picture of the maker of landscapes will not become an actuality for years; indeed, a century may pass before the artist's thought attains its full expression.

The work, therefore, of the true landscape-maker, is essentially unselfish; he can hardly hope to witness its completion, and his only delight is that of conception and of watching its growth so far as he may; the latter activity, akin to parental responsibility, is commingled with pain. Without wide sympathy, a love for the mass of his fellows, a perception of their needs and of how nature can best be brought to respond to them, his task would be a failure. It may be seen, then, that no other form of art-creation deserves more reverent care, more protection from thoughtless or mischievous hands, than that of such a master, whose canvas is the earth, and whose pigments are the objects themselves that the painter aims to counterfeit—the turf, the trees, the grass, the flowers, the rocks, the water, under the changing skies.

The chief danger comes during the progress of the work. The designer, of course, has in view the attainment of pleasing results as soon as possible, and the gradual heightening of these with the progress of the work as the

growing things take shape, although these are incidental stages, and the completed picture may be quite another thing than that out of which it is evolved. But, as in the growth of every organism, there are periods where ugliness temporarily prevails, especially in its beginnings; so it is in the creation of a landscape. In more advanced stages, also, there may be moments when the beauty of the scene might, for the time being, be heightened by making some change in the plan, but it would be at the cost of a lasting mutilation of the whole. To judge a painter's work while it is in progress, and to demand changes, because some effect of underglaze, for instance, that was intended to heighten the beauty coming from succeeding brush-strokes, chanced to be distasteful, would be the height of folly. But in the work of the landscape-maker effects equally transitory are more slow in passing, and are likely to become the pretext for demanding a change on the part of the ignorant or misunderstanding.

Therefore an essential thing in the administration of a public park is to provide some means by which the faithful execution of the original design can be assured. A public park, in order to be well administered, should have a management of the most permanent character possible. In Germany are to be found the best public parks in Europe, and a leading feature of German municipal government is its stability. While the power comes directly from the people, and the form is, therefore, fully as democratic as ours, there is in all departments a permanency of tenure for all officials, from the mayor down, equal to that prevailing habitually in our private business corporations. The result is, a continued harmonious administration of public works by competent and experienced men that assures the most economical and satisfactory results.

The adoption of such a system with us would be hardly practicable until experience had taught us the unsatisfactoriness of our present methods by more severe lessons than have yet been received. It seems possible, however, to attain a permanency of park administration in another way. There is an increasing tendency to intrust the management of public libraries, museums and like institutions to boards of trustees, incorporated bodies independent of the city government, but still public institutions sustained by public support. The parks of a city can as appropriately be administered in this way as can a public library or art museum. They form an institution by themselves, sanitary, educational and æsthetic in nature, and it is equally important that they should be kept free from the complications and uncertainties of local politics. The customary park commissions, although often admirably constituted, have the great drawback of a liability to sudden, and, perhaps, complete change of personality. Under such conditions the best results could hardly be looked for, and it is something of a wonder that our parks have been maintained as well as they have. Under well organized boards of trustees, like that, for example, which has built up the Boston Public Library, and has made it the most successful institution of its kind, we might hope for an escape from many of the dangers now attending park administration.

The Artistic Aspects of Trees.—VI. The Lombardy Poplar and the Weeping Willow.

GOOD taste is required for the grouping of all kinds of trees if the results are to have the harmony which is the only quality that, in the long run, can satisfy the eye. But if this is true of trees in general, it is doubly true of those which are eccentric in form or color, like the Lombardy Poplar, the Weeping Willow, the White Birch or the Purple Beech.

No tree has a more marked individuality or is more effective in the right place, than the Lombardy Poplar, but no tree looks worse when wrongly placed. If its constitution were more vigorous it would be well adapted to

street planting when the street is narrow, because with it a certain amount of verdure can be secured without too great an interference with sunshine. But the slender shadow it casts renders it, on the other hand, ill adapted for roadside planting where shade would be grateful. Nevertheless, as planted by the highways of Belgium, France and northern Italy it has dignity and beauty. Its stiff, aspiring form brings more accent into such wide, level, featureless landscapes than would the round, umbrageous forms of other trees. This gives no warrant, however, for planting it along winding roads or in mountainous or wooded districts. Nor does it appear well in isolation, unsupported by a long straight line of its fellows or by lower masses of foliage; nor when planted in groups; nor yet when its sharp top is seen rising here and there at random out of a wood. One or two Lombardy Poplars carefully set in a plantation just where they are needed to relieve its general softness and to break the sky-line with a touch of vigor and emphasis, are often most effective. On the border of the lake in the Central Park, not far from its western extremity, are two or three tall Poplars standing on a little promontory. Their effect is admirable, and no other tree in just this spot would have so good an effect. But perhaps the best place of all for the Lombardy Poplar is among other trees beside a low cottage. In many European villages it is thus seen, and in many beautiful pictures it gives dignity and individuality to a composition which, without it, would be tame and commonplace, for the tree is almost as effective in its own little scene as a village spire in the larger scene of which it forms a part.

Wholly different in character is the Weeping Willow, and yet its unusually pliant, drooping expression makes it as conspicuous as the rigid uprightness of the Poplar itself. As soon as it comes before the eye, it presents a striking contrast to the simple dignity of those trees which determine the general character of every landscape. Easy of cultivation, rapid of growth, not particular about soils or situations, and putting forth its leaves very early in the spring; attractive, too, to many eyes by reason of its super-sentimental air, the Weeping Willow has been planted everywhere, and opportunities do not lack, in nearly every country, for estimating its fitness to this situation or to that. Nevertheless, it is hard to say in what situation it looks best. It has not nobility enough to stand by itself, and it does not group harmoniously with any other tree. Once in awhile in a Japanese picture we see a small Weeping Willow planted by a cascade, which has a charming effect. This is because the lines of the falling water harmonize with its own, and because, so to speak, the cascade seems to give the tree an excuse for its abnormal habit. To group it with round-headed trees means contrast without harmony, and this is still more emphatically the case if there is substituted for soft, deciduous foliage, the stiffer, more horizontal forms of conifers. In a street its pendulous weakness conflicts disagreeably with the rigidity of architectural lines; and even when we think a great Weeping Willow looks well drooping over and protecting a rural cottage, we cannot but decide that some other tree would look better, expressing still more clearly the idea of protection through its greater sturdiness. A cottage with a Weeping Willow beside it looks better than a cottage bare of foliage; but an Elm or a Maple of equal size would replace the Willow to very great advantage. But the spot most often chosen for the Weeping Willow is one where it may droop over a stream or a sheet of placid water. Perhaps, however, this is the very place where its faults are most manifest. A Willow is, indeed, very often the best tree that can be chosen for the border of a stream or lake, but not a Weeping Willow. All the virtues of this tree—the delicate character of its spray, the tender, pallid color of its leaves, and their twinkling, airy grace—are possessed by other Willows which are free from its defects. The White Willow of Europe, for instance, now thoroughly naturalized in our Northern States, is much more individual

in color and texture than the Weeping Willow, and is an extremely graceful tree; yet it has great dignity, and harmonizes admirably with almost all the trees commonly planted. A glance at the illustration on page 67, which shows the border of a pond in Brookline, Massachusetts, where White Willows edge the water for a considerable distance, should be enough to prove its appropriateness for such a place, and to suggest that not only near water, but in all other situations where Willows are desired, White Willows or some other species of similar habit should be chosen in preference to the Weeping Willow. Of course, there may be rare cases where a Weeping Willow, especially a small one, has been well used by an intelligent planter; but, as a general rule, it will be found out of keeping with its surroundings. When this is the case, a tree must have extraordinary merits to justify its introduction; and this can hardly be affirmed of the Weeping Willow, which, at its best, is eccentric rather than beautiful, weak rather than really graceful.

A correspondent, who is familiar with the forests of southern Indiana and Illinois, calls our attention to the fact that in this region, which is celebrated for the richness of the forest-growth and the immense development attained by individuals of several species of trees growing upon the deep, alluvial bottom-lands, more clearing and thinning of the woods has been done during the past five years than in the fifteen years previous. A large proportion of the great Yellow Poplars (*Liriodendron*) have already fallen under the axe of the lumbermen. The wealth of these forests will be appreciated when the fact is realized that ten years ago it was not uncommon to find an average of three Poplars to the acre, with stems six feet in diameter and running up straight and clean for a distance of seventy or eighty feet to the first branches. These giants, now nearly all destroyed, grew in a forest in which the predominating trees were Beeches, Black Gums and Blue Ash, which were not surpassed anywhere in stately proportions and splendid vigor.

Japanese Gardening.—II.

I HAVE already tried to show through quotations from Mr. Conder's article in the *Transactions of the Asiatic Society of Japan*, what ideas generally control the formation of gardens in Japan, and have tried to explain that the Japanese considers his garden, with its miniature artificial hills, vales, streams and rock-arrangements, a truly "natural" work of art, because it typifies or suggests by imitations on a smaller scale the effect produced by large natural features. This is to say that the Japanese looks upon this art much as we look upon painting, not demanding that the same materials shall be used as exist in the scene portrayed, or the same scale preserved, but merely that the result shall be truthfully suggestive of something that might be found in the natural world.

Passing to matters of detail, Mr. Conder explains that whether water be actually present or be simulated by expanses of smooth earth or sand, "a garden-lake when constructed in a limited area should never be completely visible from any one point of view, but parts of the outline should be intercepted and hidden by shrubs and plants placed in suitable positions. We find here again the important principle of suggesting limitless space by the partial obliteration of bounding lines." And, it need hardly be said, this idea at least is common to good landscape-gardeners all over the world.

Great use is made of islands in such lakes, whether they be of water or of simulated water. Some of them are isolated from the shore and treated in a way to suggest that they are surrounded by the sea itself. Others are joined by bridges to the bank, and always their minor features have symbolic meanings, which are lost upon a European eye. In a few Occidental gardens great use is made of natural unhewn stones and boulders, but the practice is almost the chief element in Japanese gardening, and great care is given to the sizes and outlines of the separate stones, as well as to their general effect as a mass. "The sizes and proportions of the different stones employed govern, in many cases, the scale of the trees and shrubs used in juxtaposition. Some writers go so far as to say that stones constitute the skeleton of the garden, that their form and distribution should receive the first attention, and that the trees and shrubs should be placed

afterwards in such a way as to emphasize and 'support' these stones and connect them into one harmonious whole." Scale is nicely regarded—very large stones are not used in small gardens, nor small stones in large ones. "The principal boulders in an artificial landscape being arranged to represent natural rocks, it is often customary to describe their altitude by fictitious measurements applicable to the grandeur of real scenery. This custom not only helps to keep up the imaginary illusion, but no doubt assists the designer in a consistent preservation of the character of all subsidiary parts. . . . The chief thing to be kept in mind in arranging garden-stones is to make them appear as if Nature had placed them in position. Some of the wilder freaks of Nature must, however, not be copied, for if artificially imitated on a comparatively small scale, they would be suggestive of instability and danger, and destructive to the general repose required in an artistic composition. It is the immensity, antiquity and adamantine solidity of the overhanging rocks and towering pinnacles of natural landscape which reconciles us to their threatening appearance." How different indeed are such ideas as these from the ones that commonly direct the employment of stones in our gardens, where no thought of Nature is suggested by the rockeries, grottoes and palpably artificial cascades, and where beauty has seldom been considered in the choice of the elements of construction.

A long list of stones is given by Mr. Conder, each of which is considered appropriate to a given service—as for association with water, or for use in valleys or on mountains or beside roads—and each of which has its own symbolic significance besides. The use of turf in Japanese gardens, he says, is of comparatively recent introduction. "The level portions were formerly finished in beaten earth, kept carefully weeded, or spread with white sand or broken shells. The hills were partly covered with different kinds of green moss." Raised stepping-stones often traverse these earthy lawns, and they are kept a little damp for the sake of neatness and coolness. Or if sand is used, it is carefully raked, sometimes in patterns—as in waving lines that represent water. "Gardens consisting of such areas of naked raked sand, with only a few stones representing rocks and islands, are not uncommon." How little they would satisfy our taste! Yet the strong Japanese imagination can delight in the picture of a sea-coast or mountain-lake which they present.

"In connection with the temples there are many magnificent avenues and groves of fine trees, arranged with the same formality as is employed in Europe. Some of the avenues of *Cryptomeria* and of 'Enoki' (*Celtis Chinensis*) lining the country roads and temple approaches are hardly equaled in grandeur by any avenues in the West. But in landscape-gardening such arrangements are seldom, if ever, resorted to. In cases where trees are grouped together in numbers, they are generally of different species and specially selected to contrast with one another. Form and line receive primary attention. . . . Such contrasts as that which the rugged Pine, with its scrambling, angular branches, forms with the spreading Cherry, or the drooping Willow, with its curving boughs, are purposely designed. . . . Trees and plants should not be used in positions contrary to their natural habits of growth. For example, a hill-side plant should not be placed in a valley, nor should plants peculiar to low, sheltered spots be placed on high ground." Here again is a refinement quite foreign to Occidental gardening, which prides itself, rather, upon making plants grow in just those situations where nature had not placed them. "As a general rule, trees which shed their leaves and look bare during the winter should not be planted in the foreground of a garden. An exception . . . is in the case of the Plum tree, which, on account of its early blossoms, is placed in the front of the grounds."

"The habit of clipping and shearing trees and shrubs is a common one in Japan, but it is seldom done in a manner inconsistent with the general character of the particular trees thus dressed." What the gardener aims at, is to accentuate, not controvert, the design which nature had in forming a particular tree. The Pine, for example, "goes through a thorough surgical treatment in the nursery, with the idea of producing a shape of acknowledged beauty, as displayed in some of the finest natural trees. Its branches are bent, broken and bandaged, and bound with cords and splints, until it grows into the fancy shape desired." This shape is rarely at variance with forms that can be found in nature; yet dwarf trees are sometimes trained into curious, non-natural forms, the branches of the favorite Pine are occasionally cut into the form of balls and trained to grow in a pendant way, suggestive of a cascade, and now and then one may even see a shrub cut into the shape of a junk under full sail. But fantasies like

these, we gather, are executed on a small scale and not placed where they would disfigure a landscape effect. Low shrubs are generally cut into hemispherical forms, but this is to aid the imagination by representing "rounded masses of variegated greens placed upon the hillsides and between the rockeries. . . . Such spherical masses are frequently arranged in groups towering one behind another, so as to suggest the forms of green hills." That is to say, the eye then recognizes, not an artificially shaped shrub, but a mass of larger size seen at a fictitious distance.

In the placing of trees, great care and taste are, of course, displayed. They should stand near a veranda for the purpose of affording shade, and near bridges so that their shadow may fall upon the surface of the water and produce a pretty effect. Singular and suggestive names are applied to the trees which hold different positions in a garden, from the principal tree which occupies a foreground spot, and must be a large and fine specimen—usually an Oak or a Pine—to the "distancing tree," which must stand behind the furthest hill of the garden and be rendered indistinct in outline to aid the effect of remoteness.

Flowering trees are often massed together in large numbers in public gardens; but in private grounds, where a more delicate taste may be supposed to rule, they are preferably distributed "in such a way that they shall come between the foliage of evergreens." Flowers are profusely used in most gardens in such a way as to supply an abundance of color at all seasons of the year. But in some kinds or types of gardens they are absent or appear only in or near the water. Of course no landscape arrangement is disfigured by formal beds; but another part of the grounds, usually adjacent to the women's apartments, is often devoted to the flower-garden, and here the plants are thickly massed together, though without any attempt at geometrical pattern-making. The growing of flowers in this way is, however, regarded as a rather effeminate taste.

Many paragraphs in Mr. Conder's article are devoted to the lanterns which so prominently ornament Japanese gardens, and to the nature and arrangement of gateways, fences, water-basins, bridges and hedges, as well as to the kinds of trees, shrubs and flowers most generally seen. But there is no space here to follow his descriptions. It can only be added that, of course, the arrangement of hills and valleys described in my former article does not universally prevail. The so-called "Common Gardens" have no artificial hills, "but the stones and rounded shrubs are sometimes grouped so as to suggest mountain scenery. . . . Gardens of this type when level may be supposed to represent either a mountain-valley or a sea-beach; in the former case the surroundings should be steep, thickly planted and imposing; in the latter case the landscape may be open and placid." Gardens for tea-ceremonies have peculiarities of arrangement proper to themselves, and there are others in which a stream is the chief feature, and which are arranged so as to bring it to the best effect. Even narrow courts and passages are treated by the landscape gardener, in simple designs consisting of "a continuous row of stepping stones and an occasional group of trees and shrubs."

And in conclusion I may add that a compensation is found in Japan for that lack, which Mr. Conder notes, of large parks with roads, wide lawns and great plantations, such as we find in the West. Wherever one goes in Japan, we learn from other writers, the natural landscape has been touched up and assisted to greater beauty by the hand of man. One can never tell where nature ends and artificiality begins, so thoroughly have nature's intentions been respected and so artistically have they been developed. Where a real landscape is thus treated, of course no miniature simulations of scenery are introduced. These are reserved for spots apart from great natural features, although such features may afar off encircle them and blend with their own near beauties. Here they lie, like pictures in a frame, and as such are judged by the Japanese eye—less for what they are, though this may be something very charming, than for what they typify, suggest and stimulate the imagination to recall.

New York.

M. G. van Rensselaer.

"When you come upon a particularly fine prospect, and remark upon it, What a pity that great tree is there, how much finer this would be if it could be removed! you might be very much surprised to find, when the tree was cut down, that you no longer had a picture before you; for the highest type of garden is like a picture gallery and pictures require frames."

Pückler-Muskau, 1834.

New or Little Known Plants.

Cereus Pringlei.

ONE of the most interesting of Mr. Pringle's numerous Mexican discoveries is the great Cactus which now bears his name,* and which he found during the summer of 1884 growing upon the hills and *mesas* south of the Altar River in north-western Sonora.

The stems of this remarkable plant, which divide irregularly above the base into numerous large branches, do not attain the great height of its near relative, the now well-known *Sauwarrow*, the *Cereus giganteus* of Arizona and Sonora. They are sometimes, however, more than thirty feet high, and they are thicker and more ponderous than those of any Cactus known. The number of ribs is fewer than in *C. giganteus*, while the flowers, instead of being clustered about the summit of the stem, as in that species, are scattered along the ribs for a distance of two or three feet from the top.

Nothing more was seen of this plant until October, 1887, when Dr. Edward Palmer, the well-known explorer of Mexican botany, visited San Pedro Martin Island, in the Gulf of California, which he found covered with a forest of these trees, which our illustration upon page 65, taken from a photograph, for which we are indebted to Dr. Palmer, shows to be one of the strangest and most remarkable forests which has yet been seen in any portion of the North American Continent.

It appears from Dr. Palmer's notes that San Pedro Martin Island, is in the Gulf of California, eighty miles north-west of Guymas, in latitude $29\frac{1}{2}$ and longitude 113 west from Greenwich. It is an irregularly shaped rock about four and a half miles in circumference, with a central elevation of 1,200 feet above the level of the gulf. It is partly covered with a deep deposit of guano, which Mexicans and Yacqua Indians are now engaged in collecting for export. The *Cereus* is called *Cordon* by the Indians, who gather the fruit in great quantities. They take out the pulp and seeds and grind them together into a sort of flour. This is then mixed with water and made into *tomales*, or cakes, a tablespoonful of the paste being put between two corn husks and boiled. Dr. Palmer found these *tomales* not inferior to the pies of more civilized people.

The *Cordon* furnishes the only fuel and timber produced upon the island, which is destitute of other trees. The dry, hard ribs, the remnants of many forest generations, and practically indestructible except by fire, are found scattered over the surface in large numbers; they are carefully collected by the Indians, who manufacture them into the canes needed by the men in climbing over the precipitous rocks in search of the guano; they serve for the beams and door-posts of the workmen's huts and supply the fuel for their simple cooking. The largest plant observed by Dr. Palmer was thirty-five feet high, with a circumference at the base of the trunk of seven feet and six inches.

Dr. Palmer collected only eighteen flowering plants upon the island; among these Mr. Watson finds a new genus of *Compositæ*, and a bushy Fig, probably an undescribed species. The poverty of the collection is due in part, no doubt, to the late period of the year in which it was made, and when most annual plants would have entirely disappeared.

C. S. S.

* "*Cereus Pringlei*, Watson, *Proc. Am. Acad. Arts and Sci.*, xx. 368. Stems erect; ribs usually thirteen, very rarely more; areolæ contiguous upon the ribs, oblong or lanceolate, the younger densely tomentose and with an outer circle of nearly erect, more or less unequal, ash-colored spines (mostly six to nine lines long), and a central stouter one twice longer, all terete; the older areolæ naked, with about fifteen dark flattened spines, mostly widely spreading, about an inch long, and deciduous; flowers lateral and scattered below the summit of the stem, two and one-half inches long; the ovary and tube very densely covered with tawny hairs, nearly or quite concealing the lanceolate scales and outer sepals; petals spatulate, white, tinged with green or purple, six lines long; fruit globose, two inches long, bearing the persistent flower, and densely covered with globose cushions (four or five lines in diameter) of dense tomentum intermixed with more or less numerous white, bristly spines (one-half inch long or less); seeds black and shining, obliquely oblong-ovate, one and one-half lines long; hilum oblong, basilar."

Foreign Correspondence.

London Letter.

THE new plants of 1888 do not include anything of a sensational character. There are a great many Orchids, numerous hybrids of all kinds, and a few introductions of a miscellaneous character. But one cannot point to any of them as of very exceptional merit. The taste and demand for Orchids predominates over everything else, and, no doubt, has diverted the attention of collectors from other plants. Indeed, there are those who affirm that it does not pay to bother about introducing anything nowadays except Orchids, which is another way of saying that there is no demand for plants of other families. But a new plant of superior qualities for the garden is always certain to find general favor. As an instance I might point to *Impatiens Sultani*, which was introduced to Kew by accident a few years ago, and which is now in almost every

we find a long list of new additions, many of them decided acquisitions. Especially is this the case in regard to Orchids. It may be treasonable to say so, but is there not too much importance attached to the mere marking and size in the flowers of these plants?—a great many being dubbed varieties and distinguished by a three-barreled name on account of characters which in any other family of plants would be ignored. Plant-breeders contribute more than any one to the progress in the horticulture of to-day. It scarcely seems credible that a generation or so ago many botanists discouraged with all their might any attempt to tamper with the so-called specific characters of plants by crossing them. Darwin taught how important a light the work of the breeder of plants, as well as of animals, throws on the great secret of the origin of species. Nowadays almost every nurseryman in England tries his hand at crossing one species of plant with another. The result already is almost miraculous. Among stove and greenhouse plants we have Orchids, Nepenthes, Begonias, Crotons,



Fig. 92.—*Cereus Pringlei* on the Island of San Pedro Martin.—See page 64.

garden. *Aristolochia elegans*, *Boronia heterophylla* and *Nephrolepis rufescens tripinnatifida*, all introduced through Kew within the last five years, are also universal favorites. A large number of new plants are obtained through cross-breeding, and these absorb a good deal of the attention of horticulturists. There must be large numbers of beautiful plants still unknown in gardens. Even those fields which have already been explored by the collector will contain many good plants worth introducing, whilst such new countries as New Guinea, Madagascar and Burnah are sure to be rich in floral treasures of all kinds.

Last year's introductions comprise numerous Orchids, most of them interesting, a few beautiful, the best of them being the following: *Cypripedium bellatulum* (habitat not published), introduced by Low & Co.; *C. Elliotianum*, from the Philippines, and *C. Rothschildianum*, from Papua, both by Sander & Co.; *Spathoglottis aurea* (*Kimballiana*), Borneo; *Lassochilus giganteus*, Angola, Linden; *Disa racemosa*, South Africa, Kew.

Amongst stove plants there are none of any particular beauty, the most distinct and pretty being *Begonia Lubbersii*, from Brazil. There is no new greenhouse plant, and only the following first-class new additions to the herbaceous collection: *Lilium Nepalense*, Nepal, Low & Co., and *Ostrowskia magnifica*, Turkestan, Max Leichtlin. Two good, hardy flowering shrubs have been added. These are *Syrax Obassia*, Japan, Veitch & Sons, and *Stuartia Pseudo-Camellia*, Japan, Veitch & Sons. [The last named plant has been known in American gardens for the last dozen years.—ED.]

When we come to varieties of well-known plants, however,

Anthuriums, Caladiums, Rhododendrons (Javanese), and Hippeastrums; hardy plants may be instanced by Hellebores, Pæonies and Narcissus. It is remarkable that none of these crosses, however extreme, reveals any tendency on the part of the offspring to break away from the fixed characters of the genus. Another fact of equal interest is that no cross-breeding of species, however varied in character the different species crossed are, has produced anything more extraordinary than has been obtained by the cultivation and selection of the progeny of a single species. The Chrysanthemums, with their hundreds, thousands of forms, all from one species, according to some botanists, the Gloxinias, the Cabbages, Apples and many other well-known garden races, are cases in point. Certainly the breeding of plants is a most delightful and fascinating occupation. It is as yet in its infancy, but in England it is being pursued with zeal and patience, and the magnificent results already achieved point the way to still greater.

An exhibition of Chrysanthemums on the tenth of January is a novelty which a few years ago would have been considered absurd. But by dint of careful cultivation and the selection of late-flowering kinds a very creditable display was collected in the London Aquarium on that date. The kinds shown were the following: Belle Paul, Meg Merrilies, Gloriosum, Rolfe Brocklebank, M. de Calrol, W. E. Drover, Progne, Martha Harding, Golden Gem and Mrs. J. H. Jones. During the last month we have had very heavy and continuous fogs, which have damaged flowers of all kinds, Chrysanthemums included. Still the above display was most interesting, and is certainly a step in the right direction. There does not

seem any good reason why we should not have Chrysanthemums that flower from January to June, just as we have them now from July to January.

Growers of hardy plants here are turning their attention again to Hollyhocks, which a few years ago were as great favorites as Single Dahlias are now. Then came disease, and the stately, many-colored Hollyhock was almost given up in despair by English horticulturists. Modern growers say cow manure will keep away the disease from these plants.

January 11th, 1889.

W. Watson.

Cultural Department.

Leaf Spots of Green-house Plants.

IT is usually the case, when black spots appear on the leaves of ornamental plants, that they are supposed to be due to the attacks of insects or the growth of fungus parasites. There is, however, one form of black spot to which my attention has been several times called, which, although due to a fungus, is not caused by a parasitic species which infests the leaves themselves, and the spots cannot be considered as indications of any disease, but merely as accidental disfigurements. The spots to which I refer are about as large as the head of a pin, and are scattered without order, and sometimes very profusely, over the surface of the leaves. They can easily be removed by mashing or be picked off, when they leave a slight circular depression, as a rule. A microscopic examination shows that there is no fungus mycelium, but merely a mass of ellipsoidal, orange-colored cells covered by a black, structureless membrane of a flattened, hemispherical shape, which adheres to the leaf by its free edge. In short, the black spots are nothing but the discharged spores of a species of *Pilobolus* with their sporangial cap.

The species of *Pilobolus* are small moulds which grow on dung of various kinds, and look like minute white or pale orange-colored, glistening sacks, with a black tip when mature. The spores are ejected with considerable violence, and I have known them to be shot off to a distance of several feet. It is only when the *Pilobolus* grows on the manured soil of hot frames and green-houses, or other small-sized compartments where plants are grown, that it is likely to attract popular notice. When plants are crowded in a small space over fresh manure the *Pilobolus* is likely to appear and discharge its spores over the leaves and stems of any plants which are near. Some years ago the Roses in a green-house at Cleveland were found to be thickly spotted with *Pilobolus* spores, and the black spots were supposed to be due to a new fungus disease. More recently the Roses in a small green-house at Whitinsville, Massachusetts, were similarly affected, and an examination showed the presence of a quantity of *Pilobolus*, whose spores not only formed spots on the Roses, but also on the wood-work of the green-house for a considerable extent. The most recent case to which my attention has been called was at Newton, Massachusetts, where the leaves of Geranium were thickly spotted by spores of *Pilobolus*. The spots, of course, are merely a form of dirt, and cause no disease of either Roses or Geraniums, for the *Pilobolus* spores do not develop on living leaves and stems. It is a little singular that, while this particular form of black spot has attracted the attention of gardeners in this country, it has not been noticed in European green-houses either as a supposed cause of disease or disfigurement to any extent, if one can judge by the absence of any reference to the subject in the common works on plant diseases.

Cambridge, Mass.

W. G. Farlow.

Ferns.

DURING the dull days of mid-winter it is essential that sufficient ventilation should be given to this class of plants, for if the moisture in the atmosphere is condensed on the fronds to any great extent, the plants soon become disfigured. If the weather is severe, a little additional fire-heat may be given, so that the ventilators may be opened enough to allow the superfluous moisture to escape, though at the same time excessive firing should be avoided, the present being the season of rest for a majority of species.

Some judgment should also be exercised in the matter of watering, so that the deciduous kinds may receive no excess, which would be sure to injure their roots, and this would mean a weakened growth the following season. Of course the evergreen species will take much more water, and, in fact, should not be allowed to become actually dry at any time during the year.

These cautions are specially applicable to old-established plants, as young seedlings of many species can be readily

kept in a growing condition during the first year, or possibly eighteen months, of their existence, but the period of rest will become more marked during the second year. As the most suitable time for repotting most of the species will soon be upon us—that is, in February or the beginning of March—it may be well to give that matter some consideration here. In repotting some of the large plants, it will be found more convenient to reduce the old ball, so that the plant may be replaced in a pot of the same size, provided this operation can be done before active growth begins. Otherwise the result might prove a disappointment; and if necessary to increase the stock, division of the crowns or rhizomes, as the case may be, can best be made at the same time. The soil for potting should be rather coarse, but the plants should be potted firmly, and given free drainage, though until they begin to root freely water should be given rather sparingly, not allowing them, however, to become very dry.

The practice followed by some growers, of cutting off all the old foliage at the time of repotting, may not be very injurious to some species, and if the plants are infested with insects it is a very good way of disposing of much of the vermin; but in my experience this radical treatment has not proved entirely satisfactory, on account of the weaker growth resulting from it, so that the plants recover their beauty much later in the season than when a portion of the old growth is left until the new appears.

If it is desirable to raise some plants from spores, these may be sown at any time when they are ready, but the most successful sowing is usually that made about the beginning of March. After that time there is not so much danger of the young plants damping off, and being the natural season of active growth with many of the species, it is quite reasonable to suppose that they will make more rapid progress if sown at that time than at any other.

But apart from the economic side of the question, the raising of Ferns from spores will be found a most interesting diversion for any one so inclined, not only on account of their peculiar mode of development, but because novel forms and unexpected hybrids often appear in a collection of seedlings.

Holmesburg, Pa.

W. H. Taplin.

Girdling Grape Vines.

ON the 13th day of September last an excellent opportunity was afforded to a Committee of the Massachusetts Horticultural Society to observe the effects of the process of girdling the branches of the Grape for the purpose of hastening the maturity of the fruit. Among other vineyards, we visited one situated in the south part of the town of Concord. On the southern slope of a hill which runs down to the river we found a plantation of several acres of the Concord Grape. The elevation was about seventy-five feet above the level of the river. The plants in the eastern half of the vineyard had been girdled for this and the two preceding seasons, while those in the western half were growing in their natural way. The girdled plants were more irregular and thinner in foliage, and, upon general view, did not look as vigorous as the normal growth. A closer inspection showed that the girdling process had been severely practiced upon every fruit-bearing branch, producing a very marked effect in developing the size and hastening the maturity of the fruit. Though the season was so late and unfavorable that we found the Moore's Early, in this and in other vineyards, to be barely ripe, yet the girdled Concord were in quite as good condition. On the other hand, the Concord of normal growth were much smaller in size and hopelessly behind time. It was evident then, as the event proved, that the natural crop would be ruined by frost. Here was an instance of a crop saved by girdling, and of another, side by side, which was lost by neglect of this process.

Without going further, it is then evident that, under some circumstances and with some varieties, there are decided advantages in the process. Such excellent varieties as the Iona and the Jefferson may be hastened to maturity by girdling. But in ordinary seasons we should scarcely think it worth while to be at the trouble to hasten the Concord, when we have equally good varieties like the Worden and the Moore, which are early without this treatment. Yet there is a larger development of the fruit by the process, which is of much importance to the marketman. This is so material a consideration, that it would be likely to govern were it not for another consideration which must be taken into account. What will be the permanent effect upon the vineyard of a continuation of this process? In the instance before us the work had been so thorough, not to say severe, that the effect upon the future of the vine could be predicted with confidence.

Not only were the branches above the ring largely developed by the arrest of the descending sap and also the limbs below seemingly shrunk to the size of a pipe stem, but the renewal-caness appeared to have an enfeebled growth. It was evident that the saving of the crop was likely to prove a serious injury to the health of the vineyard. But this was an extreme practice, where the crop had evidently been treated as of prime importance, and the renewal-cane had been neglected. But this by no means determines whether a judicious use of this method may not often prove harmless and of great practical advantage. Our native Grape is so superabundant in the production of foliage that checking becomes necessary. The fact, also, that a large amount of old wood has to be removed every autumn, has a bearing upon this question. Add to these the consideration that the renewal-cane, under proper encouragement, will give a large supply of nourishment to the root, and it does not seem unreasonable to conclude that a moderate portion of the descending sap may be arrested just below

as near the light as possible, and during the months of December and January, when Orchid bloom is always welcome, large, bold blossoms of ivory whiteness and of good substance will develop themselves very rapidly and remain in good condition for several weeks.

Dendrobium Wardianum.—This is a winter blooming species, and its very free flowering qualities, combined with its easy culture, make it a most desirable Orchid. It is deciduous, and succeeds best at the warmest end of the Cattleya house, close to the light, either in pots or baskets. It does not enjoy too much pot room, its thin, aerial roots preferring the outer surface of the pot or basket which it occupies. When the growths are fully matured the plant should be removed to a much cooler and drier atmosphere, enough water only being given to keep the bulbs from shriveling. About the end of September and beginning of October the plant may be removed again to its blooming quarters, when large and very handsome blossoms, each measuring some three inches in



A Willow Walk.—See page 62.

the fruit without material injury to the vine. Indeed, the case which has been here cited, and many similar ones which are known, so far from disproving, rather go to prove that a well-considered and moderate girdling would often result in decided advantage. At all events, it is desirable that there should be continued experiments in this direction.

Newton Highlands, Mass.

Wm. C. Strong.

Orchid Notes.

Cælogyne cristata.—This is one of the most popular of all the white flowering Orchids, its blossoms being pure and very handsome. It made its appearance in European gardens nearly half a century ago and has always been greatly admired. Several varieties have flowered since its introduction, among them being the very rare *C. cristata alba* (*hololeuca*), with blossoms of the clearest white, and now only to be seen in select collections. Two other varieties, one called the Chatsworth variety and the other known as *C. cristata maxima*, are both large forms, the latter having broad, flat sepals and petals, and a large lip with a bright, golden-yellow crest. This also remains somewhat rare. In its native country it is found growing at an elevation of 6,000 to 8,000 feet above sea level, and where the atmosphere at all seasons is very cool. Large specimens of this *Cælogyne* are often met with, a fact which clearly indicates it to be a species of easy cultivation. When growth commences the plants should occupy a cool situation until the newly made bulbs are fully matured, after which they should be removed to the warmest end of the Cattleya house

diameter, will make their appearance almost the entire length of the pseudo-bulbs, during December and January, and remain in good condition for from four to six weeks. Imported plants of this *Dendrobium* arrive in the market during February and March and are easily established. With good drainage and very little potting material, they will yield quite a display of bloom the following winter.

Short Hills, N. J.

A. D.

Phalænopsis denticulata is a new species, flowering for the first time with us. It evidently belongs to the Sumatrana section, though robust in growth. It bears short, erect, few-flowered racemes; these are yellowish-white, barred and blotched with cinnamon brown; the lip is streaked with violet, the anterior lobe white and papillose. It grows very freely with us, extending its roots in all directions, delighting in abundance of water and strong heat.

Saccolabium giganteum.—This is a beautiful Orchid introduced from Burmah. It is easily grown and of robust habit, with an erect, stout stem, closely clasped by broad, ovate leaves about one foot long, dark green, with streaks of lighter shade. The flowers are produced on dense racemes, about a foot long and pendulous. They are pure white, speckled and blotched with amethyst. The lip is amethyst, with lines of a lighter shade. This plant is probably only a variety of *S. violaceum*, a species introduced more than a century since under the name of *Vanda densiflora*. In the latter the leaves are narrow and longer, while the flower is of a mauve violet on a white ground. A pure white variety of this is called *Harrisonianum*, and is somewhat rare. All of these

plants do best in baskets filled with sphagnum and large lumps of charcoal in the warmest house, with abundance of water at all seasons, not allowing them to become dry at any time.

Kenwood, N. Y.

F. Goldring.

Propagation of *Daphne Cneorum*.—This beautiful shrub has always been comparatively scarce, on account of its slow and somewhat difficult propagation by ordinary methods. To multiply it rapidly the following method has been successfully practiced: remove two or three inches of the soil about and among some strong plants, in open ground, in spring, and fill in carefully with very fine compost, almost to the tops of the branches, leaving, perhaps, two inches of their tips above the surface. This will necessitate, also, careful pegging down of the plants.

The next spring, just as soon as the frost is out, remove with the nicest care the compost, using a hose or a pail of water to wash away the soil from the thickest part of the bush, and there will be found multitudes of little white buds on the branches, each standing out from the surface of the bark like an excrescence, only held to the parent plant by a minute thread, and each bud supplied with a straight, white root, the whole looking like a seed of Clover when well sprouted, but still below the surface. This *Daphne* has a great many leaves on its branches, and in the axil of each one is a dormant bud. These minute buds rarely develop under ordinary circumstances; but the generous diet prescribed above causes many of them to push, in their cool and dark situation, into the shape described.

These miniature plants come to the surface and develop into strong and really independent plants, wherever they happen to receive enough light and space to encourage them. But the greater part would be smothered by the shade or crowded out, if unassisted. All that remains to do is to detach them carefully from their native stem, which the least touch of a fine point will accomplish, and plant them immediately in a prepared soil, fine but not too rich, in small pots or boxes, and to keep them in a cool part of the green-house, or in a frame.

One plant, three feet across, so treated, produced last season, in the nursery, over 1,000 of these young plants.

Somerville, Mass.

—F. L. Temple.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

VI.—APPROPRIATION OF CARBON, OR ASSIMILATION.

FROM the previous papers in this series the following facts must be briefly cited: (1) The parts of the plants are perfectly continuous, and there exists an unbroken connection between the leaves on the minor divisions of the branches and the hairs on the ultimate divisions of the roots. (2) That all the active parts of the plant are impregnated with water, and so long as the loss by evaporation from the leaves is made good by receipt of water from the soil, the tissues remain unwithered. (3) By evaporation of water from the leaves, the dilute solutions taken in by osmosis through the root-hairs are concentrated. (4) That the active cells throughout the plant require, for their activity, oxygen and food.

We are now to inquire in what way the plant prepares for itself this food which is essential to its activity. The question will be simpler if we look first at the mechanism of the food factory itself, the green leaves and other green tissues exposed to light, afterwards considering the materials out of which the food is made.

Each green leaf consists of a framework made up of mechanical elements imparting strength to the fabric. This framework gives us the innumerable diversities of veining of leaves, and their distribution governs largely the shape of the leaves. Supported by the framework are the active cells by which the food is prepared. In most cases these are not closely packed together, but they have between them intercellular spaces of greater or smaller size. Over the whole is extended the delicate epidermis, with its breathing-pores, previously described. The active cells contain not only protoplasm, but also green plastids or chlorophyll-granules. The pigment which gives to these their characteristic color possesses peculiar optical properties, chief among which is that of modifying the refrangibility of the rays of light, so that all the so-called violet, indigo, blue, green and yellow rays are bent from their course, and appear as red rays. Again, the color of an alcoholic solution of this pigment, which by transmitted light is green, appears blood-red by reflected light.

By gaseous diffusion the gases of atmospheric air make their way through the epidermis, and come, in a dissolved state, into contact with the protoplasmic matter and the green

granules which it contains. In the atmosphere there is found, in very small amount, the gas known as carbon-dioxide. This gas and the water from the soil are the principal raw materials used in the manufacture of food. Formerly the amount of carbon-dioxide in the atmosphere was stated to be about four hundredths of one per cent., but recent investigations have placed the figure somewhat lower, or about three one-hundredths of one per cent. This incredibly small amount is the source of all the carbon which we find in the organic world. It is first appropriated by the green granules under certain conditions about to be noticed, and, once appropriated, its combinations undergo myriads of transformations, both in the vegetable and animal kingdoms.

The conditions for the appropriation of carbon by plants may be given in the following order: (1) A supply of carbon-dioxide adequate in amount, but still not largely in excess of what the plant naturally finds around it in our atmosphere. It is generally believed that at certain periods in the geological past the amount might have been somewhat larger than that which we find at present. It is not, however, necessary to hold that the percentage was very much greater, in order to account for the enormous accumulations of vegetable matter transformed into coal during the carboniferous period. Botanists think that plants obtain the carbon-dioxide directly from the atmosphere, and all the experiments upon the subject justify that conclusion; but it seems unlikely that plants are unable, under any circumstances, to obtain a certain portion from the soil. The late Professor Gray believed that plants possess the power of taking up some of their carbon-dioxide through their roots, but he frankly said, that as yet we have no actual proof that this is the case.

(2) The second condition for the appropriation of carbon is the presence of chlorophyll granules in active protoplasm. Protoplasm without these granules (or their equivalent, like that found in certain sea-weeds), does not have the power of effecting the change by which carbon is retained. Again (3), there must be exposure of the cells to light of proper quality and intensity, such as that furnished in the sun's rays. It is not necessary, for experimental purposes, that the light should be direct or diffused sunlight, for some of the common artificial lights answer, notably the brilliant electrical lights now in use. But, of course, in its ultimate analysis, all of these artificial lights are only sunlight more or less removed from its original source.

Lastly (4), the active cells must be kept at a certain temperature. The degree of temperature most favorable for most rapid appropriation of carbon is different for different plants, but, in general, it is not far from 85° to 90° Fahr.

When these conditions are provided, the manufacture of food proceeds with greater or less rapidity, the rate depending on certain minor factors. Its chief feature is the reduction of the carbon-dioxide in the presence of water by the elimination of a certain proportion of the oxygen of these two substances, amounting practically to that which the carbon-dioxide holds in combination. This oxygen is set free from its combination, and, for the most part, escapes from the plant.

We do not know positively what the resultant combination of carbon, hydrogen and oxygen is, but it is probably one of the simplest carbohydrates, capable of immediate transformation into other substances. It is easy to show that, under certain circumstances, a part of this food is changed into starch, even in the chlorophyll granule, and there held in its solid form. But the greater part is taken away from the source of manufacture and stored in some shape for immediate or for future use. A large portion of this food is changed at once into the permanent form of cellulose or cell-wall substance. Portions are changed in the laboratory of the plant into the numerous substances characteristic of the vegetable world, such as tannin-like matters, and so on. And since all these substances formed from inorganic matter are like plant-substance, the term assimilation has been applied to the process by which they are formed. But, lastly, a certain part is consumed at once in work; combining with oxygen, it is, so to speak, burned up in doing the proper work of the plant. This proper work of the plant—its lifting and growth, its transfers of material and the motions of its parts—must be regarded as very small when compared with that which is done by sunlight in the plant. This can be illustrated by giving an approximate estimate of the amount of carbon which plants accumulate during a given time. This accumulation expresses, of course, the amount of work done by the sunlight in breaking up carbon-dioxide, less the amount of food broken up by the plant in its own activities. The difference is well seen when we take an acre of forest and estimate its annual increase in carbon. This is about the same as that accu-

mulated by an acre of herbaceous plants, or of shrubs—namely, about one ton, or more nearly 2,600 pounds, of carbon.

This ton of carbon to the acre represents, when expressed in the terms of modern physics, a certain amount of "energy of position" derived from the transformed "energy of motion" of the solar radiance. In this state it is ready upon occasion to give forth again as energy of motion its energy of position. It is a wound up spring, a raised weight, a bow upon the stretch.

This ton of carbon to the acre represents, when expressed in terms of modern chemistry, the product resulting from the reduction of a highly oxidized substance—namely, carbon-dioxide. In this new form it is ready to undergo oxidation and to return thereby to the inorganic matters from which it was produced in the mechanism of the plant through the agency of the sun's rays.

When we reflect that the carbon-dioxide from which this carbon is derived exists as what is practically an impurity in the atmosphere, irrespirable by animals, and that after its abstraction from the atmosphere there is given back to the air the oxygen which is required by all organic beings for their respiration, some of the intimate relations between animals and plants become very clearly seen. Not only do plants prepare food for animals, but they produce it from matters which are deleterious to animals, giving back in this very process the oxygen which the latter need in large amount.

To those who are fond of looking at the organic world as a product of development from very simple beginnings, these relations between plants and animals are among the most interesting subjects for speculation. Animal life cannot exist under its present restrictions as regards food, without the aid of plants; hence, plants must have preceded animals in the order of succession. But if we take into account the fact that there are a few of the lower animals which are believed by some observers to have the power, by means of a certain amount of chlorophyll which they have in their composition, to act upon inorganic matter precisely as plants do, the question of development becomes all the more complicated and interesting. These exceptional creatures, if their life history has been rightly understood, share capacities belonging to both the animal and vegetable worlds. But it must not be forgotten that without the distinctive chlorophyll (or its active equivalent), the living matter of the organism which we call a plant has the same needs as that of the animal. In fact, large groups of plants, among which may be mentioned the Mushrooms and Moulds, are illustrations of this very fact; they cannot prepare food for themselves, but must have it prepared for them by other plants. In many cases, of course, this food may, through its consumption by animals, have passed through many changes before it is presented for the parasitic plant to consume; but these cases only serve to emphasize the general statement, which may now be repeated in concluding this paper: green plants produce all the food which they themselves and animals require. The apparently simple and yet exceedingly complicated process by which plants prepare from inorganic material the organic food demanded by all organisms, transforms inorganic matter into substance like the very substance of the organisms themselves, and hence the term assimilation is highly significant.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

The Forests of the Rocky Mountains.

IN a paper on "Rocky Mountain Forests," read at Atlanta before the American Forestry Congress, Colonel E. T. Ensign, of Colorado, estimated the forest-land in Colorado, Wyoming, Montana, Idaho, Utah, Arizona and New Mexico at about 95,000 square miles, or thirteen per cent. of the entire area. This includes, he said, all grades, light and heavy, valuable and inferior. The forests are mainly coniferous, and most of them are on the mountain slopes, from 4,500 to 12,000 feet above the sea. Some of the foot-hills and mesas have a scattering and inferior forest-growth, and many of the streams are bordered with Cottonwood and a few other deciduous trees. Large tracts in the mountains from which the ever-green forests have been burned are now covered with the Aspen (*Populus tremuloides*). Other extensive areas are wholly denuded of trees, and the rocky, seamed and storm-beaten surfaces are desolate and forbidding in the extreme. Crowned all are naked mountain-crests and snow-clad summits.

Except in a few favored places, the forests are not dense. Compact and heavy growths of Spruce are sometimes found at the highest altitudes, and on the slopes. The Yellow Pine, the most generally useful timber-tree, seeks a lower level than

the Spruce, and is usually confined to southern slopes in warm and dry situations. When the pine-forest has been destroyed it is often not reproduced, owing to the prevailing arid conditions. On northern slopes, the home of the Spruce, where snow and moisture are longer retained, a second growth is more likely to appear. The altitudes of the Rocky Mountain region, inclusive of the valleys, plains and plateaus, vary from 680 feet above sea level at Lewiston, Idaho, to 14,400 feet in Colorado. The approximate mean height of the Idaho and Montana ranges is 8,000 feet, of the Wyoming mountains 9,000 feet, of the Colorado and New Mexico system, south to the latitude of Santa Fé, about 10,500 feet. I have thus indicated the great altitude of the region. It extends from the British possessions to the Mexican boundary. At least seven-eighths of its entire area lies north of the latitude of Atlanta. As a result of its high altitude and northern situation, its snowy mountains and extensive forests, powerful rivers have their sources in this region.

During the few years covering the rise of the mountain territories gold and silver mining and live-stock growing have been their chief industries, but agriculture is likely soon to take precedence of the others. Its recent progress, fostered by great systems of irrigation, has been phenomenal. Great agricultural enterprises, similar in kind if not in extent to those of Colorado, have already been started in all of the Rocky Mountain territories. It is obvious that the demand for water, already very great, will be largely increased in the future. The recent action of Congress authorizing surveys to determine what lands of the mountain and plains region may be reclaimed with the aid of irrigation, the water-supply available for such a purpose, and where reservoirs, canals and other irrigation works should be constructed, should receive the closest attention. In view of the agricultural possibilities contingent upon such action, and of the need for the prevention of floods in the great rivers, this movement for the storage and utilization of water is of the first importance.

But what, it may be asked, is the immediate connection between the forests of the Rocky Mountain region and its irrigation systems? The forests are the principal natural agencies in regulating the flow of water. They prevent the premature melting of snows, and protect and nourish the sources of streams. Aside from their office in attracting moisture and causing precipitation, it is evident that these forests, by reason of their location and character, and of the surrounding physical and economic conditions, are of vastly more importance for the conservation of water than for any other purposes.

Railway building in the Rocky Mountain region, and especially in Colorado, offers a most serious menace to the existence of the forests, and it is rapidly increasing. After the tie-chopping legion come settlers, miners, lumbermen and charcoal-burners, all of whom, in addition to their direct havoc of the woods, prepare the way everywhere for fire. For ties only the young, partly grown trees are used, and the consumption for this purpose alone is enormous. And yet cedar and oak ties, from the southern and Pacific forests, can be had in Colorado at a cost not above one-third more than the native pine ties, and they are in every way better and last at least twice as long. Lumbering to supply local and ordinary demands would not, of course, be objectionable if it were properly conducted. Under existing laws, however, most flagrant abuses are perpetrated, and the forests suffer great and unnecessary loss. Mining operations require a great deal of timber, and in some of the older mining districts the supply is exhausted, and such material is brought from a distance at undue cost to the consumer. The charcoal-burner is as merciless as fate. He spares not the smallest growth; nothing escapes him. Smelters consume great quantities of charcoal in the reduction of ores, but it is not necessary, and at some of the principal works little, if any, charcoal is used.

The number of articles which can be manufactured from wood-pulp advantageously is increasing constantly. Pipes made from it and fitted with iron couplings are now recommended for conveying underground all fluids not strongly alkaline, or which are not used at a high temperature. These pipes are impervious to leakage and practically indestructible. They have been used successfully for distributing natural gas, and the non-conductive properties of wood-pulp will make it valuable for underground wire conduits. Vast quantities of Spruce and other trees are destroyed every year in the Northern States and in Canada to furnish the material for the wood-pulp factories and iron-pyrites used in the production of "chemical pulp" are in increased demand. Wood-pulp is imported also into the United States from Sweden and other North Europe countries in very considerable and rapidly increasing quantities.

Recent Publications.

Review of Forest-Administration in British India, for the year 1886-87, by B. Ribbintrop, Inspector-General of Forests to the Government of India, Calcutta, 1888.

It appears from this report, which has just reached us, that the department controlled during the year which it covered 811,824 square miles of forests, or an increase over the amount reported a year earlier of 3,340 square miles. Some idea of the difficulties the Indian forest officers have to encounter appears in the statement that during the year no less than 1,171 cases of prosecution on account of damages of one sort or another were taken to the court, an increase of seventeen per cent. over the previous year. Convictions amounting to seventy-two per cent. of the number of prosecutions were secured.

Much attention is given to protecting the forests from fire, which has always been their most serious enemy. The whole area controlled by the department has not been brought under the fire-protection system, which, however, is being extended as rapidly as practicable. The total area under protection in all the provinces was 20,335 square miles, and of this protected area, 1,644 square miles were burned over during the year, or eight per cent., a result which is considered satisfactory, and shows the enormous difficulty of protecting forests over large areas from fire, especially in the case of forests of coniferous trees. The Indian forest administration has always been hampered by certain rights of pasturage in the forests acquired by the entire population through long custom, and the reserved forests suffer seriously from this cause, especially during dry seasons, when they are called upon to furnish more than usual quotas of pasturage. As an example of the effect of pasturage upon the forest, the case of two compartments in the mountain district of Darjeeling is cited; one field has been closed to cattle during a period of twelve years, while the other had been pastured during the same period. Seedlings and young trees abound in the former, while in the latter young trees or saplings are very rare, and no seedlings exist.

The following extract refers to Bombay, and is worth careful consideration on the part of the Commission of the Adirondack forests, who recommended the expenditure of considerable sums of money in planting trees upon the exposed rocky hills in the northern part of the state:

"The Conservator of the Northern Circle speaks very hopefully of reproduction in all forests where fires and cattle are excluded, and notices that the general experiment in the state of the reserves has been commented upon very frequently by outsiders, and this with special reference to hills which were formerly bare, but are now gradually covering over with a bushy vegetation, the advance guard of a higher order of plants. . . He expresses his conviction that the forest department could, by simple and inexpensive means, restore timber to all the bare hills of the Deccan, provided that fires and cattle are excluded, and the work of natives not interfered with in an irrational manner."

The gross revenue during the year covered by this report reached a total of \$5,016,000, which is the highest figure yet arrived at by the department. The net profits, however, fell slightly below those of the previous year, although the net revenue per square mile of forest increased from \$8.80 to \$9.24. The expenditure of the department includes the formation of new plantations covering 3,939 acres, and the cultivation of 39,924 acres of plantation made previously.

Periodical Literature.

In *Harper's Magazine* for February Mr. John Habberton writes sympathetically and encouragingly of "Bulb Gardens In-doors," explaining the charms of Hyacinths, Tulips, Narcissus and kindred flowers, and discussing their relative claims upon the amateur's attention. Many of his hints and counsels are very useful, and his enthusiasm, evidently based on successful personal experience, ought to encourage his readers to enter upon what is certainly the most satisfactory branch of house-gardening. We must, however, take issue with him when he recommends double Tulips as better than single varieties for in-door gardening. He is doubtless justified by practical considerations. The single Tulip, as he points out, is apt, when grown in this way, either to fail to develop its form in perfection or to lose it soon after it has been attained. "The double Tulip, with several times as many petals, proves that in 'union is strength' by retaining its form much longer." But when he adds that "there is little or no choice between single and double varieties as to beauty and range of color," he is surely misleading—that is to say, if by "beauty" he means

the form as well as the color of the flower. In all flowers of this character beauty of form is the most characteristic quality, and to double a Tulip, a Narcissus or a Hyacinth is to decrease its value in the eyes of the true lover of floral beauty to an almost incalculable degree. Who would not be shocked by the idea of a double Bermuda Lily or Lily-of-the-Valley? Yet the form of a well-grown Tulip is almost as beautiful, and quite as insistently demands respect at the hands of the horticulturist. With Roses the case is different. Some florists' Roses, indeed, are, like double Tulips, mere showy, formless masses of crowded petals. But in others—as in the best varieties of Tea Roses—while the exquisite simplicity of the form of the wild single Rose has been lost, a new type of form as beautiful in its own way in every stage of growth, and much more sumptuous and superb, has been achieved. The fact that the difference between double Roses in this respect is so often ignored both by cultivators and by purchasers speaks badly for the condition of public taste, but by no means excuses the praise too often given to double flowers. One glance at the exquisite drawing by Mr. Hamilton Gibson of a single Tulip and a single Daffodil, which helps to illustrate Mr. Habberton's article, should prove to the reader the folly of tampering with forms that Nature has made so perfect. If single Tulips cannot be well grown in-doors, let double ones be accepted as a makeshift. They can be nothing more than this, for even beauty of color suffers when the petals are so crowded together that their delicate streakings and shadings cannot be clearly discerned. All of Mr. Gibson's drawings, as one might expect, are very charming, and if the most important among them—the "Window Garden"—shows a result of such ideal beauty that few people can hope to reproduce it in their homes, it is well that enthusiasm and vigorous effort should be excited by a realization of what the best success may mean. The little drawing of *Freesia refracta alba* is particularly pretty.

Correspondence.

The Mistletoe.

To the Editor of GARDEN AND FOREST:

Sir.—I clip the following from an English horticultural journal: "The orchards of Worcestershire supply large quantities of the interesting parasite (Mistletoe), and though considered by some difficult to grow, it is not so. The way to propagate it is to obtain the berries, choose a suitable tree—Apple for preference—select a gnarled bough, and press in the berries in a notch where birds are not likely to pick them out, or cut a slit on the under side of the branch for the reception of the seed. Many an amateur who has an orchard cultivates his own Mistletoe, and a tree with the plant growing amongst the branches is exceedingly picturesque."

Will you kindly tell me whether the Mistletoe can thus be cultivated in America, and how far north it is hardy? Year by year at Christmas time there is a demand for it in our large cities, but the supply is small, and purchasers are often displeased with what they get, as it has a withered appearance in both the leaves and the fruit. This appearance is occasioned, I am told, by packing and transportation from distant places, and I think perhaps American amateurs or tradesmen might do well to grow it for themselves, if the thing is feasible.

Watertown, Conn.

F. R. D.

[The American Mistletoe (*Phorodendron flavescens*) is found from southern New Jersey to southern Illinois, and southward. It appears to be most common in some parts of Kentucky and Tennessee, where it does considerable damage to various trees, notably the Black Walnut, which is often killed by the excessive multiplication of the Mistletoe upon its branches. It is not known that any attempt has been made in the United States to cultivate the Mistletoe.—Ed.]

Poison Ivy.

To the Editor of GARDEN AND FOREST:

Sir.—Gray, in his "Manual of Botany," fifth edition, under *Rhus Toxicodendron*, L., Poison Ivy, Poison Oak, says the entire leaved form is *R. radicans*, L. Wood's Class-Book of Botany, 1875, separates the species into *R. Toxicodendron*, L., Poison Oak, Poison Ivy, and *R. radicans*, L., Climbing Ivy.

It seems to me that the division of these forms into species is eminently proper, if one may be permitted to generalize from a local herborization. So far as I have observed, *R. Toxicodendron*, with rhombic-ovate, variously notched, sinuate or cut-lobed leaves, is virulently poisonous. *R. radicans*, which

is either a low shrub, or a climber by rootlets over rocks and ascending trees, but with always entire leaves, is either not poisonous or else little virulent. The knowing this distinction in properties and this relation of forms may bring comfort to those who would otherwise live in a condition of timidity.

Along the shores of Buzzard's Bay *R. radicans* is excessively abundant. At Nonquitt it forms dense, low thickets about a tennis-court, occurs in the scrub growth about the cottages, along various paths frequented by nurses and children, about the play-grounds along the shore, and in the woods, climbing trees to a height of many feet, and with a stem of over an inch in thickness. In playing tennis the balls often fall amidst its growth, and are recovered by ladies and children indiscriminately, but I have yet to learn of a case of poisoning. The children ramble at all times amidst its growth, and remain unpoisoned. Those who are especially subject to Ivy poisoning in regions where *R. Toxicodendron* is the leading form, at Nonquitt last summer escaped poisoning altogether, although often fearful on recognizing contact with the dreaded plant.

Although perhaps the specific differences, as usually considered by botanists, are scarcely sufficient to separate these two forms (although I have noted no intermediate or connecting forms), yet this one difference in quality (or quantity?) would render it desirable to recognize in our manuals and local floras these two forms as if distinct.

South Framingham, Mass.

E. Lewis Sturtevant.

"When to Employ the Landscape-Gardener."

To the Editor of GARDEN AND FOREST:

Sir.—May I add a postscript to your recent editorial? It is not long since the American public first began to give thought and money to securing well-designed houses. We had first to realize that our dwellings were not what they might be, and, secondly, to learn that if we would do better we must ask the help of men specially trained to design happily and to build well. As respects the surroundings of our houses, even most of us who have employed architects are still in the first or unawakened stage. We simply have not perceived that our surroundings might be pleasanter or more in keeping with our abode. While we spend freely to fill the house with things of beauty, we probably leave the spaces round about it wholly bare, or if we attempt something better than nakedness, we do so without thought of general effect—without regard to any such principles of design as guided the architect in his shaping of the house. Not until we come to see that the surroundings of the house as well as the house itself should be designed—that house, approaches and surroundings should be planned together—shall we be likely to call upon the landscape-gardener.

Boston.

Charles Eliot.

Recent Plant Portraits.

PSEUDOPHŒNIX SARGENTI, *Revue Horticole*, December 16th; a reproduction of the figures published in GARDEN AND FOREST, vol. i., pp. 353 and 355.

RODRIGUEZIA FRAGRANS, *Gardeners' Chronicle*, December 29th. "This Brazilian Orchid is an old inmate of our Orchid-houses, and best known under the name of *Burlingtonia fragrans*. Its delightfully fragrant white flowers, with yellow centres, are grateful everywhere, but from the neat habit of the plant it is especially acceptable in collections where the space is limited and the house is small. Like the rest of the genus, it thrives best and is safest in baskets suspended near the glass of the roof, and after the pseudo-bulbs are fully matured it should be carefully but sparingly watered, sufficient only being given to keep it plump and healthy. During its inactive season, a place near a ventilator in the Cattleya-house, in which it is growing, or in some other part of the house, where there is a good air, not too heavily charged with moisture, assists in ripening its growth."

SYMPHYANDRA HOFFMANNI, *Gardeners' Chronicle*, December 29th; a native of Bosnia, where it was discovered in 1883; a free-blooming, hardy plant of the Campanula family, with white flowers, and well worth a place in the garden. The figure is from a plant which flowered for the first time in England in the Royal Gardens at Kew.

PINUS COULTERI, *Gardeners' Chronicle*, December 29th.

ECHINOCACTUS TEXENSIS, *Gartenflora*, December 1st.

ZYGOPETALUM SANDERIANUM, *Gartenflora*, December 15th.

CATTELYA RŒZLII, *Revue Horticole*, December 16th.

Public Works.

The Legislature of Minnesota having been petitioned to set aside a certain piece of ground for the purposes of a state park, the matter was referred to a committee consisting of Mr. H. W. S. Cleveland and Mr. J. D. Ludden. The following is a brief abstract of the report, which will be read with interest by all persons who look upon the preservation of natural scenery as a matter of real public importance:

After careful examination of the subject and consideration of future issues and interests involved, we have arrived at conclusions which can only be appreciated by a statement of the conditions which have led to the result. The Mississippi River, between St. Anthony Falls and the mouth of the Minnesota River, flows between high and precipitous banks, which are intersected at irregular intervals by deep transverse ravines, forming the beds of brooks. The largest of these is the valley of the Minnehaha, which is the outlet of the chain of lakes of which Minnetonka is the head. The others are simply the water-sheds of adjacent uplands. The character of the whole region is picturesque, and the effect of its topography is increased by a luxuriant growth of trees. It is yet possible to preserve nearly the whole of this historic region, and we appeal to the state of Minnesota, for its own honor and its own interest, to follow the example of the state of New York in the preservation of the Adirondacks and Niagara Falls, and to secure the whole area to be forever preserved. We ask that an area on the east side of the river extending from the grounds of the State University, or as near that point as possible, to a point opposite the lower end of Pike Island, and on the west side, from Riverside Park to the military reservation at Fort Snelling, and of such width on each side as will include the natural features of the banks and ravines, be secured as the property of the state, and that the whole intermediate space, including the river and its islands, shall thenceforth be preserved as public domain, connecting, as it necessarily and appropriately would, with the park systems of St. Paul and Minneapolis, and forming in itself a park of such unique character, comprising such features of grand and picturesque natural scenery as could nowhere else be rivaled. A broad avenue should extend for the whole length of each tract on the side farthest from the river, and the cost of these avenues, as well as the improvement of the park itself by diverging roads or paths to points of interest, should devolve upon the cities to which they respectively pertain.

The Park Board of this city passed a resolution at a recent meeting to set apart, in one of the new parks, sufficient ground for a botanical garden, if the friends of that enterprise should raise an adequate amount of money for its endowment within a period of two years. It is said that the Park Commissioners have good reason to hope that public spirited citizens stand ready to contribute the necessary funds if the garden can be established under an administration similar to that of the Museum of Natural History and the Museum of Art.

Notes.

The ninth edition of Mr. William Paul's well-known book on Rose-culture—"The Rose Garden"—has just been published in London.

Mr. E. S. Goff, horticulturist of the New York Experiment Station, has accepted the professorship of horticulture in the University of Wisconsin.

The average number of persons who have visited the Museum of Natural History in this city on the evenings when it has been open has exceeded 1,000.

Iris reticulata is now being forced near New York for the Easter trade. There is no reason why it should not be a success, though its capabilities in this direction are as yet untested.

A species of Phylloxera has been injuring Pecan trees in Mississippi. Dr. Riley has not identified it with any known species, but it is closely allied to a Hickory plant-louse named by Dr. Fitch *Phylloxera caryæcaulis*.

Of the newer grapes, Moore's Diamond was commended at the late meeting of the Western New York Horticultural Society for vigor of vine, productiveness, good quality and earliness. The Moyer and the Mills were highly spoken of.

A new white Rose is The Queen, a sport from Souvenir d'Un Ami. It will hardly supplant The Bride and Niphetos, in the trade at least. Apart from its fragrance it will not compete with The Bride, which many growers declare their most profitable Rose.

The double-flowered Chinese Blackberry has been forced successfully this winter, producing wreaths of white blooms about two inches across, which bear a strong resemblance to Polyantha roses. It is easily grown, but requires too much room in a green-house to pay the commercial grower.

The Rocky Mountain Columbine (*Aquilegia chrysantha*), which has been somewhat neglected of late, is now being grown largely with a view of bringing its merits before the public. It is a very handsome perennial, one of the handsomest of its tribe, and an admirable plant for the rockery or herbaceous border.

Houghton, Mifflin & Co. are to publish the miscellaneous scientific papers of Asa Gray, which are being selected and arranged by Professor Sargent. The first volume, containing the reviews of works on botany and related subjects, written between the years 1836 and 1887, is now in press, and will appear early in the spring.

A specimen of the Californian *Pinus Sabiniana* growing in isolation on a lawn in the Botanical Garden at Kew now measures thirty-five feet in height, and at four feet from the ground girths five feet six inches. From an illustration of it recently given in the *Gardeners' Chronicle*, it seems to be a symmetrical and beautiful specimen.

Many trees in western Massachusetts were broken down by the formation of ice on their branches during a rain-storm on the 6th of January. A correspondent writes that in some cases every twig was encased in ice half an inch thick. Accurate weighing of one of the broken branches in the village of Ashfield Plain showed that there were fourteen pounds of ice to one of wood.

The material benefit which French conquest has conferred upon Algeria shows clearly in accounts of the extent to which systematic irrigation has already increased the cultivable area of the country. In the district called the Oued Rir, the once-fertile oases had been almost buried under desert sands when the French took possession; now, by means of irrigation systematically carried out with the water of the native wells and of numerous artesian wells that have been sunk, these oases have been reclaimed to the number of forty-three, and are estimated to bear 520,000 Date-palms and 100,000 other fruit-trees which already produce profitable crops. The population of the district has meanwhile doubled, while its condition is vastly more prosperous than before.

A correspondent of an English horticultural journal writes that the thick fogs which recently spread over the neighborhood of London did serious damage to hot-house plants. "Before the fog came we had cut some six dozen good flowers (from a plant of *Camellia alba*), but not one since; nor are we likely to do so again; for although the trees were nicely set with buds and half expanded flowers at the time the fog set in, all of these turned rusty and fell off. . . . A plant next to it—a red variety well set with buds—has so far passed through the ordeal without loss of buds or flowers. Amongst Orchids the *Calanthes* show no ill effects. . . . A plant of *Saccolabium giganteum*, with two spikes of flowers on it, suffered injury at the ends of the trusses, where the flowers were not fully open, all of them turning to a brown color and having to be cut off. *Azalea Indica*, white and colored—a few of which were gently forced—have withstood the fog well."

The largest artificial cascade ever planned is doubtless the one which was partly built in the grounds of Wilhelmshöhe near Cassel, the summer residence of the local dukes, but better known in our time as the place where Napoleon III. was confined after the battle of Sedan. The park is a large and fine one, with very beautiful Beech-woods and many passages of the most charming natural scenery. But it likewise includes a make-believe mediæval castle and many singular devices. The cascade was begun in the first years of the last century, and was intended to consist of a series of regular steps leading down the whole side of the mountain upon which the park was created to the vicinity of the castle below. The plan proved too ambitious for accomplishment, and only the upper part of the cascade was built, the steps starting from a statue of Hercules, which is thirty-six feet in height, and into the head of which visitors may ascend to spy out the landscape, literally through the giant's eyes. Yet though this completed portion is only a third of the whole, it measures 800 feet in length, the steps gradually widening as they descend between masses of forest verdure.

In the latest Bulletin from the Iowa Experiment Station, Mr. R. P. Speer points out certain structural differences which are said to exist between such Apple trees as Duchess of Olden-

burg, Letofsky and a few other varieties from Russia which have endured the trying climate of the North-west, on the one hand, and the ordinary American Apples and those from west Europe on the other. The flowers of the former have larger and thicker petals, shorter and more stocky pistils and stamens, larger stigmas, anthers and pollen grains; their leaves are thicker; their wood, bark and bud-scales have a finer texture; and their roots penetrate more deeply beyond the frost-line. These physical peculiarities of the hardy trees are protective against summer drought and winter cold. Having been developed in a region of short summers, they ripen their wood early, their cambium layers do not contain so much liquid, and are, therefore, less subject to scalding of the bark on the south-west side when freezing temperature quickly follows warm weather in early spring. The questions suggested by these studies are interesting, and it is to be hoped that further investigation will enable Mr. Speer to give more definite facts in support of his theory.

In a recent number of the *American Florist* are printed trade reports with regard to holiday sales of flowers from forty-seven towns in the United States. In almost all cases the report is satisfactory in so far as quantity is concerned, though there are numerous complaints about the quality of the flowers as having been affected by unfavorable weather. In many places the demand for the costliest kinds of Roses seems to have been very large, while in others the cheaper kinds of flowers were in greater requisition. The trade in Christmas trees and in greens for church decorating is evidently increasing from year to year, and the finer greens—Holly especially—are more and more in demand. But the most interesting fact to be gathered from these reports is that the public is turning away from baskets and set pieces and learning to prefer boxes of loose flowers, which may be arranged at home. "Four-fifths of the call was for loose flowers," writes one correspondent; "A notable decrease in the demand for baskets and bouquets," writes another; a third "The demand for loose flowers exceeded everything; but few baskets were made up," and a fourth, "The demand for baskets is yearly on the decrease," while thirty-four reports out of the forty-seven include similar statements, and only four speak of an increased demand for set pieces. Had the holiday trade, as a rule, been bad, these changes might be explained by the fact that a reasonable quantity of cut flowers may be more cheaply purchased than even a small basket arranged by the florist. But as things have stood this year they seem to denote a growth in good taste and in the appreciation of the true beauty of flowers, which is indeed of promising import.

Mr. Sylvester Baxter, who is contributing an interesting series of letters on "Archæological Campaigning in Arizona," to the *American Architect and Building News*, speaks as follows of the neighborhood of Las Acequias, where Mr. Cushing is now pursuing his explorations: "The new camp is pitched in a pretty little hollow amid a clump of old Mesquite trees. The hollow is that of one of the ancient reservoirs and the moisture retained there makes it a favorable place for the luxuriant growth of the Mesquite trees. . . . The name conferred on the ancient city, Las Acequias, comes from the great irrigating canals that spread out fan-like among the ruins, and reach away to various parts of the plain to supply the other cities of the group. . . . It must have been an enormous labor to excavate them in those times, with nothing but crude stone implements and baskets for the transportation of the earth." When emigration sets in "the landscape undergoes a rapid transformation in the course of a few weeks. . . . The Mesquite trees are cut down and burned in piles above their roots, whose ramifications are followed by the smouldering combustion, leaving the ground ready for the plow, when that instrument shall eventually be brought into requisition, which will probably not be for two or even three years, for the mellow, rich soil needs no plow at first. A seed-drill rapidly sows the grain when the ground has been cleared, and the only labor then required is to irrigate and harvest. The next year even the labor of sowing is unnecessary, for a luxuriant volunteer crop springs up from the self-sown, ripened grain, and often, the second year, there is still another volunteer crop as abundant as the first! The growth of Sage-brush or Greasewood is cleared off with slight trouble or cost; a stout bar or beam is dragged across the land by a pair of horses, one attached to each end. The bushes are displaced by the powerful leverage at their bases as the beam is dragged over them. The team then follows the same course in a reverse direction, either yanking up the bushes by the roots or breaking off the brittle wood close to the ground. The brush is finally gathered into great piles and burned, making a strong, clear flame that shows across the country for a great distance."

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The Soil and National Development.

CIVILIZATION means, or should include, foresight, the perception of essential and controlling conditions, adaptation of means to indispensable ends, and the defense and preservation of vital national possessions. All wealth is drawn from the earth itself. All the means which sustain human life come out of the ground or the sea. The principal source of permanent wealth for this country, and of sustenance for its people, is in its soil. No matter how great our mineral wealth may be, or our income from exports of manufactured articles, agricultural success is for us an indispensable condition of national power and permanence. The soil is our most valuable possession, and it is the only one of our important national possessions which is in danger of being seriously and permanently impaired in value. Under present agricultural methods a great proportion of the soil of this country is being rapidly exhausted of its fertility.

A large part of our agricultural population is still, to a considerable extent, nomadic, multitudes of farmers expecting to leave their land after they get about all they can out of it. They do not regard the land which they now till as a permanent possession. They think they may yet go to some other part of the country and there find better land. Many of them do not wish always to be farmers, but hope to find something better than their present occupation, a way to make money faster, and with less hard work. The illusory expectation of finding better land somewhere else is a factor in the unsettled and uncertain state of mind of many thousands of farmers regarding their occupation. It should be considered and analyzed by thoughtful men.

So far as the soil is concerned, most farmers might as well stay where they are. It is their methods which are at fault. Any temporary improvement of individual fortunes which might result from a migration to newer regions would be at the expense of the impoverishment by which such farmers have destroyed the soil which

they now wish to leave. But the essential feature in this matter, surpassing all others in importance, is the fact that, compared with the demand for new land, the total possible supply or quantity remaining available in this country is very small. Practically it is already exhausted. Considering the vast immigration which we receive, and the increase of our population by birth, the area available for agriculture which still remains unoccupied is insignificant. It is not a factor of importance in our agricultural problem.

Our people cannot all live in cities. If men will not themselves cultivate the soil, they must still eat what is brought out of it, and the subsistence and civilization of the entire population must depend at last upon the fertility of the land. We cannot advance much farther in civilization, or national development, until the nomadic methods of agriculture by which the soil is now mercilessly exhausted and ruined, shall give place to a practical and enlightened policy which will preserve permanently unimpaired the fertility of cultivated lands.

When Nature is allowed to retain undisturbed possession of a region she plants it with a crop which reproduces itself forever, and which perpetually augments the fertility of the soil out of which it grows. There is much talk in New England of lands being exhausted and abandoned, and of farms being sold at prices which would not reproduce the buildings on them. The buildings are sold for less than they cost, and the land is given away. But none of this land should ever have been cleared or cultivated. It should have been kept in forest, and if it had been so kept, would have been more valuable to-day than any of the adjacent cultivated lands.

One of the most effective agencies in the process of eliminating all fertility from land is excessive pasturage. Unless there is a radical change in agricultural methods, it will only be a very short time in the life of the nation until many millions of acres will be so exhausted that the soil will yield no return for agricultural labor. Population will begin to press closely upon the means of subsistence in large regions of our country. These are not remote or merely possible evils. They are already real dangers, which threaten us with a speedy culmination of our prosperity, and with arrest of our national development. The process of the exhaustion of the soil of the country will not only limit our national expansion in wealth and power, in character and genius, but will change the type of our civilization, and the development of conditions analogous to serfdom will be as inevitable as "the process of the suns." The most important changes in human history are often produced by the gradual and unobserved shifting of forces, of the very existence of which the mass of men are unaware.

A Piece of Vandalism.

THE press of New England has recently called the attention of the public to the destruction of a venerable Oak tree growing in the town of Woodbridge, near New Haven, in Connecticut. The tree was a very famous one, widely known throughout the state, and a familiar and valued landmark for the navigators of Long Island Sound. The following notes with regard to this tree have been furnished by Professor D. C. Eaton, of Yale College, and in a future issue we hope to publish its portrait:

A large party of New Haven and Woodbridge people gathered under the Oak on Friday, October 13th, 1882, to celebrate its venerable age. There were speeches by Ex-Governor English, Hon. N. D. Sperry (a native of Woodbridge), Rev. Mr. Marvin, of Woodbridge; Rev. Dr. Todd, of New Haven; Judge Pardee and a few others (myself included). The opinion was freely expressed that the tree was at least a thousand years old. I found a branch four and a half inches thick which had been sawed off, high up the tree, and on this branch I counted eighty-nine rings. The girth of the tree at five feet from the ground was twenty-two feet, at one foot from the ground twenty-seven feet; the diameter, therefore,

about ninety inches, or at the lower place of measurement 103 inches, and by the rule of three I made the age of the tree a little short of 900 years, and so could very well call it about a thousand. Taking the lower diameter the result would be 1,184 years. Last December the tree was cut down, and it was found that the trunk was a mere shell, the sound wood from five to twelve inches thick.

Last Wednesday I drove out to Woodbridge, and persuaded one of the proprietors to let me have a large piece of the wood from the trunk. I brought away, also, a small branch, and some leaves and acorns, and send you a part of all of them.

You will see that the tree was of the species *Quercus tinctoria*, the Black, Yellow, or Quercitron Oak, leaves, acorns, timber and yellow inner bark all concurring in their testimony. One of the pieces I send is a transverse section of the main trunk, passing from the bark inward as far as the wood was sound. I send also a bit of the half decayed wood from still further inward. The larger slice shows fifty-seven rings in the outer five inches, and forty-one rings in the next five inches, the innermost part showing about five and a half to the inch. The bit of deadwood from somewhere in the interior of the tree is nearly four inches broad, and shows about thirty-one rings, an average of eight to the inch. I conclude that the tree must have had periods of rapid growth and other periods of slow growth; but I do not see that we can put the average rate higher than twelve rings to the inch for the last sixty years, and eight to the inch for the previous life of the tree. This would give us 40 x 8 and 12 x 5, or 380 years for the whole life of the tree. With ample allowance for unestimated irregularities I cannot now believe the tree to have been as old as 500 years, probably only 375 to 400 years. The tree stood at the corner of two country roads about four and a half miles from New Haven, on the top of a long hill, about 300 or 350 feet above tide level. It was a conspicuous object for miles around, and was constantly visited by many lovers of nature. The owners are having it sawed up into boards for sale, and it is expected that many people will secure relics of this venerable Oak.

It is almost incomprehensible that any man could be found in New England sordid enough to destroy a tree of such imposing dimensions, venerable age and widespread fame, that it should draw about it the most distinguished men in the state to celebrate the marvel and the mysteries of its existence. The thought naturally arises that the celebration had been organized for the express purpose of increasing the value of the tree to relic-hunters. But whether this is true or not, there is some consolation in the fact that the tree was hollow, and that the amount of material it affords will not go far to gratify the cupidity of the man who destroyed it. It is devoutly to be hoped that no one will be found willing to buy an atom of the wood of this tree, and in this way or in any other countenance this piece of vandalism.

Ten years ago the forests covering the western slopes of the Big Smoky Mountains in Tennessee were considered as inaccessible and remote from market as any in this country; and a serious proposition to convert them into lumber would have been regarded as purely chimerical by persons who had seen those rocky wilds. A powerful Scotch company has, however, been operating in these mountains during the past two years, and the rocky and precipitous beds of the Pigeon, the Little Pigeon and other streams which flow west from the Smokies have been partially cleared out and improved, and timber cut from their banks is now manufactured in immense quantities at the mills in Knoxville. Much of the best and most accessible Yellow Poplar has been cut down already, and what has not been cut is controlled by this company, who have had for some time agents at work quietly buying up every good tree at prices ranging from fifty cents to one dollar each. These trees, it must be remembered, are the finest of their kind, with tall, straight shafts six to ten feet in diameter, running up without a limb for eighty or one hundred feet. They represent the undisturbed growth, under conditions of soil and climate perfectly favorable, during a period of not less than 500 years. Five hundred years' growth, under the changed conditions made by man, will not serve to build up their like. The last stronghold of the great

deciduous forests of eastern America, the richest, most varied and most valuable found on the surface of the earth, with the exception, perhaps, of the little known forests of western and south-western China, has been invaded, and its destruction is now a question of time alone.

The Yellow Poplar only has suffered so far, but in these same forests are Ash trees of a height and girth which even the bottom-lands of the Ohio and the Mississippi have never produced; Birch of a size and beauty unknown elsewhere, and above these, and near the summits, Spruces unmatched, except by those which grow, or once grew, on the banks of the Columbia. The amount of lumber contained in these forests of Spruce and Birch is comparatively enormous, and certainly nowhere else is there so much, or so valuable, Red Birch. The inaccessible position occupied by the Spruce, and the small demand up to the present time for birch-lumber, have saved these forests so far. Their destruction, however, will not be delayed much longer, and sooner or later a way will be found to transport to the saw-mill the most inaccessible tree growing on the remotest slope of the Alleghany Mountains.

There is a bill before the Legislature of this State to authorize the City of New York to expend \$300,000 in improving and extending the menagerie in the Central Park. This bill ought to be defeated. There is not room in the Central Park for a Zoological Garden. The present collection of beasts is not a credit to the city; it injures the park as a park, interfering seriously with those purposes for which it was created, and thus injuring the people who frequent it. New York ought to have a Zoological Garden commensurate with its population, wealth and commercial importance among the cities of the world. There is no better educator than a good Zoological Garden, and none of the equipments of well-ordered modern cities are superior to it in attractiveness and in the general interest and intelligence it creates. Provision should be made now for the location of a garden of this character in one of the proposed new parks; but instead of spending more money on the existing menagerie, the sooner it can be cleared away, and the space it now makes offensive devoted to trees again, the better.

The Landscape Gardener.

IRRESISTIBLE forces are drawing vast populations into the cities. Here, in the busy centres of the great towns, life is lived at high pressure—at such pressure that men are continually compelled to seek rest and refreshment, either in suburban home-life, or in frequent flights to the country, the mountains or the sea. It is to meet this want that millions of dollars are spent upon public country-parks, and other millions upon country seats and seaside seats, summer hotels and summer cottage neighborhoods; while, near the cities, the same want causes the region of detached and gardened houses to continually expand. This modern crowding into cities results in a counter invasion of the country; and it is just here that the special modern need of an art and profession of landscape-gardening is first felt. How can we add roads, and many or large buildings, to natural landscape, without destroying the very thing in search of which we left the city? How shall we establish ourselves as conveniently as may be, and at the same time preserve all the charms of the scene we have chosen to dwell in? How may we rightly work to bring more and more beauty into that scene?

Questions like these are not easily answered, and many other problems arise equally difficult of solution. How shall we arrange the roads and buildings of a new suburb so as to make it a thoroughly pleasant place to live in? How shall we secure all possible convenience and beauty in the door-yards and gardens of a neighborhood? How shall the railroad station-yard and the church-yard, the public school-yard and the public square

be made as pleasant as possible to look at, to linger in or to play in? How shall the public park, to which many hundreds or thousands will resort at one time, be so made and preserved as to be to all city dwellers a revelation of nature's beauty and peace?

Only special study and long observation will fit a man to solve successfully these problems of landscape gardening. Says Mr. Ruskin: "Art, properly so called, cannot be learned in spare moments nor pursued when we have nothing better to do. To advance it men's lives must be given, and to receive it, their hearts." To the art of preserving, enhancing or creating out-of-doors beauty, whether natural or formal, the landscape-gardener gives his days. One week will find him plotting the half formal ways and plantings of a city-square, and the next may see him working to bring out and to emphasize all the beauty a piece of park-land can be induced to yield. One day he is designing a garden-terrace for a stately country-seat; another day finds him suggesting ways of perfecting the charm of a rocky wilderness by the seashore, or the beauty of a meadow or pondside or woodside in the country; while a third day may be given to the planning of the plantations which are to make some ugly, wind-swept field a pleasant place. He shares with the architect the designing of homesteads—fits the part called the house to the surrounding parts, plans the necessary approaches, and works out such appropriate changes in the surrounding scene as trained taste and experience suggest. He plans, with care, the roadways and the foot-paths by means of which the people shall enjoy their country-park without harming it; he studies sites and surveys preparatory to laying out new suburbs or new neighborhoods of summer-cottages; he devises the surroundings of hotels, hospitals and public buildings—everywhere endeavoring to supply every convenience of arrangement, and, at the same time, to preserve or to create as much as possible of beauty, be it picturesque or formal.

Boston.

Charles Eliot.

The Kentucky Coffee-tree.

THE specimen of the Kentucky Coffee-tree, of which a view appears in our illustration upon page 79, is, by far, the largest and handsomest I remember to have seen. It was planted in 1804, directly in front of the historical Verplanck mansion, at Fishkill-on-Hudson, occupied for some time by Baron Steuben during the Revolution, and the scene of the first meeting of the Society of the Cincinnati.

This tree is now seventy-five feet high, and the short trunk girths, three feet from the ground and below the point where it forks into two main stems, a little more than ten feet. One of the main stems was struck by lightning in August, 1887. The damage inflicted was considerable; it has, however, now partially recovered, although it hardly seems probable that the great rent torn by the lightning can ever entirely heal over, or that the tree can ever regain all its old vigor and beauty.

The Kentucky Coffee-tree (*Gymnocladus dioica*), although occupying a comparatively wide area in North America, is nowhere common. The most northern limits of its distribution are in the Province of Ontario and in southern Minnesota; it is found from western New York and southern Pennsylvania as far west as eastern Nebraska and the Indian Territory, although east of the Mississippi River it has not been noticed anywhere south of the central part of the State of Tennessee. It is always found scattered among other forest trees, upon rich hillsides, or on the bottom-lands of rivers. The trunk is erect and rather slender for its height, rarely attaining a diameter of two feet and a half, and is covered with dark, gray-brown, conspicuously furrowed bark. The branches are all erect, not spreading, giving to the tree, even when old, a narrow, ovoid outline; the branchlets are unarmed, very stout, covered with thick, coarse bark, and entirely destitute of spray—a peculiarity which led the French botanist Lamarck to give to this tree the name *Gymnocladus*, formed from two

Greek words, *γυμνός* and *κλάδος*, meaning "naked" and "branch." The leaves, like those of the other plants of the Pea family, are alternate; they are two to three feet long, unequally twice-pinnate, with four to seven pairs of pinnæ, which are seven to thirteen foliolate, with the exception of the lowest, which is reduced to a single leaflet. The leaflets, which stand vertically upon the stems, are an inch or an inch and a half long, ovate-acute, stalked, membranaceous and pale green. The flowers are polygamo-dioecious—that is, upon some plants there are perfect flowers, with well-developed pistil and stamens—and upon other plants male flowers only, with perfect stamens, but rudimentary pistils.

They are borne in slender, terminal racemes, which, upon the male plants, are four or five inches long and more compact than those of the perfect flowers, which are ten or twelve inches long. The flowers are long stalked, pubescent, greenish white, an inch long, with an elongated, tubular disc, a calyx of five oblong petal-like sepals, and four or five small, oblong, equal, spreading, imbricated petals, inserted, with the sepals, upon the summit of the disc. There are ten short, included stamens, those opposite the sepals being rather longer than the others. The anthers are two-celled, introrse, and open by two longitudinal slits. The pistil, which, in the male flower, is reduced to a small conical process, consists of a sessile, hairy ovary contracted into a slender style, obliquely dilated into a terminal stigma, with two spreading lobes covered with stigmatic hairs. The fruits, of which three or four are sometimes developed upon one raceme, are oblong, somewhat falcate, chestnut-brown pods, with thick, hard walls, six to ten inches long by two inches broad, containing a thin layer of sweetish, yellow-green pulp surrounding the obovate, slightly flattened, long stalked seeds, which are half an inch in diameter, and covered with a hard, dark chestnut-brown shell. The embryo, with fleshy cotyledons, and short, erect radical, is surrounded by copious, horny albumen.

The wood of the Kentucky Coffee-tree is quite heavy, although not very hard, strong and coarse grained, the layers of annual growth being strongly marked by one or two rows of large, open ducts. In color it is light rich brown, tinged with red, the thin sap-wood, which turns into heart-wood generally at the end of five years, being much lighter. It is very durable when placed in contact with the ground, and is therefore sometimes used for posts and fence-rails. It is occasionally used, also, in cabinet-making, as it works easily and can be made to take a good polish. It is liable to check, however, in drying, and the grain is rather coarse for fine work. The seeds were sometimes used as a substitute for coffee before and during the Revolution by the inhabitants of the then remote regions west of the Alleghany Mountains—a fact which has given to this tree its popular name. It is said that the fresh leaves, macerated and sweetened, are sometimes used to poison house-flies, but I have never been able to substantiate this statement to my satisfaction.

The Kentucky Coffee-tree has a good deal of value in ornamental planting. It is an excellent street tree, possessing the merit for this purpose of not putting forth its leaves until late in the spring. The foliage is light and graceful, and in winter this tree is always a conspicuous and interesting object, with its upright branches and thick branchlets. It requires a deep, rich and rather moist soil. It is never a fast growing tree, but this peculiarity is not a disadvantage in the case of ordinary street-planting.

The tree from which the very fine specimen log in the Jesup collection in the American Museum of Natural History was cut, grew in Missouri, not far from St. Louis, and, although only eighteen inches in diameter, was 105 years old. This, perhaps, should be taken as about the average rate of increase of this tree growing naturally in the forest, although the Verplanck specimen, which was probably several years old when it was planted in 1804, has grown much more rapidly.

The first description of the Kentucky Coffee tree appeared, with a figure of a raceme of the male flowers and of a leaf, in Duhamel's "*Arbres*," i., p. 107, t. 52, published in Paris in 1755, in which it was referred to Bonduc of Plumier, the *Guilandina* of Linnæus. It had been introduced into France several years before, as Duhamel speaks of trees already large, although they had not flowered at that time. From France it was sent to England, or, more probably, it reached that country directly from America; and in 1753 Linnæus, in the first edition of the "*Species Plantarum*," referred this tree to his genus *Guilandina*, calling it *G. dioica*. Lamarck many years later separated it from *Guilandina* and established for it his new genus *Gymnocladus*, changing unfortunately the specific name to *Canadensis*. One of the rules of botanical nomenclature, however, insists that in cases where a plant is transferred from one genus to another it shall retain the specific name originally given to it, provided, of course, that this specific name shall not have been previously given to another plant in the new genus. If this rule, which was established long after Lamarck's time, had been followed in the case of this plant, it would have been called after its removal from *Guilandina*, *Gymnocladus dioicus*, the gender of the specific name being changed to agree with that of the generic name. Karl Koch (*Dendrologie*, i., p. 5) first adopted the name of *Gymnocladus dioicus* for our tree, and his lead and that of Baillon (*Histoire des Plantes*, ii., 87) had now best be followed, and the name *Gymnocladus Canadensis* given up for the less familiar *G. dioicus*.

It was believed for a long time that the American species was the only representative of the genus *Gymnocladus*, but fifteen years ago a second was discovered in China, and is now known to be widely distributed through the central part of the Empire. It is the *G. Chinensis* of botanists, the *Fei-tsao-toa* or fat Black Bean of the Chinese, the seeds of which are largely used by the Chinese women in washing their hair and heads. Very little, however, practically, is yet known of this tree, which has not been introduced into the United States or Europe.

Our illustration is from a photograph made by Mrs. Winthrop Sargent, of Fishkill. C. S. S.

New or Little Known Plants.

Rosa humilis,* var. *triloba*.

THIS pretty freak of our common low Wild Rose was detected by Miss Jennie E. Whitesides, of Harmonsburg, Pennsylvania, in 1881, growing upon a sandy bank near that place, whence it was transferred to her garden. Since June, 1886, it has been in cultivation at the Botanic Garden at Cambridge, where it has for three years perpetuated the abnormal character of its petals. Aside from the interest which attaches to it on this account, the figure is also of value as illustrating very clearly the characters which distinguish *Rosa humilis* from other eastern species. The slender habit, the open foliage, the very slender, straight spines, the narrow stipules, and the nearly constant and often free toothings of the outer sepals, are characteristic of this species. In this form it is found in the dry, sandy or rocky localities which it prefers, from New England to the Mississippi and southward to the Gulf States. As in all the species of the group, the pedicels, hip and calyx-lobes are more or less glandular-hispid. And like every other Rose, it is subject to variation. When growing in wetter localities it may be somewhat stouter in habit, the spines thicker at base, the stipules more foliaceous, and, of course, there may be found anywhere specimens or young shoots with enough of scattered prickles. But it never takes on the taller, stout and bushy growth, and the broad-based, recurved spines of the northern *R. lucida*, nor the peculiar foliage and densely prickly covering throughout of the *R. nitida* of New England swamps. S. W.

**ROSA HUMILIS*, Marshall, *Arbust. Amer.*, 136, *R. lucida* of Gray's Manual, Wood, etc., in part.

[*Rosa humilis*, next to *Rosa Caroliniana*, is the most common Rose in the elevated mountain region of Virginia, eastern Tennessee and Carolina. Here, unlike our other Roses, which frequent open situations, it is found growing only in the shade of the forest, generally on steep slopes, and usually in very rich soil. As it appears growing in such situations it is one of the most distinct of all the American Roses, with its very slender stems, sparse, open foliage, and few long, slender spines. C. S. S.]

Cultural Department.

Nerines.

THESE plants have suddenly come to the front in England as useful autumn and winter-flowering bulbs. Ten years ago they were scarcely known in English horticulture, only two species, viz., the Guernsey Lily (*N. sarniensis*) and Fothergill's Amaryllis (*N. curvifolia*) being at that time represented in a few collections. Now, however, eight of the ten species acknowledged by Mr. Baker (Kew) are in cultivation, and, besides these, there are a great many hybrids and improved varieties, most of which are of first-rate merit. The principal growers and breeders of Nerines are the Guernsey nurserymen and amateurs. Chief among the latter is Mr. Mansell, who has raised some beautiful hybrids, *N. Manselli* being the best of all, species and varieties included. Messrs. Henderson, of London, raised some good hybrids about six years ago. Lately Herr Max Leichtlin, of Baden-Baden, has taken an interest in Nerines, and, as is the case with almost everything he takes in hand, he has done much to improve them and make them known.

Dean Herbert raised about half a dozen hybrid Nerines, which, however, appear to have been lost long ago. All the species are natives of South Africa. They do not appear to be abundant in any part, as collectors find a difficulty in obtaining the bulbs in any quantity. The oldest and best known species, *N. sarniensis*, was for a long time supposed to be a native of Japan. It was cultivated in Paris as early as 1634, and in London in 1659. In the Channel Islands it has been cultivated at least 200 years, the bulbs being sent to English and other markets under the name of Guernsey Lilies. Tradition had it that a ship which had come from Japan and was wrecked near these islands had on board a quantity of the bulbs of this Nerine, which were washed ashore and soon established themselves. But there are no Nerines native of Japan; the two plants known in gardens as *N. Japonica* and *N. aurea* being species of the genus *Lycoris*, which is not unlike Nerine, though really nearly related to Zephyranthes.

The cultural requirements of Nerines are of the simplest kind. The point of chief importance is that of the growing and resting periods. The flower spikes are developed in the last three months of the year, usually just preceding the foliage. Growth continues all winter, usually finishing in April, when the leaves turn yellow and fall off. It is not advisable to repot the plants often, a pot-bound condition being favorable to the production of flowers. The bulbs may be allowed to crowd (they produce offset bulbs freely), and a pot nine inches across will often hold as many as twenty bulbs, all huddled together. Under good treatment almost every one of these bulbs will flower annually. In repotting, the whole mass of soil, roots and bulbs should simply be transferred intact to a larger pot. The right time to repot is immediately after the flowers have faded. A light loam, or a mixture of loam and peat, with a little sand, may be used. Whilst making growth, weekly waterings with liquid manure should be given. The temperature at this time ought not to fall below 50° at night nor below 55° during the day; air should be given on all favorable opportunities. A position near the glass and exposed to full sunlight is indispensable. In America, where the winter sunlight is brighter and more continuous than in England, Nerines ought to thrive perfectly. After the leaves have faded the plants should be placed in a dry, sunny position, exposed to all the summer sunlight, and *never watered*. The crop of bloom in the autumn is dependent on a strict observance of this point. As soon as the flower spikes show themselves water should be given, and from now till growth is over the soil must be kept moist.

Seeds are ripened freely, and these, if sown as soon as ripe, ought to produce flowering plants in about three years. All the kinds hybridize freely with each other. Probably, however, the greatest improvement may be looked for from seeds of the largest and best colored seedlings and hybrids already obtained. The following are the best of the species and hybrids:

N. Sarniensis.—Guernsey Lily. Already very well known. The scape is developed in August, and is about one foot long, bearing an umbel of from ten to twenty bright, rose-crimson flowers, each one and a quarter inches long, with red filaments half as long again as the corolla.

Var. *Plantii* has longer scapes, deeper colored flowers, and

even larger in the flowers. This is, perhaps, the finest of all the forms of *N. Sarniensis*.

N. curvifolia.—This is the largest flowered and handsomest of the species, and is also the parent of all the best kinds of garden origin. The scape is about a foot and a half high, the umbel twelve-flowered, six inches through, large, bright scar-



Fig. 93.—*Rosa humilis*, var. *triloba*.—See page 76.

is a better plant than the type. It is one of the best of the Nerines.

Var. *profusa* has bright scarlet flowers, with narrower segments.

Var. *corusca* is distinguished by its broad foliage, large umbels, and large, bright, scarlet flowers. A major form of it is

let, glittering in the sunlight; each flower is one and a half inches long, with broad, reflexed segments, and long, projecting filaments. I have seen a specimen of this in a twelve-inch pot, bearing sixteen grand heads of flower. Certainly nothing could be finer. The flowers are developed in September and last about a month. *N. Fothergilli* is a large flowered

form of this. It is generally known as *N. Fothergilli major*. *N. Moorei* is a most beautiful plant of recent introduction. It is like *N. curvifolia*, but has bright green leaves, a compressed scape nine inches long, and a nine-flowered umbel of large, bright scarlet flowers. It blooms in the latter end of September.

N. Manselli is the largest and best of all. It is a hybrid or seedling of doubtful parentage, though probably *N. curvifolia* was one parent. The leaves are twice as broad as those of any other Nerine, and they are developed along with the scape. This is one and a half feet to two feet high, stout, bearing an umbel fully six inches through, and composed of from twelve to eighteen flowers. These are one and a half inches long, with broad recurved segments, and colored bright, sparkling rose. They are developed in November and last into January. I saw a magnificent inflorescence from Guernsey on the seventh of this month. This plant is certain to become a great favorite. It has very few equals among winter flowering plants, whether stove or green-house.

N. flexuosa.—A free flowering, pretty species, which produces its flowers and leaves together in October. The scape is tall, sometimes flexuose. The umbel is composed of from ten to twenty flowers, which are declinate, with crisped segments, and colored pale pink. The stamens and style are curved. There are several varieties of this, all of them pretty, but small flowered when compared with the better kinds.

N. pulica.—This is remarkable for its ivory white flowers; they are borne in four to six flowered umbels on scapes a foot long. The segments form a ball which is semi-erect, one inch long and three-quarters of an inch across. There is a tinge of rose on the keel at the back of each segment.

N. atrosanguinea is a hybrid from *N. Plantii* and *N. flexuosa*. It has a scape sixteen inches high, the flowers two inches across, with wavy segments, the colors being deep salmon-rose.

N. Cami was raised from *N. curvifolia* and *N. undulata*. The umbels are ten-flowered, the scapes a foot long.

N. amabilis has a scape a foot high, with a large umbel of bright pink flowers.

N. excellens has a twelve-flowered scape, and is one of the best of the rose-colored kinds.

N. Meadowbankii has flowers as large as *N. curvifolia*, and colored glowing scarlet, while those of *N. elegans* are salmon-rose. There are other hybrids which can be well recommended as first-class kinds.

Kew.

W. Watson.

Tea Rose, The Gem.

THIS variety has been previously mentioned as being possibly an old sort presented to the horticultural public under a new name. Some growers have pronounced it identical with Marie Van Houtte, while others were of the opinion that while it greatly resembled Marie Van Houtte in some points, yet they were inclined to esteem The Gem superior to that variety. It should be stated, in justice to the introducer of The Gem, that it was not presented with a positive voucher as to its origin, but merely offered as an apparently valuable addition to the list of Roses for forcing, and though he had an idea that it might have been a sport from Perle des Jardins, yet he was unable to make a positive statement to this effect. Judging from the style of the plant and form of the bud, however, this opinion does not seem to be well founded, and we are led to offer the opinion that it may have been an unnamed seedling which was accidentally distributed.

But, be this as it may, The Gem has not yet proved such an acquisition as was anticipated, and after one season's trial it is not spoken of with much enthusiasm. However, it should not be utterly condemned because it is not a brilliant success as a forcing Rose, for its sphere of usefulness may be found in another direction, that is, when planted out-of-doors for summer use. It showed some good flowers last season under such circumstances. One great objection to The Gem has been found in its color, which is not decided enough. By artificial light, however, its yellowish white petals appear to much better advantage than when seen by daylight.

In size few of the flowers equal those of a good Perle des Jardins, though occasionally buds are seen that would compare favorably with buds of that variety. In form it is inclined to be globular, the petals being rather short, and sufficiently numerous to make the flowers quite double.

The Gem seems strong and vigorous in constitution, with bright, handsome foliage, and it holds its leaves well when forced, giving the plant a more attractive appearance than some other more useful varieties. But the fact remains, so far as it has fallen under my observation, that the flowers have not proved to be so marked an improvement upon other roses

in beauty and general utility as to render it of much value to the commercial grower; and though it may improve as a better knowledge of its cultural requirements is gained, yet it does not now promise to be a profitable venture. The public taste in the matter of Rose-buds is of a much more exacting nature than it was a few years ago, so that color, size and fragrance must all be taken into consideration; and besides all these, for the benefit of the grower, free production of bloom is insisted upon as a necessary qualification W.

January, 1889.

The Green-house.

AS most green-house plants are now in active growth a rather higher temperature must be maintained than that used in December and January; a night temperature of 50° to 55° in the cool green-houses and 65° to 75° in the warmer ones will be about right. But in very cold weather, rather than drive the fires hard to maintain heat in the pipes, the temperature should be allowed to fall 5° or 8°. Hard firing is injurious to green-house plants and favorable to the development of red spider.

Ventilate in fine, warm weather, moderately and carefully, a little at a time and early in the day, and shut up gradually and early in the afternoon. In this way considerable sun-heat is saved, and this natural heat is far better for plants than is artificial heat of any kind.

While Callas, Carnations, Roses, Streptosolen, Leptosyne and some other plants now in bloom, if copiously supplied with water, delight in the bright sunshine, there are many others, for instance, Calceolarias, Cinerarias and show Pelargoniums, that are benefited by a slight shading from warm sunshine; and bulbous plants, as Hyacinths, Tulips, Ornithogalum, Narcissus, Amaryllises, and the like, last much longer if slightly shaded when in bloom. Gloxinias love a place near the glass, but at the same time perfect shade from sunshine.

With most cool green-house plants, such as Cytisus, soft-wooded Heaths, Acacias, Chorozema, Hardenbergia and many others, so long as an abundance of water and free ventilation is supplied, shading is never necessary at this season. But it is well to shade stove plants, including Marantas, Anthuriums, Dracenas, Dieffenbachias, Palms, Medinilla, Ixoras and many others. Most Orchids, Ferns and Selaginellas should also be shaded. But while a thin shading is desirable, a heavy shading is injurious. Cheese cloth, tiffany, or some other light linen cloth fixed to rollers, and arranged so as to be raised and lowered at will, is the best; but for those who have not time to attend to this shading some sort of paint for the glass should be used. Turpentine or naphtha whitened like milk with white lead, and applied with a whitewash-brush, adheres very well, but can be easily washed off at any time. Linseed oil and white lead make a capital shading, but it is almost impossible to wash it off again.

A moist atmosphere is absolutely necessary in our warm green-houses, and in order to keep the plants in healthy condition, clean and free from insects, they must be syringed at least once a day. Tepid water is best for this purpose, and syringing should be done in the morning before warm sunshine reaches the house, and again in the afternoon just as the sunshine is passing away. And in order to still further moisten the atmosphere of the house and counteract in a measure the evil effect of hot pipes, water should be sprinkled around freely on the benches and floors.

In the cooler houses where less fire-heat is used less water will be needed, and in the green-houses where plants are in bloom—and these should be collected in a house by themselves as much as possible—syringing should be almost discontinued, to save the flowers from disfigurement. D. A.

Boston, Mass.

Orchid Notes.—*Angracum Chailluanum* is a rare species introduced some twenty years ago. It produces a slender stem, with leathery, dark-green leaves about eight inches long, deeply notched at the apex. The flowers are borne on pendulous racemes, are pure white with narrow segments, the lip being prolonged into a yellowish-green spur about four inches long. This plant grows freely on a block of wood or in a basket filled with sphagnum moss. The warmest house suits it best, and it requires a liberal supply of water.

Phajus irroratus is a charming and very rare hybrid (I believe the entire stock is here) between *Calanthe vestita* and *Phajus grandifolius*, and presents the intermediate character of these plants, with conical-ovate bulbs, and dark-green, lanceolate, plaited leaves. The erect racemes bear about a dozen flowers, three inches across, of a creamy yellow flushed

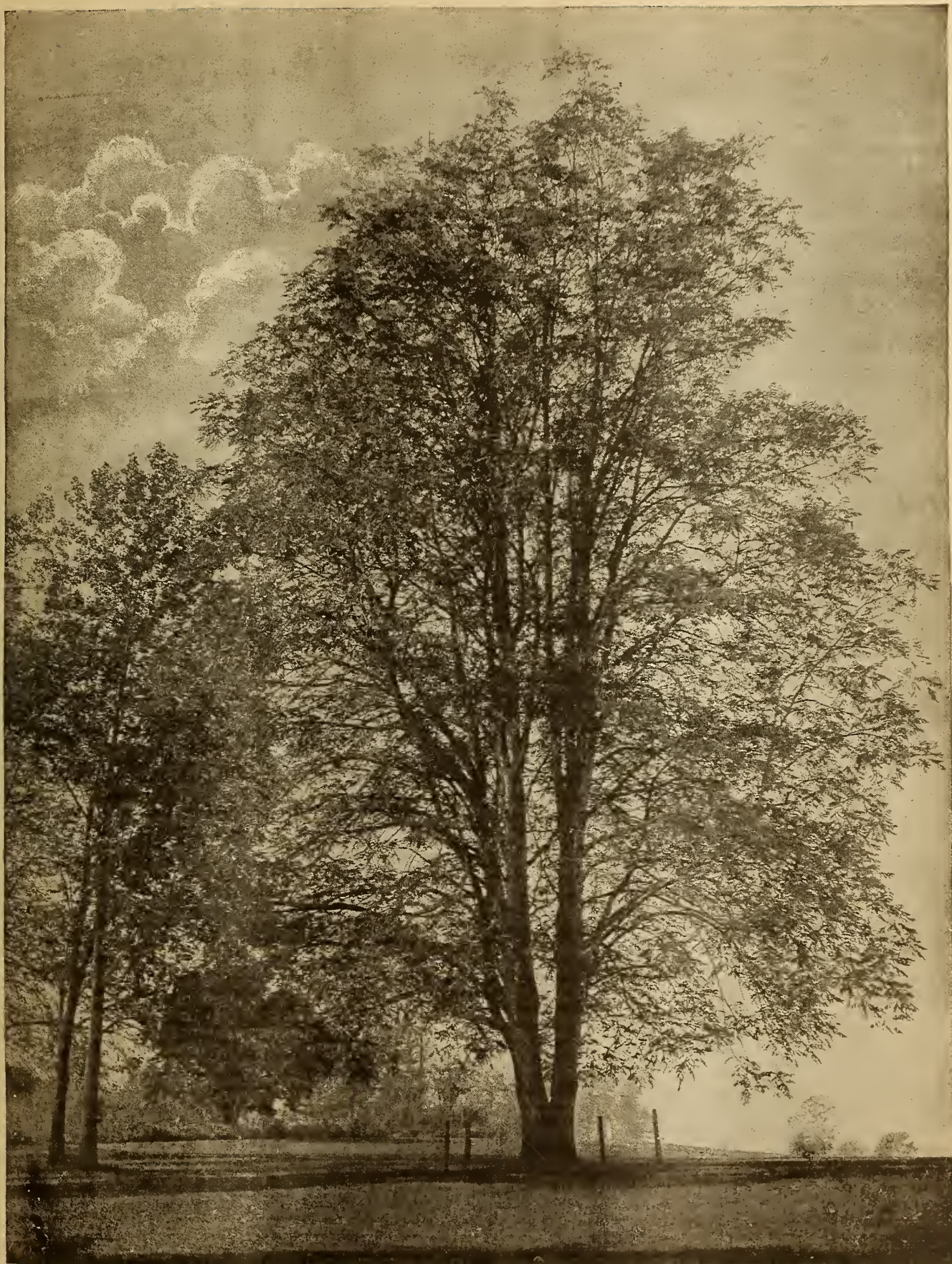


Fig. 94.—The Verplanck Kentucky Coffee Tree.—See page 75.

with rosy pink. The roundish lip is creamy white stained with yellow. This Orchid is rather a delicate grower, and does best in an open compost of peat and loam in an intermediate house. *P. irroratus purpureus* is the result of a reverse cross from the parents named above. It is more plentiful

and a far stronger grower, very much resembling *P. grandifolius* in its growth, and equally free. It produces a stronger raceme, and the flowers are somewhat larger than those of *P. irroratus*. The sepals and petals are white; the lip is of a dull rose-color with a pale yellow throat. This plant may be

treated in the same way as the commoner kinds, and, being a gross feeder, will be benefited by occasional waterings of liquid manure.

Kenwood, N.Y.

F. Goldring.

Plant Notes.

The Origin of the Double-flowered Horse-chestnut.

AS it seems very desirable to put on permanent record the origin and history of curious forms and garden varieties of cultivated trees, I have thought that the following résumé of an article which was published in the *Belgique Horticole* so long ago as 1854 should be given in GARDEN AND FOREST. Neither Loudon nor any other writer whom I have consulted appear to have been aware of the facts mentioned below. As the work to which I am indebted for the information is not generally accessible to lovers of trees, a brief statement of the real facts of the case can hardly fail to be of interest.

The editor of the *Belgique Horticole*, in an early number of that periodical for 1854, stated, in the letter-press accompanying a very good figure of the Double-flowered Horse-chestnut, that the origin of the form was unknown. Shortly afterwards, Monsieur Auguste-Napoleon Baumann, nurseryman, Bollwiller, wrote to the editor that the tree in question originated as a branch-sport in the garden of Monsieur Duval, at Geneva, at which town the writer stayed from 1819 to 1822, studying botany under De Candolle. M. Baumann had noticed a branch of the parent tree clothed with larger and more deeply-colored leaves than usual; he called the attention of the gardener to this particular branch, and the following spring when the tree was in flower, M. Baumann was sent for to see it. That portion of the tree which had excited his curiosity the previous year was laden with splendid inflorescences in which the stamens were changed into petals—the flowers had become double. Grafts were sent to the famous Alsatian nursery, and probably the vast majority of the specimens now in cultivation have been propagated from the stock raised at Bollwiller, in 1822.

A writer in a recent volume of the *Revue Horticole* calls attention to the hardness of the tree, and M. Charles Baltet, in his paper "*De l'action du froid sur les végétaux*," definitely states that the Double-flowered Horse-chestnut did not suffer in France during the very severe winter of 1879-80.

Kew, January, 1889.

George Nicholson.

Monsieur Naudin contributes to the *Revue Horticole* an account of two interesting new plants. The first is his *Saccia elegans*, a name bestowed upon a shrubby plant of the Convolvulus Family, raised from seeds sent to Antibes by Dr. Sacc, an agricultural chemist residing at Cochabamba, in Bolivia. Unlike most Morning Glories, it is an erect shrub, growing to a height of six feet or more; the flowers are lilac, and hang in long clusters from near the extremities of the branches. This very ornamental plant is not hardy in the south of France, although in Algeria it succeeds admirably, and has ripened seeds. It may be expected to flourish in some parts of southern California.

Monsieur Naudin's second novelty is *Sicana odorifera*, a remarkable Cucurbitaceous plant from Brazil, with climbing stems twenty-five or thirty feet long, attaching themselves to the smoothest surfaces by means of tendrils, the ends of which flatten out and present an exceedingly adhesive surface to any object with which they come in contact. This plant is monoecious, with yellow flowers, which, when fertilized, produce cylindrical fruits the size of a large Cucumber, or of a small Musk Melon, and becoming red or orange when fully ripe. They are edible, although many persons dislike them on account of their strong aromatic odor. They are used, it is said, to free dwelling-houses of flies, which are unable to support their peculiar odor.

The *Sicana* requires more heat than the Cucurbitaceous plants in common cultivation. It produced two fruits, however, at Antibes the past season, in spite of the abnormally cold and wet season, and M. Naudin believes that in an ordinary season it would fruit abundantly. These fruits, although fully grown, did not entirely ripen, and unless M. Naudin can succeed in ripening them artificially, further experiments with this interesting plant must be deferred until a fresh supply of seed can be obtained from its native country. M. Naudin believes that the region in which this plant can be cultivated can be extended by selection. "I have just spoken," he says, "of the possibility of obtaining, sooner or later, varieties of the *Sicana* better suited to our climate than the plants first introduced. Whether it is considered the result of acclimatization or not, the fact remains that the constitution of the exotic Cu-

curbitaceous plants which we have cultivated for a long time in our gardens has been sensibly modified. The plants which I have raised from the seeds of species brought from the tropics have been invariably more difficult to raise and later in ripening their fruit than individuals of the same species raised from seed produced in France, and adapted, to a certain extent, by long cultivation to their surroundings. It is to be hoped, therefore, that the same change may be operated with the *Sicana*, and perhaps with several other species."

It is probable that the long summers of our Southern States will make the cultivation of this very interesting, and perhaps valuable, plant possible there.

Principles of Physiological Botany as Applied to Horticulture and Forestry.

VII.—NITROGEN.

ALL living matter (protoplasm) contains a certain proportion of nitrogen in combination—the living matter of animals is derived directly or indirectly from the living matter of plants, and, therefore, the appropriation of nitrogen by the latter is a question of great importance and general interest.

By far the larger proportion of the nitrogen appropriated by plants is absorbed in the form of some combination. Experiments on an extensive scale, and very carefully conducted, have been correctly interpreted as showing that, under the conditions of the experiments in question, none of the nitrogen absorbed came from that which exists, uncombined, in the atmosphere. But there are certain facts in regard to the nutrition of a few plants which render it highly probable that, under some circumstances, the free nitrogen of the atmosphere may be utilized to some extent as a source of this element. While, therefore, the general statement found in the textbooks—namely, that the nitrogen of plants is not obtained from the free nitrogen of the air—is undoubtedly correct in the main, it should be qualified to some extent for at least a few of our cultivated plants. It is necessary to consider first the general statement, and pass thence to the puzzling exceptions.

In the experiments instituted to settle this vexed question, series of plants were cultivated under conditions by which they were afforded all the materials necessary for healthy nutrition, with the sole omission of combined nitrogen. These trials were made in numerous ways, and with every possible precaution, but always with the result of showing that the plants growing in our ordinary air did not derive therefrom any of the free nitrogen. It is seldom that experiments in any field of research are checked by as many precautions to avoid error as characterized the series referred to, and therefore the results have been generally and properly accepted.

The forms of combination most favorable as nitrogenous food for plants are different for different plants; for instance, for some, the ammonium salts are best, while for some others, nitrates serve a better purpose. The following statement presents briefly the general facts relative to this point: The Beet and Tobacco thrive best when combined nitrogen is afforded them in the form of ammonium salts, and the same is true of the Sunflower. But, usually, nitric acid, in any of its diffusible combinations, answers every purpose. These combinations may be with ammonium, potassium, sodium, calcium and magnesium. It may be said that, as a rule, these combinations offered to the plant must not present an alkaline reaction, but there are some exceptions to this.

Whence do our wild plants obtain in nature their supply of these substances, which, of course, our agricultural and horticultural plants procure from the liberal amounts presented to them in the form of manures? Leaving for subsequent consideration the question of utilizing, in some cases, the free nitrogen of the air, it may be said that the supply appears to come first, from the minute amount of combined nitrogen present in the air and brought down in falling moisture. These combinations are in very small amount, and are properly termed traces, since the minute quantity cannot be accurately determined. By electrical disturbances in the atmosphere, combinations of the free nitrogen, with oxygen on the one hand and with hydrogen on the other, are effected. A second source is probably the nitrogen which enters into combination during the evaporation of water at certain temperatures. A third source is found in the products which result when organic matters, perhaps in a state of decay more or less complete, are acted upon by weak electrical currents. This may possibly explain, in part, the good effects of vegetable mold incorporated with the soil.

At this point should be noticed, in passing, the important

fact that many organic matters containing nitrogen are decomposed by the action of minute organisms into nitrous and afterwards nitric acids. This process of nitrification, as it is called, probably takes place whenever the ammonium combinations in manures are placed upon arable soil. There are, however, a few organic combinations of nitrogen which are not decomposed in the soil in this manner—for instance, scraps of tanned leather. These remain unaffected even after long periods of time.

With regard to the difficult inquiry as to whether any plants whatever can make use of the free nitrogen of the atmosphere, we have the results of many careful investigators who have been impressed by the peculiar relations of Peas, Beans, Clover and other plants belonging to the natural order Leguminosæ. In comparing Cereals, like Indian Corn and Wheat, with Peas and other leguminous plants, Professors Atwater, Hellriegel and others have found some interesting and puzzling facts. For instance, in experiments by the latter, plants of the Grass family were found to require a generous supply of some salt of nitric acid, in order to grow thriftily and yield a satisfactory amount of grain. But when Peas were cultivated under similar conditions, there was a distinct increase in the amount of nitrogen in the plants above that which was supplied to the plants during the experiments.

Recent observations have shown that certain leguminous plants possess on their roots tubercles, which are alleged to contain minute gemmules belonging to the vegetative threads of a fungus. By some, these organisms have been termed bacterial forms, and they are thus described by one of the most assiduous investigators of the subject, but the later conception is, that instead of being bacteria they are yeast-like gemmules. Be that as it may, it is highly probable that these organisms have the power not only of breaking up nitrogenous matters, but the far more extraordinary power of effecting combinations of the nitrogen of the air which has been absorbed by the soil, and thus placing nitrogen combinations directly within the reach of the roots of the plant. And it is even suspected, upon good grounds, that the fungal forms may assist in effecting absorption of other substances from the soil, and thus play an important part in all root absorption. Among the more recent observations of interest in regard to this matter is the curious discovery that although nitrogen compounds may and probably do easily escape from the soil where they occur, there is, in some instances at least, a marked increase in the amount contained in the soil, which is ascribed with plausibility to the presence therein of similar micro-organisms unconnected with the roots of plants, by which the free nitrogen of the air in the soil is brought into combination. But in what way this combination is brought about is not yet satisfactorily explained by any hypothesis yet proposed.

The amount of combined nitrogen brought down by rain and the like has been variously estimated, but the problem presents peculiar difficulties, since the observations must cover long periods of time. Moreover, there are local conditions which must necessarily modify results, and hence it is manifestly unwise to rely on observations taken at any one point. The most trustworthy results are probably those made at Rothamsted, in England, which have been extended over many years. To be sure, the determinations have not always been made by the same methods, but, this aside, the general results may be relied upon. The following are among the estimates furnished by this station:

1. "The nitrogen existing as nitric acid and ammonia in the rainfall of one year is not far from 3.3 pounds per acre. The proportion of this calculated as ammonia is between 2.3 and 2.6 pounds per acre, the rest being given as nitric acid."

2. "We may probably take 4.5 pounds per acre as the best estimate we can at present give of the total combined nitrogen annually supplied in the Rothamsted rainfall."

It will be seen from the above estimates that the amount of combined nitrogen falling in rain-water is far too small for the demands of our cultivated plants, and hence, in the case of the latter, manures must be supplied.

Concerning the destination of the nitrogen compounds taken into the plant, observations have been numerous, but the results are not wholly accordant. The statement given below represents perhaps as well as may be, the present condition of knowledge in regard to the matter, but it must be understood that much of what follows is conjectural. The nitrates or nitric acid absorbed by the roots are changed in the plant into ammonia compounds which unite with the earliest formed carbohydrate (in the leaf probably) to constitute the proteid or albuminoid compound. In the formation of this there is also a trace of sulphur required. This union of nitro-

gen is not, however, confined to foliage alone; it may be supposed to take place in any active cell.

The nitrogen compounds thus formed in the plant are of various kinds. The principal ones are chemically termed albuminoids, and resemble in many of their properties the white of egg (whence their name). In amount these compounds differ in different plants, in different parts of the same plant, and in the same part at different seasons of the year. The following percentages are cited from a trustworthy source:*

Red Clover, in full blossom,	3.7
Carrot-root,	1.5
Carrot-leaves,	3.2
Winter Wheat,	13.0
Field Beans,	25.5

Of these amounts about 15 or 16 per cent. may be reckoned as nitrogen.

Besides the combined nitrogen, there is always to be found a small amount of free nitrogen in the intercellular spaces, and dissolved in the cells of plants.

It is yet uncertain in exactly what way the nitrogen compounds in the plant are finally broken up. The course has been traced out in a few instances, which can better be examined in another paper of this series, when we glance at the numerous changes which organic matter, as a whole, undergoes while in the plant.

George Lincoln Goodale.

Cambridge, Mass.

Correspondence.

The Yosemite Valley.

To the Editor of GARDEN AND FOREST:

Sir.—Your editorial in GARDEN AND FOREST of January 2d on the Yosemite Valley interested me very much, as I passed one of the pleasantest weeks of my life there only last May, and if it is allowed to an Englishman to criticise, I should like to give my impressions of the present system of management in the valley. I have been all over Europe and a good deal of India and the United States, and I certainly have never seen a spot, except the Yellowstone Park, so well worthy of being preserved forever in a state of nature as the Yosemite.

I quite agree with you that the system of leasing the park to a company who have practically an absolute monopoly, both of the means of conveyance and the hotels of the valley, is not, in some respects, a good plan, and though I cannot speak too highly of the civility and excellent accommodation we received, and the goodness of the horses, drivers and carriages supplied by this company, yet you feel all the time that you have got to do as they like and not as you would like yourself. The present system is all very well for travelers who wish to be put through, in a large party, in five or six days, and to see the regulation sights at the regular hours, and who are able and willing to pay about \$100 for it; but for travelers who, like myself, prefer not to be herded with a number of other more or less congenial companions, and who, either on horseback, on foot, or in a small party of two or three in a carriage, wish to go their own way at their own time, the system is not at all suited, and many, I am sure, are deterred from going there on account of this monopoly. Why should it not be possible for the Commissioners to allow outsiders, under proper regulations, to take their own, or other people's hired horses and carriages, into the valley, without having to pay fabulous sums for tolls and fodder? And why should not a little more of the open competition, which is always so advantageous for those not in the ring, be allowed? With regard to the fencing and cultivation which is going on, it must be remembered that it would be very difficult and costly to bring hay for so many horses from a distance, if none is cut in the valley.

It is not only the valley itself which needs conservation and protection from the depredations of sheep, cattle, cutting and burning, but also the magnificent range of forest which extends from a little beyond Grants all the way to Wahwona and on to the valley. Though I have seen the finest forests in the Himalaya, Mexico and the Alps, the drive through this unequalled coniferous timber filled me with almost as much wonder and delight as the valley itself. At present it is intact, or nearly so, and it may not be too late to take measures for keeping it in a state of nature; but if once settlers and lumbermen get in, half the beauty and pleasure of the Yosemite trip will be destroyed, and California will have lost forever what is now a unique pleasure ground.

The efforts of GARDEN AND FOREST to bring the people of the United States to a sense of the value of their forest property are worthy of the very highest praise and support. I have

* The tables in Johnson's "How Crops Grow," 1868.

seen so much of the fatal effects of the destruction of forests in other countries, that I only hope they may be successful; and I could not help thinking on many occasions during my recent journey in America, that every bushel of corn and wheat which is now being exported from the United States, at prices which leave little or no profit either to the grower or the carrier, represents an amount of timber, of virgin soil and of virgin forest, which would be worth, probably in the lifetime of its present owners, far more than all the corn and wheat which may be, in the meantime, produced by its destruction and waste. Forest-fires are even more ruinous, for they seem to rage annually over a large part of the Rocky Mountains and Pacific States, and I cannot help thinking that very strong measures will, sooner or later, have to be taken to stop them. The prevention of burning has been one of the most difficult tasks of the forest-department of India; but it can be done, even when the feeling of the local population opposes it; and though freedom is a very good thing, yet it seems to me to be going too far, when you allow the inhabitants of the head-waters of a great river to make the country uninhabitable for hundreds of miles below them, by burning or allowing to be burnt the forests on which those rivers depend, in a great measure, for their regular flow of water. The fearful devastation lately caused in China by the overflow of the Hoangho River is a good instance of this, and we might expect the same thing in Bengal, if the forests of the Himalaya had been treated as the forests of China have, and as I am afraid some of the forests of the United States are in a fair way to be dealt with, if the eyes of the people are not opened in time.

Cirencester, England.

H. J. Elwes.

To the Editor of GARDEN AND FOREST:

Sir.—In my letter published in GARDEN AND FOREST of January 16th, I referred to localities in Rhode Island where the Tulip-tree is found indigenous. I omitted, however, to refer to a locality where it grows naturally in Massachusetts, but so near Rhode Island that it might properly have been spoken of in the article alluded to.

I discovered a number of these trees in June, 1887, in a rather scattering wood on the north-eastern shore of "Wal-lum Pond," a sheet of water in the north-western corner of Rhode Island, and running over the line into Massachusetts. The trees were in the latter state, but close to the line of division. I saw a considerable number of them, varying in size from the seedling a foot high to trees forty feet high or more, but none very large, and being with other trees, they had little room for development of top. I was not looking for them, nor should I have been much more surprised to see a band of native "Nipmuck" Indians spring from the woods than I was to see these trees. The pond is almost wholly surrounded by forest, and is, indeed, in the midst of a wild forest-region.

A note from Mr. Jennings, of our recent topographical survey, gives the altitude of this pond as 575 feet, which height makes the occurrence of this tree there of still greater interest. Some of the trees growing with the Tulip-trees, or near them, are Birches, Oaks, Beech, Maples, Ash, Hemlock and Pines, with an undergrowth of Laurels, Viburnums, Cornus, etc. Near by is *Viburnum lantanoides*, a very rare plant in Rhode Island.

I think this region has been but little explored, or the existence of the Tulip-trees would have been noticed before.

Providence, R. I.

L. W. Russell.

To the Editor of GARDEN AND FOREST:

Sir.—A recent note from one of your correspondents states that the wood of Burr Oak in North Dakota is brittle and shaky, and of little value, and throws doubt on the use of cultivating it here.

While it is true that most of the oak grown in this region is short, brittle and shaky, some of it has been found as durable for axe handles, rollers, etc., as much of the hickory found in the market.

I think there is reason for studying carefully the circumstances under which the toughest wood here is naturally produced. The growth of some trees here is vigorous.

In northern Minnesota, near Aitken, on the well sheltered and alluvial bottoms of the Mississippi, I have seen the Burr Oak four feet in diameter at four feet above the ground, and seventy feet to the first limb. In Manitoba, along the Pembina Mountains, near Nelsonville, I have seen valuable groves of this timber.

My impression is that the exposure to fire and wind is the principal reason for the poor quality of most of the oak timber grown here.

I shall be glad to furnish next season samples of leaves, fruit, wood and soil of the Burr Oak from different localities, with full notes, to any one who will study them and publish the results.

St. Paul, Minn.

H. B. Ayres.

Periodical Literature.

The following extracts from an exhaustive article in the January *Bulletin of Miscellaneous Information*, issued by the authorities of Kew Garden, upon the plant (*Erythroxylon Coca*) which produces *Cocaine*, is of general interest now that this valuable anæsthetic has come into such general use:

"In recent years the well known Coca plant has received considerable attention, owing in a great measure to the valuable properties which have been ascribed to one of its alkaloids called *Cocaine*, as a local anæsthetic. Coca wine and various other preparations of coca leaves are now largely in use. The plant itself has been noticed and described by botanists and travelers for more than three hundred years.

"The earliest detailed account appears to be that given by Nicholas Monardes in the third part of his '*Historia Medicinal de las Cosas que se Traen de Nuestras Indias Occidentales que Serven en Medicina*,' which was published at Seville in 1580, after the author's death. This was translated into Latin by Clusius while delayed by adverse winds at Gravesend on his way to Belgium, where the translation was published at Antwerp in 1582. In 1580 an English translation of the third part, in addition to that of the two earlier parts previously printed, was also published by John Frampton, a London merchant. The Kew library possesses a copy of this book, which is printed in black letter; its title is 'Joyfull Newes out of the Newe Founde Worlde, Wherein is Declared the Virtues of Hearbes, Trees, Oyles, Plantes and Stones.' A condensed translation from the Spanish of the three parts is given by Clusius in his '*Exoticorum Libri Decem*,' 1605, which is usually quoted as the earliest authority on Coca.

"The account given by Monardes of the Coca plant and its uses are tolerably minute. He describes the methods of using Coca when traveling, either in the form of balls, or of a paste made by chewing the leaves with lime made from shells, or the leaves alone. 'For the use of these little Balls taketh the hunger and thirst from them; and they say that they receive substance there by, as though they did eate meate. At other times they use them for their pleasure, although they labour not by the way, and they use the same Coca alone, chewing it and tossing it in their mouths, from one side to another, until there be no vertue remaining in it, and then they take another.'

"The Coca plant, although known for some time previously to European botanists, was first defined as a species, according to modern principles of nomenclature, by Lamarck, in the *Encyclopédie Méthodique* (1786), from specimens brought from Peru by Joseph de Jussieu. Cavanilles figured and described it from the same specimens, and we have also a representation of it in the inedited plates of Ruiz and Pavon. The first figure of the Coca plant published in this country appeared in the *Companion to the Botanical Magazine* (1836), Vol. ii., t. 21, with a description by Sir William Hooker, from specimens gathered by Mathews in the environs of Chinchao, Peru. A full account of the uses and property, mode of cultivation and commercial value of Coca in its native country had been given previously in the same work (p. 161), in a translation from the second volume of Dr. Poeppig's '*Reise in Chili, Peru, und auf dem Amazonenstrom*.'

"At that time and for many years afterwards Coca leaves were looked upon merely as the source of a stimulant to the nervous system, employed by the inhabitants of Peru and Bolivia in very much the same manner and for the same purpose as the Chinese use opium and the East Indians chew the betle. The published statements from Monardes onwards respecting Coca appear to establish the fact that its use by the Indians of the Andean region enable them to accomplish such severe labor as no European could perform. Von Tschudi refers to the effect the use of Coca had on himself, in greatly assisting respiration and in enabling him to ascend high mountains without fatigue. Dr. Weddell, Spruce and Markham, and numerous other travelers and scientific observers, agree in ascribing to Coca marvelous sustaining power, although many of them are careful to point out that Coca used in excess produces highly injurious effects, like the immoderate consumption of other stimulants or narcotics.

"According to De Candolle the original home of the Coca plant in South America has not been clearly defined. He states that early authors, such as Joseph de Jussieu, Lamarck

and Cavanilles, had only seen cultivated specimens. The specimens gathered by Mathews in the ravine of Chinchao might have been beyond the limits of cultivation. Those from Cuchero, collected by Poeppig, were said to be wild, although the traveler himself was not convinced of this. 'It is by no means improbable,' he says, 'that the seeds may have been dropped by birds.' André speaks of Coca in the valley of the river Cauca, in New Granada, as 'in abundance wild or half wild.' On the other hand, Triana, a reliable authority on such matters, does not admit that the species is wild in New Granada. At present we have the Coca cultivated to a very large extent on the Andes in the Argentine Republic, of Bolivia, Peru, Ecuador, and the United States of Colombia (New Granada). It is also cultivated in the mountainous parts of Brazil, and there are specimens in the Kew Herbarium collected from the head waters of the Rio Negro by Spruce, in 1854. The largest plantations, called locally *Cocals*, are said to be in the province of La Paz, in Bolivia. Weddell estimates in a good harvest the produce of Coca leaves per acre at about 900 pounds. The total production of Coca is something like 40,000,000 pounds, worth at 1s. per pound a value of £2,000,000. Almost the whole of the production is consumed in South America.

"In the Andes the Coca plant succeeds best in the mild, but very moist, climate of the lower mountains, on elevations between 2,000 and 5,000 feet above the level of the sea. The thermometer at this elevation does not often fall below 60° Fahrenheit, and the climate is free from any great or sudden changes. It appears that Coca, like Coffee, succeeds best on mountain slopes, where the soil has perfect drainage. Swampy land is very unsuitable, and so, also, according to Poeppig, is land strongly impregnated with lime. From the experience gained in cultivating Coca in other parts of the world, it appears that the plant thrives in warmer localities than were at first supposed suitable for it. In many tropical countries it will grow at sea level, provided there is sufficient moisture in the air and the rains are pretty evenly distributed through the year. It will not thrive at the higher elevations at which Coffee grows in either the East or West Indies. An elevation midway between those mentioned above will probably prove most suitable, regard being had to the fact that the lowest minimum temperature does not fall below 65° Fahrenheit. Shade is said to be unfavorable to the development of the alkaloids in the leaves. Dr. Rushby has made repeated analyses of shade-grown and sun-grown leaves, with the result that the latter were invariably found much richer in total alkaloids. Plants appear to be generally raised from seed, and when eight or ten inches high they are put out in their permanent places during the rainy season. The care or cultivation suitable to Tea or Coffee plants would appear to be also those necessary to the cultivation of the Coca plant. The crop is a leaf crop similar to Tea, and there would appear to be nothing special in the requirements of the plant, which is found to be hardy and easily managed.

"In Peru the plants begin to yield the first crop of leaves in three years after planting, but in poor soils the plants are often left until the fifth year. The full-grown shrub yields a harvest every thirteen or fourteen months; but as the ripeness of the leaves, which is proved by their breaking when taken in the hand and bent, depends very much upon the soil and situation and the age of the plants, in many large plantations the collection goes on throughout the year. In some favorable localities two or three good crops are gathered in the year.

"In Tea the very young leaves only are gathered. In Coca, on the contrary, the largest and most matured leaves are sought, as these contain most of the alkaloids which render the Coca leaves a marketable product. After being gathered, the leaves in South America are usually dried in the sun on platforms. They are then heaped up to undergo a slight amount of sweating, and are then ready for use.

"Now that Coca is being cultivated experimentally in other countries than South America, it is important to bear in mind that the standard of best Coca leaves is likely to change. To a manufacturing chemist the best quality would mean simply the quality that would yield the largest percentage of crystallizable Cocaine, obtainable in the easiest manner, while the same Coca might be considered for domestic consumption (amongst the natives of South America) one of the lower grades. It is highly probable that the amount of Cocaine forms no element in the Indian's estimate of the quality of Coca any more than the percentage of nicotine establishes the quality of a particular grade of tobacco. Coca leaves are classed by the Indians as *Najas dulces* (sweet leaves), and *Najas amargas* (bitter leaves). The former are made sweet by the abundance of alkaloids other than Cocaine, while in the

latter the bitter flavor of Cocaine is the predominant one.

"Since the discovery of the anæsthetic properties of cocaine the demand for Coca leaves in South America has considerably increased for export purposes. A distinct loss in the alkaloids generally, as well as in cocaine, has been noticed during the transit of leaves to this country, and latterly, in consequence, it has become the practice to extract the alkaloids from the leaves in South America and export to the United States and Europe a crude preparation which is largely taken up by the manufacturers of cocaine. The demand for Coca leaves has therefore fallen off, and it is probable that the cultivation of the Coca plant in our tropical colonies may never assume large proportions. Small and exceptionally fine samples of Coca leaves may find a limited market in this country and on the Continent; and possibly in India and eastern countries it may be worth while to grow sufficient leaves to meet the local demand for cocaine. Beyond this it is scarcely possible to go, if it is borne in mind that South America is able, without further extension of cultivation, to produce such enormous quantities of Coca leaves that the one-eightieth part would be sufficient to swamp the cocaine markets of the whole world. In a letter dated January 25th, 1888, Messrs. Burgoyne, Burbidge, Cyrian and Farries reported that the commercial value of 'Coca leaves yielding total alkaloids of .80 per cent. would be about 6d. to 8d. per pound. At present it is difficult, they say, to get a true valuation on account of absence of demand. . . . The average price last year (1887) was about 8d. per pound, taken all around.' In a letter dated the 9th of November, 1888, Messrs. Burgoyne state, 'Very few parcels of Coca leaves now come before us of the market, as the manufacturers of cocaine either deal directly with the shippers of the leaves or buy the crude extract for manufacturing purposes. The demand for the alkaloid increases, and the price of the leaves varies from 10d. to 1s. 6d. per pound. In the absence of statistics of stock here we cannot say what the probable future of the article is with regard to price.' In a further letter dated the 5th of December, 1888, Messrs. Burgoyne kindly forwarded the following interesting information respecting Coca leaves in the United States: 'We have just heard from New York that the stock of Coca leaves in that city consists of 10,000 pounds of Huanuco leaves and 40,000 pounds of Truxillio leaves. These were all imported this year and are good green leaves. The Huanuco leaves are the kind used for making cocaine, but since the large quantities of the crude cocaine arrived from Lima on the European markets there has not been such an active inquiry, and the price has declined to twenty-two cents (eleven pence) per pound. It is a well known fact that they cannot be imported under twenty-six cents (thirteen pence) per pound, and when the small stock of 10,000 pounds is gone, higher rates will no doubt be obtained for Huanuco leaves. The Truxillio leaves, on the other hand, are only used in pharmacy and for Coca wine. They are as strong as the other kind in alkaloid, but the product will not crystallize. The stock in hand, viz., 40,000 pounds, is a large one, and the price may probably go down to fifteen cents (seven pence half-penny).'"

Recent Plant Portraits.

Botanical Magazine, January:

BROWNEA MACROPHYLLA, t. 7033; a New Grenada tree of the *Leguminosæ*, only known in flower through a specimen which has grown under glass in the late Mr. Crawford's garden near Cork. The splendid heads of scarlet flowers are ten inches across, but they are produced directly from the main trunk near the ground, and are of comparatively short duration, characteristics which must somewhat lessen the value of this tree as an ornamental plant.

OLEARIA INSIGNIS, t. 7034; a representative of a genus which, in New Zealand and in some parts of Australia, replaces the Asters of the northern hemisphere. *Olearia insignis* is a low, stout shrub, with handsome, white flowers, occupying rocky river banks in the northern part of the Middle Island of New Zealand.

ROSA INCARNATA, t. 7035; a native of widely separated districts of France, belonging to the group of *R. Gallica*, of which it has been often considered a form. It is, nevertheless, incredible, as Sir Joseph Hooker points out, "that a plant growing wild in several parts of France, and which was recognized in English gardens 248 years ago, and named and described in a standard work 117 years ago, should have, as it were, passed entirely out of the knowledge of horticulturists and botanists till the latter half of the present century." Yet this is the history of this very handsome Rose, with large and brilliant flowers.

Notes.

None of the encyclopædias tell us what plants furnish the briar tobacco-pipes. It is said the Heath of the south of Europe (*Erica Mediterranea*) furnishes the best.

One objection to the Worden Grape is that its skin is too tender to bear transportation well. A grower in western New York has found that this difficulty is overcome if a vine-leaf is placed under each cluster.

It is proposed to place a bust of the late Professor A. E. de Bary in the hall of the new University building in Strasburg. Contributions are solicited from his former pupils and friends, and may be sent to his successor, Professor Graf Solms-Laubach.

The climate of Afghanistan is so very dry that without irrigation nothing can be grown below an elevation of 3,500 feet, at which point dew first begins to form. During the summer season the people live chiefly on Melons, which are grown in such quantities that syrup is made from them.

The attention paid to forestry is increasing in England. Among other proofs we may note that during the winter Professor Boulger will deliver, at the City of London College, a course of ten lectures on this subject, with especial reference to the examinations of the Surveyors' Institute, and will follow them up in the spring by a course of practical demonstrations in the country.

In the year 1887 1,140 public lectures on the culture of fruit trees were delivered in Belgium, twelve on the culture of forest trees, and six on Tobacco-culture. The relative amount of forestry instruction seems unduly small; but it should be remembered that special schools exist in Belgium for the instruction of foresters, and that these public lectures were addressed to a mere general audience.

A writer in a recent number of the *Saturday Review*, of London, says: "We cannot admit that the very best American apple ever possesses a tittle of the flavor of good English fruit. But that cannot affect the economic question (of increased fruit-growing in England) at all, because the number of persons who can distinguish excellence of taste is, and must be, always very limited. Market prices, except for limited amounts of exceptional products, will always be ruled by the supply of fair average commodities."

The officers of the Pennsylvania Horticultural Society announce that in order to make the monthly meetings more interesting and secure a larger attendance, they have made arrangements for a series of essays on horticultural subjects, one of which will be read at each meeting. The first of these papers, "The History and Future of the Pennsylvania Horticultural Society," will be read by Wm. A. Reed, M.D., at the meeting on Tuesday, March 19th, 1889. At this meeting, and at each subsequent one, there will be an exhibition of new and rare plants.

The *Revue Horticole* wonders why the White *Platycodon grandiflorum*, a beautiful plant, well known in America, is not grown in the vicinity of Paris. A greater wonder is that, known in America, it is not more popular than it is. Both the white and the original blue are admirable border flowers, and are excellent for cutting. And then they have the character, so dear to the American flower-gardener, of knowing how to take care of themselves. Once in a garden, they rarely die. *Platycodon* was once among the Campanulas, and it yet often goes under the name of Siberian Bell-flower.

An interesting article in a recent number of the *Illustrirte Garten Zeitung*, of Vienna, is devoted to the *Leguminosæ* of the western prairies. Especial mention is made of the "Tuskee," or Prairie Turnip (*Psoralea esculenta*) and the attempts which were made to introduce it into Europe as an article of food at the time of the potato famine some forty years ago. In 1849 the Academy of Sciences in Paris considered two treatises upon the tubers of this plant, which were said to contain eighty-one per cent. of starch. A certain Monsieur Piquot tried hard to bring it into favor under his own name as "Piquotiana," and sold the seeds in bottles at a price equivalent to nearly \$2 for fifty seeds. But all efforts to establish it as an article of diet were unavailing, as was the case with many other tuber-bearing plants at the same epoch.

In Mr. W. R. Bliss' interesting book, "Colonial Times on Buzzard's Bay," recently published by Messrs. Houghton, Mifflin & Co., there is a sentence which proves that the early

settlers had a keener sense for the value of woodlands than was shown in later years, or is often found to-day. When the so-called "Rochester Propriety" was established in 1679, "the value of the great forests . . . was recognized by the order that their shall be no Tymber of any sort conveyed or carried a way out of the Lymits of Scippican under the penilltie of twentie Shilings for every Tree or part of a tree so used." To protect the production of turpentine, which was a chief industry of the district, another decree prohibited "any person from boxing or shiping or milking any pine tre or tres on the common on the penalty of payeng Ten Shilengs for every tre." And in another place we read, "So valuable was the right to gather turpentine regarded that it was specially mentioned in deeds of woodlands granting 'All ye privildge of milking of pine trees.'"

A Japanese correspondent of the *Revue Horticole* has begun in that paper a series of articles on the horticulture of his native land. The first article recites certain facts with regard to Japanese landscape gardening which were recently given to our readers from another source. As far as history tells, it is furthermore said, the first garden was established in Japan in the reign of an emperor who lived in the middle of the ninth century of our era. In 900 another palace-garden was laid out by the Emperor Ouda, who is notable as having been the first to introduce the culture of the Chrysanthemum, afterwards adopted as the royal symbol. The remains of a garden planned by his son are still to be seen at Kioto. During the twelfth, thirteenth and fourteenth centuries the art seems to have reached its highest development, and in 1378 was established the Ghinkakouji Garden at Kioto, which is still the finest specimen of landscape gardening in the empire. After that time the art remained stationary, owing to the civil wars which distracted the country. But when peace was made in 1580 the Shogun of the moment proved a noteworthy patron of gardening, as was likewise his contemporary, the famous *savant*, Rikiyu. The many plants introduced by the Portuguese towards the end of this same century gave an impulse also to horticulture properly so-called, and it was further helped, towards the beginning of the seventeenth century, by the introduction of conservatories, and quickly advanced to a point never before attained. Mr. Yoshida's explanation of the way in which the Japanese regard their landscape gardens tallies with that which has already been given our readers. "To imitate nature," he says, "would be a very simple thing, and would demand no effort of the imagination. But the question is how to represent lofty cascades of which the source is so mysterious, and high mountains covered with walls of trees on inaccessible rocks?" To represent, not to imitate; to make a picture of a landscape, not an actual landscape; this, in truth, is the chief aim of the Japanese artist.

Catalogues Received.

- A. BLANC & Co., 314 N. Eleventh Street, Philadelphia, Pa.—Cacti.
 A. BRIDGEMAN, 37 E. Nineteenth Street, New York.—Garden and Farm Seeds.
 WILLIAM BULL, 536 Kings Road, Chelsea, London, S. W., England.—Flower and Vegetable Seeds.
 W. ATLEE BURPEE & Co., 475 and 477 N. Fifth Street and 476 and 478 York Avenue, Philadelphia, Pa.—Garden, Farm and Flower Seeds.
 M. CRAWFORD & SON, Cuyahoga Falls, O.—Strawberry Plants.
 CURRIE BROS., 108 Wisconsin Street and 312 Broadway, Milwaukee, Wis.—Seeds, Plants, Bulbs.
 JOHN GARDINER & Co., 21 N. Thirteenth Street, Philadelphia, Pa.—Vegetable, Flower and Farm Seeds.
 PETER HENDERSON & Co., 35 and 37 Cortlandt Street, New York.—Seeds, Plants, etc.
 HOOPER & Co., Ltd., Covent Garden, London, England.—Garden Seeds, etc. Agent for United States and Canada, J. A. De Veer, 183 Water Street, New York.
 E. H. KRELAGE & SON, 17 to 27 Kleinen Houtweg, Haarlem, Holland.—Dutch Flower Bulbs.
 D. LANDRETH & SONS, 21 and 23 S. Sixth Street, Philadelphia, Pa.—Vegetable and Flower Seeds.
 LUDWIG & RICHTER, 14 Federal Street, Allegheny City, Pa.—Vegetable Seeds.
 W. PIERCY, 89 West Road, Forest Hill, London, S. E., England.—Summer Flowering Chrysanthemums, etc.
 PITCHER & MANDA, United States Nurseries, Short Hills, N. J.—Cypripediums.
 SCHLEGEL & FÖTTLER, 26 S. Market Street, Boston, Mass.—Seeds, Plants, etc.
 F. W. WILSON, Chatham, Ont.—Fruit and Ornamental Trees.
 YOUNG & ELLIOTT, 54 and 56 Dey Street, New York.—Seeds, etc.
 BOWKER FERTILIZER CO., Boston and New York.—Manures.

GARDEN AND FOREST.

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The Defense of National Property.

THE greatest obstacle in the way of effective action for saving the forests on the nation's lands, is the lack of a clear understanding of the situation and of what it requires on the part of the people of this country. The problem is specific, limited and particular. It is not merely a topic for leisurely discussion and contemplation. One of the most important possessions of the nation is in imminent danger of extinction. An exigency now demands immediate and effective action, and the only alternative is ruin.

The plan presented in this journal three weeks ago, and to which we now recur, requires the immediate withdrawal from sale of all the public lands in the mountain forest-regions of the country, and the employment of the Army of the United States to protect these forests from injury and spoliation until a permanent policy for their care and preservation can be put in operation.

An emergency confronts us, and the employment of the army for this work of national defense is a necessity. If one of our great seaboard cities were demolished by a foreign foe, the loss to the nation would be far less than that which would result from the destruction of the forests on the lands now belonging to the nation. Or, if hundreds of millions were exacted as the price of escape from bombardment and obliterating flame, the subtraction from the nation's wealth which this would require would be trivial compared with the permanent extinction of the very springs and sources of national wealth and revenue which would be caused by the destruction of these forests.

The overwhelming and unanswerable argument for the adoption of this plan, and for the employment of the nation's army for the defense of the nation's property, is the fact that it is the only method which can be made efficient and successful. It is obvious that so much time would be required to prepare any other administrative machinery and put it into operation, that the forests would be extinct before the completion of an elaborate arrangement for their defense. But here is the best available machinery for the protection of this invaluable national property ready

to our hands in the thorough organization and intelligent efficiency of the Army of the United States. Its officers are superior men, who have been trained at the expense of the nation, and they are already in its paid service. There is not at present any other service so important as this in which the army can be employed.

As for official or Government work in forestry in this country, nothing could be attempted that would so strongly tend to vitalize and popularize it, as the success of the scheme which we have proposed. Official persons often justly complain that they are not sustained in their work, as they should be, by public interest and sentiment. There is no other way in which intelligent and public-spirited citizens can so efficiently co-operate with all that is vital in the forestry work of the national Government, as by urging the adoption of the plan we have presented—the immediate withdrawal from sale of all the public lands in the mountain forest-region of the West, and the employment of the United States Army to guard these forests until a plan for their permanent administration has been completed.

New Varieties.

MONSIEUR ANDRÉ, in a recent issue of the *Révue Horticole*, calls attention to the difficulties which confront the purchasers of plants who are obliged to rely, in making their selections, upon the glowing and interested statements of value with which new plants are habitually put upon the market:

"Plant-buyers, no matter what class of plants they are interested in, must often find themselves confused if they consult the catalogues of dealers. The immense number of new varieties now obtained on every side, and named and described as possessing every desirable quality and virtue, must cause a well-nigh hopeless embarrassment. If they are not fortunate enough to possess some work upon gardening containing authoritative lists of the different varieties of garden plants, they must buy on the strength of the catalogue descriptions, and then be compelled to throw away, as worthless, a large part of what they have bought, or else continue to cultivate inferior forms. The way to prevent this is simple; and it can, with a little trouble, be arranged. It is only necessary to establish, for the different classes of ornamental plants, juries of approval, of the same character as the pomological congresses, which have successfully established the nomenclature and the merits of cultivated fruits. Monsieur Godefroy-Lebeuf has recently suggested such a plan in the case of Orchids; but every new plant, no matter of what class, should be submitted to a jury of specialists to determine if it merits recommendation, if it is not already cultivated under another name, or if it is really worth cultivation for any particular purpose or special reason. The question is certainly somewhat complicated, but it can be solved to the satisfaction of intelligent producers of new plants and of all plant-buyers."

American plant-buyers suffer, perhaps, more than those of any other country, from exaggerated statements regarding new plants, which too often appear in trade-catalogues, because Americans are, as a rule, more easily misled by glowing advertisements than Europeans, and because in America trade-catalogues are too often the only sources of information about new plants and horticultural matters generally, with which plant buyers provide themselves.

An international jury, or a number of juries, to pass upon all new plants originated in England, France, Belgium, Holland, Germany and the United States, might, perhaps, be impracticable, but there ought to be no very serious or insurmountable difficulty in organizing such juries in Europe, with an American jury of American specialists to confirm, so far as the United States is concerned, the action of their European associates. It is pretty evident that the vast numbers of varieties of garden-plants which are now produced every year must, sooner or later, necessitate some such plan as this, and the sooner it can be perfected, and put in good working order, the better it will be for every one interested in horticulture. The producers of valuable varieties would gain as much,

and perhaps more, from the endorsements of such juries as the people who buy plants, for they would buy all the more if they could feel assured that they were getting what they were asked to give their money for.

Private letters from Philadelphia indicate that there is a chance, if the financial support of public-spirited citizens can be obtained, to put into execution at last the long-cherished plan of acquiring, for public uses, the site of Bartram's Gardens, the first botanical garden established in the United States, with the house built by John Bartram, the famous Philadelphia botanist, and many of the trees planted by him. This spot has for years been the Mecca of botanists and horticulturists. There is no other more interesting to them, and none so filled with associations connected with the early development of botanical science in America.

This opportunity is an important one, therefore, and we trust that it will be improved. The public spirit and civic pride of Philadelphia's leading men are known all over the civilized world, and there can be no doubt that as soon as this matter is once understood they will not consent to see this spot, at once so valuable on account of its historical associations, and so convenient and suitable for a public breathing-place and pleasure-ground, given up to the demands of commerce. The land should be acquired in such a way, or on such terms, as would permit some permanent special supervision of it by some body of men who would be specially interested in the historic character of the place—the University of Pennsylvania, or the Academy of Natural Science.

If it becomes merely one of the city parks, under the general management of some branch of the city government, it would inevitably lose all its distinctive or special character and interest.

The taste for museums and in-door collections of all kinds, and the habit of giving large sums for their establishment and maintenance, are valuable and encouraging features of our national character; but we must strive to make the out-of-door life of the inhabitants of our great cities more attractive, healthful and interesting; and places of historic or other special interest should be utilized for purposes of this kind whenever it is practicable.

The name of Bartram's Gardens should be preserved, and in order that it shall have any significance or appropriateness, should be maintained in as near the condition as its first owner left it as is practicable. Whether any other features of a botanic garden would be practicable is, we suppose, rather doubtful. But the name of a distinguished man is a precious possession to a great city and a potent influence in popular education and the development of civic patriotism. We hope to hear that definite steps have been taken to purchase the old garden and to perpetuate the interest of the place.

The Daily Mirror and American, published in Manchester, New Hampshire, calls attention to the fact that the statement, recently made in our columns, that six million feet of Spruce timber were to be cut this winter from the immediate vicinity of Mount Washington, give a very inadequate idea of the damage which is being inflicted upon the forests of northern New Hampshire.

"The Connecticut River Lumber Company, whose headquarters are at the Connecticut lakes, will probably put into the streams this winter nearly a hundred millions of Spruce. The Brown Lumber Company, of Whitefield, and the Berlin Falls Company will cut twenty million feet each, the Kilkenny Lumber Company half as much more, and half a hundred other firms and individuals will contribute very much to the destruction of the forests north of Woodsville and Conway. Instead of six million feet, which a stranger might infer from the statement made was the total output of our northern mills, it must be several hundred millions. But this only emphasizes the fact that one of the chief glories and sources of wealth of our northern counties is fast disappearing before the woodman's axe to return no more, for the mountain sides

from which this timber comes do not reproduce a growth as land does in this part of the state, and when once stripped they remain bare. With the forests departs much of the beauty, the grandeur and the attractiveness which have made our mountains famous as health and pleasure resorts. When the woods have been cut away, the White Mountains are about as bleak and barren a section of country as we know of, and when there are no timber lots left the charm that was formerly theirs will be wanting. Even the Profile, the Franconia and Crawford Notches and Mount Washington would lose much of their glory and beauty with the destruction of the forests in which they are set, and the territory about them, when stripped of trees, would be one to shun.

"It is but a few years, comparatively, since nearly all these forests were owned by the state, and it was a terrible mistake when they were sold for a song to speculators. Most of the timber lands in Pittsburg, and many in other townships, were sold for twenty cents an acre during Gov. Harriman's administration. Perhaps this was all they were worth to sell at that time, for with the nearest railroad forty miles away no one could realize much by clearing them; but some one ought to have been far-seeing and wise enough to have concluded that in a few years they would be worth a hundred times what they sold for, and that the state could not afford to sell them at any price. Other immense tracts have been sold for even less per acre, or given away to Dartmouth College or some of our academies, which have turned them over, for a nominal price, to the lumbermen."

These statements are quoted, not only because they emphasize the words of Mr. Harrison in another column of this issue, but because they invite attention to the broader fact that what has happened in New Hampshire is now happening in other parts of the United States. Valuable forests are being frittered away in the South and in the West without any adequate return. But the experience of New Hampshire, expensive and disastrous as it has been, may yet have some value as a warning to the people of other states. On no part of this continent today are there any forests so remote from existing means of transportation that they will not soon be called upon, if they have any value whatever, to give up their quota to supply the wants of our rapidly increasing population.

Some Old American Country-seats.

I.—THE GORE PLACE.

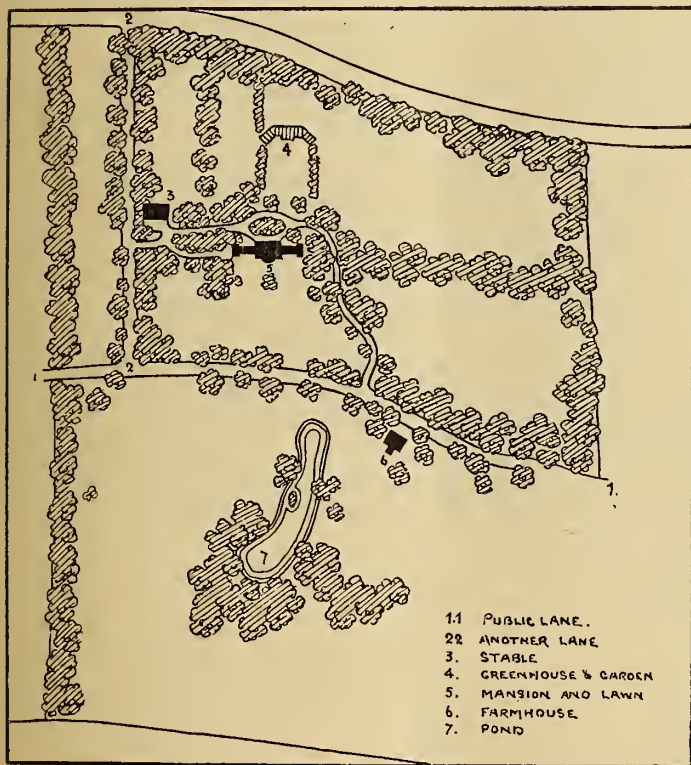
JOHN WINTHROP, first Governor of Massachusetts, had his country-place. It lay upon Mystic River, and was called Ten Hills. The pleasures of life there were certainly peculiar, wolves and prowling Indians being frequent visitors; but now that several of the ten hills have been even destroyed, Winthrop's frontier "paradise" can only be imagined, not described. Unfortunately the same must now be said of almost all the mansions and gardens of the later aristocratic time which preceded the Revolution. The rising tide of population has swallowed up the handsome establishments of Tories and patriots alike. The Craigie house, which the Longfellow family preserves in Cambridge, is now almost the sole surviving representative of the terraced and high-walled stateliness of the colonial days.

Boston and her surrounding sister cities grow continually. Farm after farm and garden after garden are invaded by streets, sewers and water-pipes, owners being fairly compelled to sell lands which are taxed more and more heavily. Before destruction overtakes the few old seats now remaining, it will be well to make some sort of record of their character and beauty.

About eight miles from the State House, one of the roads of the Charles River valley, after passing through a somewhat squalid manufacturing district, suddenly becomes a rural lane, which winds its shady way first past the low-roofed farm-house and then past the lawn and mansion of what is plainly an old estate. The accompanying picture on page 91 shows the house as it appears from just within the trees which shade the lane. The grass sweeps up to the walls of this long, south front. No line of any sort breaks the flowing breadth of the lawn, for the approach-road, which leaves the lane near the farm-house, goes around through the trees to the door in the north front of the house. The simple but well-proportioned building is set off against a background of foliage, and the ends of the low wings are shadowed by tall Pines and Chestnuts, whose brothers, forming noble masses at the sides of the lawn, support and frame the house, and, joined with it, compose

one satisfying picture. On the further side of the lane is an open field and a winding pond, whose distant further end is lost in the shadow of a Pine-wood, from out the edge of which a White Birch leans over the water. Larches, too, and small Beeches, grow in the edge of this distant wood, and enliven the darkness of the Pines in spring and autumn, while here and there above the tops of the trees appear the crests of low hills, a mile or two away beyond the river.

This strikingly peaceful and lovely scene, so religiously preserved by its present owner that he can say that only the gales have harmed it since he came into possession more than thirty years ago, impresses the most casual passer-by, and teaches owners of country-seats a lesson of first importance. Here is not one rare tree, not a single vegetable or architectural wonder, not one flower-bed or ribbon-border; only common trees, grass and water, smooth ground and a plain building. The scene is interesting, impressive and lovable, and it is this solely by reason of the simplicity, breadth and harmony of its composition. This is real landscape-architecture of the purest type, in comparison with which all modern arrangements of specimen fancy trees must always appear ineffective as well as inappropriate.



Sketch-plan of the Gore Place.

The lands about this mansion, once a part of the so-called Beaver Brook Plowlands, were first owned by the beloved first minister of the colonial church of Watertown, the Reverend George Phillips. After his death, in 1644, certain of the Garfield family became the owners, and when Mr. Christopher Gore bought "the forty-acre lot," about 1791, he entered upon lands which had been the home of excellent people during a full century and a half. Mr. Gore was sent to England in 1796 as one of the Commissioners under Jay's treaty, and one wing of his house having been burned in his absence, he caused the present mansion to be built of brick and made ready for his return in 1804. It is said that he brought with him an English landscape-gardener, and certainly the old place bears every mark of the distinctive style of Humphrey Repton, whose book on landscape-gardening was published just before Gore's visit to Europe. The brick house, which is painted white, contains many finely proportioned rooms. Two doorways open upon a long platform on the north front. Between these doors stretches a hall dining-room, with a marble floor, and fire-places at each end. The large bay in the south front contains an oval drawing-room; on one side of this room is a breakfast-room, and on the other a parlor; the east wing contains a billiard-room, the west the kitchen and offices.

The carriage-turn, and the whole north side of the house, is crowded with large trees; many Hemlocks, whose soft boughs sweep the ground at the edge of the drive, several Umbrella

Magnolias among the Hemlocks, some large Lindens, and many very tall White Pines. Just beyond is the flower-garden, carefully sheltered and quaintly laid out in geometric fashion, with great banks of shrubs at the sides, plenty of smooth grass, and large beds crowded with perennials in rich, old-fashioned array. A small enclosure for deer adjoins the garden; two smooth and open hay-fields are close at hand, and around all this forty-acre home-lot stands a dense belt of forest-trees, shutting out the commonplace world and affording a pleasantly shady walk of something like a mile in length.

Mr. Gore lived to be Governor of Massachusetts and United States Senator. One of the later owners of the place, Mr. Theodore Lyman, 2d, made the pond beyond the lane, and built the present approach-road, and both he and the present owner planted many trees; but every proprietor since Mr. Gore's time has respected the character which was impressed upon the scene in the beginning; nothing to-day appears incongruous or out of place. If the Governor himself could walk about this country-seat to-morrow he would certainly be very proud to own it his.

Boston.

Charles Eliot.

Winter in the Pines.

IN a winter ramble there is much revealed that is hidden or passed by in summer. The leaves have fallen from the deciduous trees, and we see more clearly their shape and size. During my woodland walk to-day I measured a tree and found it to be over nine feet in diameter. Its gnarled branches and scarred trunk told of the centuries that had come and gone since, as an embryo, it first sent out its little plumule to the light. This old monarch is but a common Chestnut (*Castanea vulgaris*, var. *Americana*), but its great horizontal branches, each one as large as a fair-sized tree, give it an immense expanse of shade, with a venerable and protecting expression which would be marked even outside of the Pine Barrens, where, it is imagined by people unacquainted with our forests, that only scrub Oaks and scrubby Pines abound. In the immediate vicinity of this large tree were several Oaks from three to five feet in diameter. And beautiful Hollies, and Laurels and Cedars and Pines, were all around, which, together with the unusual warmth of this January weather, conspired to give the impression of a sub-tropical land. Grape-vines had climbed to the tops of the tallest trees, and not contented with one support, they had reached out and clasped others, binding them together and forming dense bowers beneath. Other woody climbers were also here. The Virginia Creeper and Bittersweet and various species of Smilax were abundant.

Birds twittered and sang and watched us from evergreen boughs, and woodpeckers and creepers were on the naked trunks and branches, always keeping us in view with the same angle of observation, no matter how often we made them revolve around the trees, or tried to circumvent them. Not so with the little Chicadee, however; he was willing to be on quite familiar terms, following us with his merry music, hanging and clinging to small twigs just above our heads, with back down, but all the time keeping a sharp, inquisitive watch upon the invaders of his domain.

Leaving the big trees and the bright moss that carpets the ground beneath them, and the prickly Smilax that hedges them in, we turn toward the more open barrens. Here, amid a goodly forest of trees from one to two feet in diameter, we find many old charcoal beds. The forest must have grown up since the sooty burners left this region. They usually make a clean sweep of the wood over quite an extensive tract, except perhaps a few trees that are left to shade the huts where they live during their forest raids. And this, no doubt, is the reason that we occasionally find small groups of large trees scattered here and there throughout southern New Jersey.

Probably there is not as much demand for charcoal now as there was fifty years ago. Still large tracts of timber are annually burned to supply the demand. But in New Jersey, for some reason, probably because the soil is so productive, no arid wastes are left, but young trees immediately spring up in the place of the old, and in a quarter of a century or so there will be quite a respectable forest to hide the former devastation. In the old charcoal beds to-day a glad surprise awaits me. The little *Draba verna* is in full bloom, standing thickly over the blackened spots, where the direct rays of the sun have more powerful effect than on the surrounding light soil, and bring the little plants forward as if in a hot-bed.

Dr. Gray was inclined to the opinion that this plant was not indigenous to our soil. If not, the seed must have been distributed in these forest fastnesses through the agency of the early charcoal-burners, or possibly birds may have been the agents, as I have often seen our little field sparrow (*Spizella*

pusilla), and the pine linnet (*Chrysomitris pinus*), and the thistle bird (*C. tristis*), eating seeds from plants growing on the roadsides and in fields.

Passing on through these open barrens, we soon reach a dense Cedar-swamp, which for several seasons past I have promised myself I would explore in the winter. Along its borders we find the rare local *Helonias bullata* growing in large clumps, with leaves fresh and bright, somewhat resembling those of the old-fashioned White Lily (*Lilium candidum*); but the leaves are more shining and larger, and withstand the frost better than the Lily. And very beautiful they are here in mid-winter, standing up in great rosettes, and looking more appropriately placed and beautiful than they ever do in a garden.

What I saw within the gloom of the Cedars must be told in another letter.

Vineland, January, 1889.

Mary Treat.

History of the White Lilac Industry.

FOR a long time it was generally, and even now is by many, believed, that to obtain White Lilac flowers during winter, the plants should be forced in a dark place. Such, however, is not an absolute necessity by any means; it is practically a question of heat, and, given this, White Lilacs can be easily produced in fully-lighted houses. The varieties mostly grown for this purpose are Charles X. and Rouge de Marly, both of which are cultivated in enormous quantities in France, and also in England, for forcing. Formerly Covent Garden was supplied almost exclusively from France, but now many English establishments are devoted to this special branch of the flower-trade. In some of these a system prevails by means of which the bushes to be forced are retarded to such an extent that the flower-market is furnished with fine White Lilacs (forced) long after unforced bushes in the open air have ceased flowering. The exact means adopted to secure these results are not divulged by those who practice them; the rough-and-ready plan of stripping off all the leaves of established plants in the open air, and so causing a second growth and a crop of flowers in autumn, is, however, not the one adopted by the Covent Garden growers. The white-flowered forms are not used for early forcing, they are not sufficiently vigorous, and the two red-flowered ones above-mentioned are almost invariably used. The red coloring matter, however, exists in such a quantity in some—for instance, Andenken and Ludwig Späth, a handsome dark-colored form of recent origin—that, even in the dark, white flowers cannot be produced.

In connection with this subject, the historical notes of M. Héring, in a recent volume of the *Journal de Botanique*, are of especial interest. As early as 1820 we learn that several French gardeners had tried the forcing and bleaching process, but not with any degree of success. Their plan was to make towards Carnival-time a deep hole, put fermenting material in the bottom, and cover the top with boards and straw. By this means in a fortnight or three weeks they obtained flowers which had lost a portion of their redness, but which were far removed from the snowy purity of those produced at the present day.

When hot water began to be successfully used for heating plant-houses a new era commenced in the Lilac industry, and in the winter of 1858 Paris society had its floricultural sensation in the pure White Lilacs, grown by M. Laurent, a Parisian florist. His plan was to take bushes from the open ground, plant them in a house which was kept day and night at a temperature ranging from 86° to 95° Fahrenheit, and under these conditions it took less than three weeks to get flowers. Madame Furtado, at the *Chateau de Roquencourt*, and M. Lavallée, at the *Chateau de Segrez*, among others, began to force Lilacs, and the latter, during his Presidency of the *Société Nationale d'Horticulture de France*, exhibited to the Society perfectly White Lilac which had been produced in a fortnight in full light in a house heated from 95° to 105° Fahrenheit.

The Marquis de la Ferté, *Chateau du Marais*, tried the cultivation in an Orchid house (in full light), with a temperature of from 59° to 68° Fahrenheit, but the flowers did not change markedly in color; the heat was insufficient, and the same results were noted at Segrez whenever the thermometer was not allowed to rise above 68°. Even in the dark, with comparatively low temperature, flowers become rose-tinted. So far M. Héring.

A few words may be written, however, about forced colored Lilacs. As is evident enough from previous remarks, the bushes must not be subjected to nearly so much heat if normally-tinted flowers (and for these, too, there has arisen a

large demand) are required. For pot-culture it is best to graft or bud the desired varieties on stems of *Ligustrum ovalifolium* or of *L. vulgare*. The plants thus treated make short, stubby growth, and set very freely, but they will not bear early forcing. *Syringa Chinensis* makes a delightful pot-plant, and this species it is usual to bud on two-year-old seedlings of the common Lilac (*S. vulgaris*). This operation takes place at the end of July. The next spring, as soon as the growth is as long as the finger, it is stopped, and by autumn a fine head is formed. Early the following spring the little trees are potted and the pots plunged in the open ground. An abundant water supply is necessary to induce a vigorous growth. In the middle of July the pots are taken out of the ground and less water given, in order to ripen the shoots. In November the pots are covered with some material to prevent frost from breaking them, and the plants are ready for removal to the forcing-house as required.

Kew, February.

G. Nicholson.

Cultural Department.

Hybridization of Gladioli.

IN 1885 I prepared to raise Gladiolus-hybrids by planting a row of the species *G. purpureo-auratus* among rows of Gandavensis varieties for the sake of convenience in hybridizing the flowers. Similar plantings of *G. dracocephalus* were made. Many flowers of *G. purpureo-auratus* and of *G. dracocephalus* were used as the pistillate parents. Some hybrids were attempted in the reverse order, using Gandavensis varieties as the pistillate parents, with but little success, and as the resulting seed was not kept separate, no notes can be given on this cross. The stamens were removed from all flowers to be hybridized while in the condition of unopened buds. The pollen was removed from the cells of the anthers with a sharp-pointed stick, and transferred directly to the stigmatic surface. This, in practice, was found the simplest method with Gladioli, although with most plants a camel's hair brush is best.

The hybridized seeds were planted in April, 1886, in shallow boxes, and so grown throughout the summer. About mid-summer, when the leaves attained a considerable height, fine sifted cow-manure was spread over the soil in the boxes to the depth of half an inch or more. This proved beneficial as a mulch and source of liquid-manure at each watering. In autumn the bulbs were sifted out of the earth and kept in boxes, as they have been in succeeding winters. The second year the seedlings were planted thickly in rows in the open ground.

I was informed by Mr. W. E. Endicott, who has had large

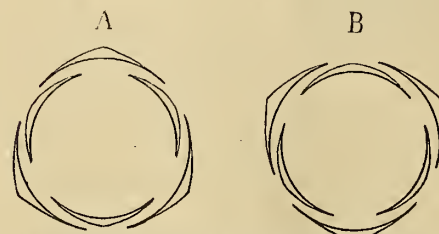


Fig. 95.—Diagram of the Perianth of Gladiolus.

were planted as one lot. The seed proved highly fertile, and yielded as many plants as do seeds of ordinary Gandavensis varieties.

About twenty-five hybrids of *G. purpureo-auratus* bloomed in 1887, the second year from seed, and were essentially similar to those which bloomed last summer. Many bulbs accidentally overlooked when digging in the autumn of '87, grew finely last summer, which is strong evidence of the hardiness claimed for the hybrids, as the winter of '87-'88 was extremely severe.

During the summer of 1888, 175 purpureo-auratus hybrids bloomed for the first time, and careful notes were taken of each plant.

Before discussing the hybrids, a few preliminary notes are necessary. In the Gandavensis varieties (the ordinary Gladioli of gardens) the segments of the corolla are arranged on two anthotaxic* plans. The first and most numerous arrangement is that shown in A fig. 95. The uppermost segment of the perianth is without, overlapping the adjoining segments; the lowermost within, embraced by its contiguous segments; the upper pair of laterals are overlapped by the lower pair of laterals; the lower pair of laterals overlap their adjoining segments. The other arrangement of the segments is shown in B fig. 95. The uppermost segment overlaps the adjoining

* "Anthotaxy, denoting flower arrangement. A name formed on the analogy to phyllotaxy, or leaf arrangement." Asa Gray, "Structural Botany," Part I., p. 141.

laterals; the lowermost overlaps its laterals; the lower pair of laterals is wholly within, and the upper pair of laterals is wholly without their adjoining segments. A single spike may be composed of flowers of the first arrangement (*A*) wholly, or it may have flowers of both arrangements in varying numerical proportions; but the first (*A*) as far as noted always predominates. Flowers of the second arrangement (*B*) may be the first, last, or scatteringly intermediate on the spike. The two arrangements are fundamental in the flower, they are not brought about by twists in the segments. The arrangement of the cells in the ovary coincides with the varying relative position of the segments.

In *G. dracocephalus* all the flowers, in the large number examined, were arranged as in *B*. The same is true of *G. purpureo-auratus*. Only a few flowers of *G. Saundersii* were observed when this character was in mind; but those were of the second arrangement. *G. psittacinus* is the only species where a variation of the arrangement was noted. In his species most of the flowers were arranged as in *A*; but a very few were found of the type of *B* in the diagram.

The existence of two plans of flower-arrangement on a single spike in a true species would be anomalous, and I consider its occurrence in hybrid Gladioli due to the inheritance of mixed blood; the arrangement (*A*) being due to certain ancestral species, and the arrangement (*B*) to other ancestral species. This suggestion is borne out, in fact, by the hybrids of *G. purpureo-auratus*, for, as noted below, both arrangements are found in the hybrids, although the form *B* only is characteristic. It is quite possible that, by following this character out one might be able to trace the origin and kinship of species and garden-hybrids of Gladioli.

The species *Gladiolus purpureo-auratus*, used as the pistillate parent, is well represented in the illustration upon this page. The flowers are deep, tubular, and bell-shaped. The ar-

range of the segments is as in *B*. On the central lower petal is a narrow blotch, and on the adjoining laterals broad, elongate blotches of dull maroon-crimson. At the base of the blotches, near the centre of the flower, the color heightens to a rich crimson over a very small area. This rich color is an important fact in the result obtained in the colors of the hybrids, where the whole blotch is commonly a rich crimson. On the margin of the blotches is a lip-like splash of golden yellow (not shown in the figure). The color of the rest of the flower is a pale greenish-yellow. The plant grows to the height of about four feet, with foliage narrower than in *Gandavensis* varieties. The flower-spike grows in a graceful subarcuate fashion, quite distinct from that characteristic of *Gandavensis* varieties or of any species with which I am acquainted. The flowers are arranged rather far apart on the stem; they all face in one direction, and in view of the arcuateness of the flower-stalk, and pendant, bell-shape of the flowers, their interior is not easily seen. The corms of *G. purpureo-auratus* are not very large. They bear bulb-lets at the base, and, in addition, small corms at the tips of the characteristic running root-stocks, one of which is shown in the figure. The species is distinct, and different individuals vary little. The only variation noted was a specimen which had a richer yellow than common in the lip bordering the maroon blotches.

The *Gandavensis* varieties used as the staminate parents were a choice lot of named varieties and seedlings.

The quality of the *Purpureo-auratus* hybrid seedlings was of a high order. Of the 175 which bloomed, ten per cent. were plants worthy of a place with the best

named varieties. Thirty-seven per cent. were well worthy of general cultivation. Fifty-three per cent. were of medium quality, indifferent or poor. In estimating quality, color was considered of first importance, and, after it, form and arrangement.

All the flowers, without exception, were colored—white,



Fig. 96.—*Gladiolus purpureo-auratus*.—See page 88.

pink, red, crimson, maroon, etc.—thus showing the *Gandavensis* blood. In many the color was of a peculiar magenta-pink, quite similar to that often seen in *Magnolias*. This color existed in none of the *Gandavensis* parents and was distinct from any that I have seen in *Gandavensis* varieties. Twenty-six per cent. of the hybrids were marked on the lower segments by the characteristic shape of the blotch in *G. purpureo-auratus*; but, instead of being dull maroon-crimson, in most cases it was rich crimson, the color found at the base of the blotches in the species parent. This is an interesting and striking fact. Only eighteen per cent. of the hybrids had the characteristic *Gandavensis* stripe on the lower segments, and fifty-three per cent. had markings which in shape were a combination in varying proportions of the linear stripe of the *Gandavensis* and the blotch-like stripe of *Purpureo-auratus* flowers. The yellow splash at the margins of the maroon blotches in *G. purpureo-auratus* is largely inherited by the hybrids, but is often wanting. It was noted in nearly half of the seedlings. Not infrequently the form of the yellow splash is retained, but the color is replaced by white. The arrangement of the segments in most of the flowers was that figured in *Balone* like the species parent; but exceptions were frequent in which the arrangement *A*, found so predominantly in the *Gandavensis* varieties, also existed, but always in a few flowers only of a spike. The form in eighty per cent. of the flowers was sub-open or flaring, being close to the form which would be made by modeling a pattern half way between the two parents in shape. Some were widely flaring, remotely resembling a full blown *Magnolia* in shape. A few flowers (eight per cent.) were deep bell-shaped, like the *Purpureo-auratus* parent. A few others (nine per cent.) were close to the *Gandavensis* parent in shape. The size of the foliage and habit of the plants was half-way between the two parents in ninety per cent. of the hybrids. A few (ten per cent.) tended toward the greater size and rigidity of the *Gandavensis* parents. The corms bear small corms at the tips of the stoloniferous underground side-stems, thus following the character of the species parent. The percentage in which this character occurred was not ascertained, but it was generally present.

Out of 175 hybrids flowered, only three closely resembled the *Gandavensis* parents, two were close to *G. purpureo-auratus*, but they showed the foreign blood by being shot with red. Mr. Endicott, in a recent paper,* noted that he had only had two plants showing pure blood from many hundred seedlings raised from *G. purpureo-auratus*. This statement, with my own observations, leads to conclusions of great interest and importance. It proves the complete union of the parents in the hybrid offspring, there being very rarely or never individuals which copy either parent to the complete exclusion of the other. It proves, also, the extreme potency of foreign pollen on *G. purpureo-auratus*. This would not be expected, as the pollen of its own species would be supposed, on all common principles of fertilization, to be prepotent.

In the hybrids, the shade of color, the crimson central blotches and the flaring form of the flowers may be considered the new characters developed by the mixed blood. They are the characters due to the cross, of which traces only can be found in either parent. The hybrids, in a most remarkable degree, were, roughly speaking, half way between the two parents in form, coloration, marking, habit, etc.

Mr. Charles Putnam, of Salem, raises many *Purpureo-auratus* hybrids. He uses for the pistillate parent the variety known as *Lemoinei*, which is itself a hybrid between *G. purpureo-auratus* and *G. Gandavensis*. His staminate parents are *Gandavensis* varieties. The seedlings which he raises are largely very close to or nearly identical with *Gandavensis* varieties, which is further proof of the complete union of parents in the offspring, as his seedlings are three-fourths of *Gandavensis* blood and only one-fourth *Purpureo-auratus*, and therefore would be expected to lean toward the *Gandavensis* parent.

Mr. C. Sander has originated a hybrid between *G. dracocephalus* and *G. Gandavensis*, which promises to produce a line of hybrids of much importance.

G. dracocephalus is a tall, strong-growing species with hood-shaped, yellowish green flowers, netted with very small linear red dots. The only approach to a stripe in the basal segments is the omission of the red, leaving a pure yellowish green line. The species produces very large bulbs and an abundance of bulblets. With high culture I have grown this species and its hybrids to the height of six feet. A few of the hybrids were given me, and in 1885 seed was saved from which during the past summer ninety-six seedlings bloomed.

The flowers were naturally fertilized, and, judging from the results, probably largely by *Gandavensis* pollen. The type species was fertilized with *Gandavensis* pollen, and perfect seeds matured, but as unfortunately they were planted with seeds from the hybrids, no notes can be given on them separately. None of the hybrids approximate to the *Dracocephalus* type, but many come close to the *Gandavensis*, indicating, as was probably the case, that the blood was three-fourths *Gandavensis*. The great value of the hybrid is the strength, size and floriferousness of the plants and the unique form and marking of the flowers, due to a combination of the characters of both parents.* One of the most important features of these hybrids is that a large percentage bear flowers entirely free from stripes in the lower segments. This is a character due to the *Dracocephalus* blood, and will be highly appreciated by *Gladiolus*-growers, because of the possibility it offers of obtaining flowers of whole colors. The characteristic carmine stripes of *Gandavensis* varieties make often, and it might be said commonly, an inharmonious contrast with the ground color of the flower. Several crimson, pink and red *Gladioli* of this cross of various shades, and of great beauty, bloomed, and were distinguished by the fact that the colors were pure and the stripe wholly absent. This is suggestive, as other species having no stripes or blotches, and desirable markings would doubtless tend to give to hybrid offspring their special features, as is so clearly seen in hybrids of *G. dracocephalus* and *G. purpureo-auratus* when crossed with *Gandavensis* pollen.

One seedling of much interest was produced. The pistillate parent was *G. purpureo-auratus*, the staminate a *Dracocephalus* and *Gandavensis* hybrid. The result was a flower combining the characters of all three parents in a marked degree. The form was a combination of that characteristic of the *Purpureo-auratus* and *Gandavensis* parents, with sharp, pointed petals; color, dull magenta-red, bearing the characteristic *Purpureo-auratus* and *Gandavensis* blotch in the three lower petals. On the margin of the blotches, in the middle of the two lateral petals, was a blotch of distinct mottled yellowish green. In the centre of these blotches was a line of clear yellowish green. This color and the mottling were the only *Dracocephalus* characters noted, but they were so distinct and are so characteristic of the species that no doubt can be entertained of their origin. Four other *Gladioli* from seed of *G. purpureo-auratus* were noted, which, in color and peculiar hood-like form, showed the blood of the triple parentage.

The complete combination of parents in plant-hybrids is shown in a marked degree in the fine hybrids sent out by V. Lemoine, of Nancy, under the name of *Montbretia crocosmiaeflora*. I have grown five of his hybrids, and they are all directly intermediate between the parents, which are *Montbretia Pottsii* and *Crocsmia (Tritonia) aurea*. The combination is seen in the color, size, form and habit of the inflorescence. Some swing toward one parent more, some toward the other, and there is a brilliancy of color in several of the hybrids far exceeding that of either parent.

The hybrids of *Gladiolus purpureo-auratus* and *G. Gandavensis* and of *G. dracocephalus* and *G. Gandavensis* are entirely fertile, and the seed grows easily. The *Montbretia* hybrids, above noted, also seed freely, so that there seems here to be none of that whole or partial sterility attributed to true species-hybrids in plants and animals.

The pollen of *G. purpureo-auratus* is much less active on *Gandavensis* varieties than the reverse cross, and attempts to make this cross were attended with little success. The same is true of crosses tried with *dracocephalus* pollen. In a lot of about 250 *Gandavensis* seedlings, bloomed for the first time last summer, only three or four showed signs of *Purpureo-auratus* blood, although the flowers had quite as good a chance to be naturally fertilized by *Purpureo-auratus* pollen as did that species with *Gandavensis* pollen. Insects must have passed freely from one species to the other in order so effectually to cross-fertilize the *Purpureo-auratus* flowers. No *Gandavensis* seedlings showed traces of *Dracocephalus* blood.

To sum up the deductions. The species *G. purpureo-auratus* is very readily fertilized by *Gandavensis* pollen. The offspring of *G. purpureo-auratus* and *G. dracocephalus* crossed with *G. Gandavensis* are vigorous and readily set fertile seed. The hybrids are a direct combination of the two parents in color, form, habit and root, but with some new characters developed by the mixed blood.

It is sometimes thought, with garden-plants long in cultivation, from which seedlings have been raised in abundance and for a considerable time, that we have reached the end of the striking variations possible. Such a statement has been

* "The Species of *Gladiolus*," by W. E. Endicott; GARDEN AND FOREST, No. 31, page 363.

* A few of these hybrids were shown at the Massachusetts Horticultural Society last August, and were noticed in GARDEN AND FOREST, No. 28, p. 336.

made in regard to Gladioli. As a general conclusion this may be said to be emphatically incorrect. The limitations of hybridization, as regards what species may be crossed by what other species or even genera, are entirely unknown, and this is now the most inviting field for horticultural experiment. A keen pleasure is assured to the individual who shall strive to break the bonds of varietal variation, and by infusing new blood gain valuable and novel plants for the cultivator, and a furtherance of our knowledge of the conditions and effects of hybridization.

Boston.

Robert T. Jackson.

Window Plants.—This is the season when complaint is most often made that window plants look sickly and that their leaves turn yellow and fall. Insects often cause the trouble, and in some cases it is because leaves are not kept clean. But more commonly too much water is given. When the pots are insufficiently drained the water remains stagnant about the roots. Roots need air, and when this is excluded no food is absorbed,

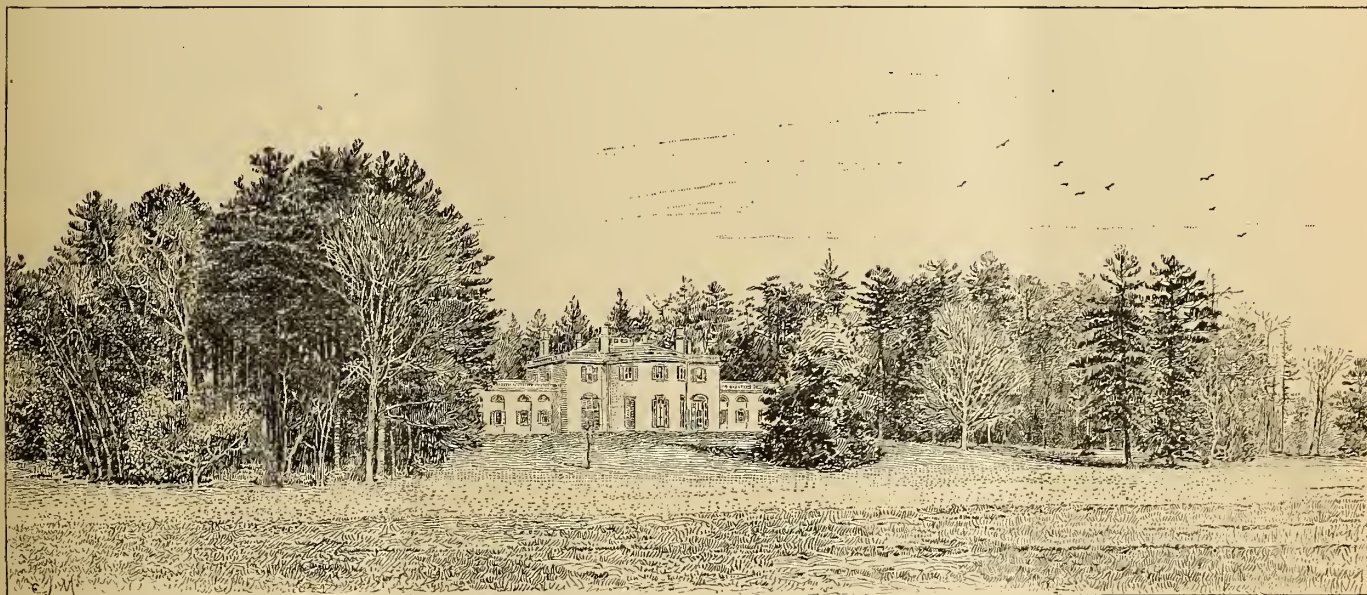
dividing a stemless crown much fewer plants could have been obtained. But we still had the crown to divide, in addition to the long trunks, so that one plant made many rooted sets.

This method gives four or five times as many young plants as the ordinary one, and why can it not be applied as well to such herbaceous plants as Delphiniums, Hollyhocks, Aconites and Clematis? Of course it would be advisable to cover them in gradually as the stalk grew up, and not all at once, a method which might kill some plants.

Somerville, Mass.

F. L. Temple.

Orchid Notes.—*Calogyne cristata*. This is one of the best known of the tropical Orchids, and is a general favorite everywhere. It can be successfully grown and flowered in almost any kind of green-house, or in any soil, provided it be well drained. We grow large numbers of these Orchids, and they are now making a wonderful display of bloom. The flowers will last a long time when cut, add gracefulness to the heavier kinds when used in a vase, and relieve the rich colors



The Gore Place, Waltham.—See page 86.

the reserve material in leaf and stem is soon exhausted, and the plant is starved. Window-plants should have no water when the soil is damp. A plant is in a healthy condition when it is allowed to dry out until water is needed, and this demand should be made twice a week or oftener, according to the size of the pot and of the plant, the rapidity of transpiration and of evaporation from the soil. An aerated soil is essential to success with window plants, and it is just as necessary for the health of shrubs and trees. Last June a dam built across a little brook which runs through my meadow raised the water level of a pond, half a dozen square rods in extent, about two feet. A thrifty Tulip tree stood ten feet from the bank, but in a few days every leaf turned yellow and fell. So many of its feeding roots were shut out from air by the water that saturated the soil about them that the tree died of starvation.

Trenton, N. J.

S.

Propagating Herbaceous Pæonias.—Four years ago some frames in the nursery were built where there had been a bed of herbaceous Pæonias, and after the frames had been filled with rich and light soil some weak shoots of Pæonias were seen pushing up from roots left in the soil. These plants were left for three years, when they were dug up and found to be set eighteen inches deep.

They had pushed a stalk through all this covering, and the stem, which in plants set near the surface would have been an annual one and would have died back to the crown of roots in autumn, had become a perennial trunk, full of axillary buds, and having strong roots directly under and feeding these buds, while the crown of roots at the bottom was also strong, but not so strong as when planted near the surface.

The benefit to the propagator from this remarkable change of habit of the plant is that a long stem full of buds and roots is produced which has only to be cut into short sections with the shears to furnish a large number of well-rooted plants. In

of the more showy. When grown in baskets, the plants are useful for hanging in the dwelling-house. It is very little trouble to grow this plant, which needs to be repotted only once in three or four years, though it is benefited by an annual top-dressing of chopped leaves and moss. We grow them in a cool house, where the sash is kept down from June till September, and they are treated to a good drenching of water once or twice a day, until the bulbs are matured. The plants make fine stout bulbs, thoroughly ripened, and sure to give good spikes of bloom. The pure white variety, Alba, is at present somewhat rare, but, happily, it grows as freely as the type, and bids fair to become very plentiful in a few years. Another good variety, named Citrina, has long, narrow bulbs, more slender and bronzy green foliage. This flowers fully a month later than the species, and on that account it is a valuable kind, as it prolongs the flowering season till early spring. If possible it is more floriferous than the type; one plant with us has 112 spikes, which will yield some 600 flowers.

Dendrobium Endocharis is a charming little plant, the result of a cross between *D. Japonicum* and *D. aureum* (*heterocarpum*). The flowers, freely produced from the sides of the bulbs in twos or threes, are milk white, with a purplish striated blotch at the base of the lip. It has a delightful primrose fragrance, and grows freely in a pot or basket filled with a mixture of fibrous peat and moss. It requires a cool house, and should be kept moderately dry after growth is matured.

Kenwood, N. Y.

F. Goldring.

Doronicums as Pot Plants.—Although the proper place for these showy Compositæ is the hardy flower-garden, they are also suitable for use as winter-flowering plants. If lifted with care in autumn, potted, and placed in a cool house, in the earlier months of spring an abundance of bright yellow flowers will be the result. Besides their beauty, the flowers have the additional value of lasting well when cut. With the above treatment we now have *Doronicum Caucasianum* in full bloom.

This species does not exceed twelve inches in height, and does well in five-inch pots, making it a useful pot plant. *D. plantagineum excelsum* is also showing flower-buds. This is much taller in habit, and under liberal treatment it grows four or five feet high, with flowers four inches across. *D. Austriacum* and *D. Clusii* are equally desirable. After flowering in pots the plants may be placed in the border for the summer, and a second, and even third, crop of flowers will be produced if the soil is rich and abundant water is supplied.

Passaic, N. J.

E. Orpet.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

VIII.—THE CHANGES WHICH ORGANIC MATTER UNDERGOES IN THE PLANT.

THE preceding papers have outlined the mechanism by which organic matter is formed by plants. It has been shown that the green parts of plants possess the extraordinary power of constructing out of inorganic materials, taken from the air and soil, matter which is essentially like the very substance, of which both the framework and the living parts are made. It is now necessary to see what are the changes by which the simplest organic matter is transformed into various complex substances found in the plant.

For this examination a very brief review is essential. The efficient agent in the change by which inorganic materials are converted into organic matter is, as we have seen, the chlorophyll-granule (or its green pigment), which imparts to our ordinary plants their characteristic color. In some striking instances, this green color is hidden by other coloring matters which occur either in the shape of granules or as dissolved pigments; but wherever a leaf accomplishes the work of changing inorganic into organic matter, it does so through the agency of its chlorophyll, or some equivalent of chlorophyll. Moreover, in these granules, or in the cells which contain them, is effected also the equally important, but even more mysterious, change by which nitrogenous compounds are brought into combination with the simpler organic matter, and the whole substance endowed with life. The absolute necessity of sunlight, or light of substantially the same quality as sunlight from some indirect source, in the first step in the production of organic matter, has been commented on, but attention must now be called to the fact that many, if not indeed all, of the subsequent changes and combinations, can go on without light.

The radiant energy which falls upon the plant as sunlight is received by the cells which contain chlorophyll, and in the presence of the requisite inorganic materials upon which it acts, is transformed into another form of energy, which is retained. Chemically, this transformation in the plant always accompanies reduction of highly oxidized compounds, in which process a portion of the oxygen is released. The newly transformed energy is now to be turned to other forms (or, as one may say, different kinds of work) within the plant. Putting the same idea into the language of chemistry, we say that the newly constructed organic matter (formed by reduction from highly oxidized materials, carbon-dioxide and water) is now to be modified in many ways. But the principal ways are the following: (1) the construction of new living matter, (2) the building up of new parts, including the repair of waste, and (3) the performance of such kinds of work as lifting, and transfers of all sorts. And when, after watching the expenditure of the treasured energy, or the consumption of the stored-up organic matters, we look at the ultimate products resulting therefrom, there meet us only the inorganic materials with which we started. In other words, we have followed the course of sunlight in its marvelous activities, and have come back to the point of departure. But between the first point, when we have before us sunlight acting on the green plant containing chlorophyll and employing carbon-dioxide and water in the presence of a small amount of dissolved earthy matter, as its raw materials, to the last point, at which, after all the products have been utilized and all the work done, we have only the raw materials back again, the distance is very great. Between these points the changes may be simply innumerable. Their multitude and complexity are best realized when we reflect upon the diversified products of the vegetable kingdom which man turns to account for his needs. All the timbers for shelter, the fibres for clothing, the starches, sugars, oils, nitrogenous matters and condiments for food, the perfumes, the dye-stuffs, tanning materials, gums, resins, and drugs in general, form but a small proportion, since these are only the very few of which man has yet discovered the uses and employed for his wants. Their multiplicity is so great that only a few characteristic changes of a general nature can be selected for pres-

ent observation. For this purpose, in our hasty glance at these changes, or what is called metastasis, or metabolism, we must note that there is a building up, and there is likewise a pulling down—a treasuring and an expenditure of energy; and one of these is discernible in all the greater changes which go on within the plant. But there are a few changes which appear to be on a single plane, that is, there is no marked modification in the chemical composition of the materials, but simply a re-arrangement of their constituent atoms. In the plant, constructive metabolism, in its widest sense, includes the storing up of sunlight and the subsequent utilization of the formed materials in the making of new parts; on the other hand, destructive metabolism includes all those retrograde changes in material by which the stored energy does any sort of work.

For convenience it is well to look first at the organic products which contain no nitrogen. These may be roughly grouped into three classes, (1) the carbo-hydrates, (2) the fats, and (3) the vegetable acids.

1. The carbo-hydrates are of two general sorts, (1) the starch group and (2) the sugars. Starch is the first visible product of assimilation proper; that is, it is the first substance which we can detect as a solid in the assimilating cells, but in all probability it is not first body formed; it is likely that some form of sugar is the primary substance produced in the work of a green leaf. Starch has the same elementary composition as cellulose or cell-wall material, but its physical characters and chemical reactions are different from those of cellulose. Under certain circumstances cellulose may be employed as food by the seedling; but such cases occur only in instances like that of the hard seeds of dates, etc., in which there is also a further supply of more easily utilizable food. Cellulose is used for building, not as food. Starch, on the other hand, is one of the principal forms in which food is treasured by plants. It is accumulated in underground parts, as roots and tubers, and above ground in leaves, stems and seeds, taking on characteristic shapes and markings. In many instances these distinctive characters enable one, by the use of the microscope, to detect cases in which starch from one source has been substituted by accident or design for another sort. One of the most interesting discoveries of modern times is the fact that these grains of starch accumulate through the intervention of colorless granules of living matter, which, as shown in the first paper of this series, are substantially the same in origin as the chlorophyll, or green granules, by which organic matter is constructed under the influence of sunlight.

There are many substances which are identical in atomic composition with cellulose and starch, namely, *inulin*, or the substance in which much of the food is stored in certain plants of the Sunflower Family, and *dextrin*, which occurs in much sap at the time when rapid building of new parts is going on. To the same group belong certain gums—for instance, Gum Arabic. These which we have mentioned are only a very few of the bodies allied to cellulose which are found in plants, but this brief reference to them may indicate the importance of the fact that out of precisely the same proportions of three elements, viz., carbon, oxygen and hydrogen, it is possible to derive substances so diverse in their appearance and physical properties. By comparatively slight changes in the chemical composition these are transformed into other substances, which will be discussed in the next paper.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

Forestry in New England.

THE extracts which follow are from an address delivered before the Massachusetts Horticultural Society, at Boston, on February 9th, by Mr. J. B. Harrison, Secretary of the American Forestry Congress:

New England has in her own territory a conspicuous illustration of the value of an extensive tract of mountain forest, and of the evils which result from the destruction of the woods. The White Mountain region of New Hampshire was, in its natural condition, remarkable for the amount of beautiful scenery in a limited area—that is, for the number, interest and variety of its separate, complete landscapes. Each picture or scene was large enough to make the impression of individual and satisfying beauty, and there was little waste space between them. There was merely for each one a natural and charming frame.

I have time to-day to mention but one of the functions of this mountain forest—that of a place for summer rest and recreation; for sylvan peace and shade, coolness, beauty and refreshing change for men and women weary of the heat

and dust and noise and wearing care of life at home and in the towns. The preservation of these mountain woods for this use was of vital importance to the people of the nation in general, and the inhabitants of New Hampshire possessed in them a source of perpetual revenues. As population, wealth, leisure and the disposition to seek change of scene in summer increase in our country, these mountains and valleys have been thronged by an ever-changing multitude of guests, glad to have the opportunity of paying liberally for the comforts and luxuries of life while sojourning at the great mountain hotels. The region was worth more to the state than the richest gold mines would have made it. The one condition of a permanent and most liberal income was the protection and preservation of the forests. They are, in very great proportion, already ruined. They have been cut and burned away in most unintelligent disregard of their value. In consequence, the charm of the region is in great measure destroyed. The value of the hotel property will be seriously impaired, and many of the places which were once the loveliest are now desolate and hideous. The hills themselves are crumbling and dissolving, and a blight and curse are settling upon important parts of this sanctuary of beauty and peace. It might have been preserved uninjured forever; and yet it might have yielded another great revenue from the timber which it produces, most of which could have been cut, at proper times, without impairing the value of the forests in any way. All this would have been practicable, if we had been sufficiently civilized.

I have not time to speak of the loss by the destruction of this great source of timber supply, nor of the injury to the streams which have their sources here, the disastrous floods and the depleted summer flow, or the effect on the industries and subsistence of thousands of men and women in the great mill-towns between these mountains and the sea. The injury to New Hampshire agriculture is to be recognized, though it is less important, because most of the state is unsuited to cultivation, and should have been left permanently under forest conditions. Some portions of the hill-country of western Massachusetts, have, in a considerable degree, the same character as the mountain region of New Hampshire, and should be taken care of accordingly.

Men who own small tracts of woodland, especially successful lumbermen of towns and cities who have recently acquired them, are apt to thin and prune and drain and clear away the undergrowth, and, in short, to change as completely as possible all the conditions under which the trees had lived hitherto, and then wonder that the trees do not thrive. One thing necessary to most trees in this part of the country is shade. In New Hampshire, as in many other regions, the southern side of ravines and the north side of hills grow up to trees whenever they are protected from cattle and fire. But where the ground slopes to the south it remains bare. The trees will not grow, the young plants being scorched to death by the sun, and this is true of some of the level country where the land has been exhausted by tillage. Of course the forest would skirmish around and would cover such places in time, conquering them slowly from the edges, but such object-lessons are instructive, if we have eyes to see them. The chief things required for the successful management of such tracts of woodland is to protect them from fire and from pasturage, and then let them alone, mostly. The trees will do best under the conditions which produced them and have always nourished them hitherto.

The destruction of the timber of a forest by fire is a trivial loss compared with the permanent injury to the soil itself, which always results from forest fires. The burned land produces only inferior trees, and repeated burnings destroy the soil itself. We already have deserts of our own in this country created by this process, where the soil was before remarkably fertile. But, taking our whole country together, pasturage is a worse enemy to the forests than even fire, because it is everywhere. It operates more slowly, but it brings a ruin just as certain and complete, and where forest land is pastured there can be no permanent forest. If it is necessary or desirable to grow timber or trees in Massachusetts and New England, it is indispensable that some lands should be set apart for tree culture, and protected entirely from pasturage. The pasturage of woodlands is a feature of existing agricultural methods, in which a change might well begin, which should be extended to the whole matter of pasturage, and its relation to the fertility of the soil and to the profit and loss of farming. There can be no considerable advance or improvement, except by giving up some existing practices and methods, and adopting better ones in their stead. A little synthetic observation would convince thoughtful men that pasturage has too

large a place in our present methods of agriculture, and that it is a wasteful and costly process, especially in its effect on the fertility of the soil. I think it would be an important step in a real advance in civilization if in Massachusetts and New England the pasturage of domestic animals were to a great extent gradually, and not too gradually, relinquished. This belief is sustained by more reasons than can be presented to-day. To feed cattle in-doors would enable farmers to save and utilize all the manure. In pastures it is largely wasted, and is often even an injury to the grass upon which it is dropped.

Forestry and arboriculture are chiefly economical subjects. Where tillage is more profitable than the production of timber or trees, the land should be cultivated. Where wood-products are the most profitable crop, there forest conditions should, of course, be maintained. But considerable intelligence, instruction, observation and forethought may be required to determine what lands are really available for profitable agriculture. A great deal of land is filled and pastured in Massachusetts and New England which should never have been cleared or cultivated. When farms are abandoned it means that they should never have been farms. The land would have been more valuable under permanent forest conditions.

Our agricultural methods are steadily impairing the fertility and productiveness of a large proportion of the soil of our country. It is tilled and pastured to the last degree of exhaustion, and about everything that people can think of is done to hasten the process of impoverishment. A little while ago I saw the great wheat country of the Red River of the North all ablaze with the burning straw over hundreds of square miles.

We are not worth so much as we think we are. Much of our agriculture impairs and exhausts the capital invested in land. Methods that exhaust the soil of a country cannot rightly be regarded as civilized methods. The *wants* of our people are increasing. More and more is required to make life comfortable, interesting and satisfactory to the inhabitants of this country, while we deal most ignorantly and carelessly with the soil, which is the great store-house from which nearly all our wealth and means of subsistence must come.

I think that in Massachusetts and New England forestry and arboriculture should be considered largely in their relations to agriculture and to the permanent fertility and productiveness of the soil. It is important to observe that, while no method or system can reasonably be recommended which would be permanently unprofitable, yet much experiment is often necessary here in tree-planting and culture, as in other fields, and we cannot expect that each particular step or effort will in itself be profitable, or will yield a satisfactory return for the capital invested. No considerable advance is easily or quickly made, and changes are necessarily attended with some inconvenience.

There is no way of learning all about these subjects at once. People who read and study good papers and books on forestry are likely to know more about forestry and arboriculture than anybody else.

But the great need is, not that the people of Massachusetts and New England should accept any particular opinions or judgments regarding these subjects, but that they should examine these subjects with a new degree of attention and interest, especially in their economic aspects and relations. We do not need a sentimental fashion of talk about trees and tree-culture, but we do need, as a means to a most important end, to have the people of Massachusetts and New England think about trees, talk about them, read about them, write about them, until there is a tree-feeling in the air, and such a reverberation of sensible and practical teaching on the subject as will compel general attention.

Correspondence.

Shrubs for Shady Places.

To the Editor of GARDEN AND FOREST:

Sir.—Please give a list of shrubs which will flourish under the shade of deciduous trees.

Boston, January, 1889.

E. A.

[The number of shrubs which can be grown under the shade of trees depends largely upon the density of the shade. If the trees under which it is desired to carpet the ground are growing close together, or if they are trees which produce a dense shade, it will be found difficult to establish a satisfactory growth of other plants under them. The Periwinkle is the best plant to use under such circumstances. It is an evergreen, very hardy, and, when once established, it will flourish in deep shade. The difficulty in

establishing this or any other plant in ground filled with the roots of old trees is found in the dryness of the soil, from which the tree-roots absorb all the moisture, rather than in the absence of light. Periwinkles or other shrubs used in this way will require, therefore, careful watering until they are fully established. When the shade is not dense almost any shrub can be successfully used under or among trees. The common Privet, the Barberry, Wild Roses, the native Cornels, Viburnums and Blueberries can all be used for this purpose. Rhododendrons, although they will not bloom in the shade, are good under-shrubs, and so is the Mahonia in those parts of the country where it is hardy. The growth under the dense forests of the southern Alleghanies, especially in the neighborhood of the streams, is often carpeted with a beautiful evergreen *Andromeda* (*A. Catesbaei*), which is one of the best of the shade-supporting plants. It is hardy in New England with a little careful protection. There could be found probably no better dwarf under-shrub for the Middle States than the European *Hypericum calycinum*, the so-called Rose of Sharon—a low, dwarf plant, which produces large yellow flowers during the summer, and which is very generally planted in England under trees, and always delights Americans who visit English gardens. This plant is not, unfortunately, very hardy in northern and eastern New England.

It is desirable, when possible, to plant the under-growth at the same time the trees, which are to shade it, are planted. If this plan is adopted the shrubs get a secure hold upon the ground, and become established before the trees are large enough to shade the ground, or to draw from it all its moisture. If this plan is adopted there is hardly a shrub which cannot be used in this way, although it must be remembered that there are few plants which can produce flowers abundantly without sunlight.—Ed.]

Mutilating Street Trees.

To the Editor of GARDEN AND FOREST :

Sir.—The people of St. Louis have for some years been in the habit of pruning and pollarding their trees, chiefly Ailanthus and Sycamore, but Maples and Elms in many instances. This treatment is usually given to young trees as soon as they have reached the height of the second-story windows, but for the past three or four years a severer method has been practiced, and trees that have struggled successfully with the vicissitudes of a city life until they have attained considerable size, have been topped off down to branches at least four inches in diameter. One row of some twenty or more Sycamores has been mangled to this extent by the neighborhood-carpenter. Will you kindly state what effect this is likely to have on the vitality of the trees? F. C. P.

St. Louis, Mo.

[The appearance of American cities and towns is seriously injured by the way in which ignorant and irresponsible men are allowed, in so many cases, to mutilate shade trees. Sometimes the cutting is done to satisfy the unreasonable demands of the various corporations operating wires; sometimes it is to gratify the whims of individual property owners. We can never hope that the streets of our cities and towns will be ornamented with handsome trees or properly protected from the summer sun, as long as the governing bodies delegate their authority to cut or prune trees to irresponsible agents of private corporations, and allow individuals to hack down every tree standing in a public thoroughfare which may be disagreeable to them. In every city and town there should be a responsible officer, familiar with trees and their requirements, whose special duty should be the planting and care of the street trees, and this officer should superintend the planting of all such trees, and their care and pruning, upon a system which should secure the greatest benefit to the greatest number. Until some plan like this is adopted, in accordance with popular interest and popular demand, there is little use in giving advice in cases like that in St. Louis, as described by our correspondent. Cutting off large branches from a healthy tree reduces its vitality, and, of course, should never be

permitted. Severe pruning may be resorted to when a tree is in a feeble or perishing condition, when such an operation may stimulate vigorous growth. A wound made by cutting off a branch, unless it is immediately protected by a coating of coal-tar or of paint, is liable to be attacked with dry rot and other fungus-growth, and from the affected surface, the decay will gradually penetrate the whole tree and finally destroy it. It is merely a question of time when trees subjected to the treatment described by our correspondent must perish. There can, of course, be but one opinion as to the appearance of a street in which the trees are mutilated by the ordinary city laborer.—Ed.]

To the Editor of GARDEN AND FOREST :

Sir.—In your issue of May 3d, 1888, you kindly inserted an account of cases of inflammation of the skin of the hands and face of a florist and some of his assistants, which was attributed to the irritating action of some plant. *Primula obconica*, the only one handled by them for the first time that season, was held in especial suspicion as the possible offender. The cutaneous disturbance therein described, *dermatitis venenata*, subsided in a short time, and the skin of the three affected persons has remained in a healthy condition until recently. Within the last two or three weeks, however, they have all manifested a recurrence of the same symptoms, an eczematous inflammation of the hands and face, and in about the same degree as last year. They now feel assured that the trouble is caused by *Primula obconica*, for the condition did not develop until a few days after this plant was first offered for sale in the shop, where it was freely handled by them. The proprietor informs me that his hands and face became affected immediately after making it up into dinner-table decorations. He states also that some of those engaged in cultivating it have complained to him of a similar inflammation of the skin, which it has produced upon them. His other assistants in the shop, who were not thus affected last season, remain exempt this year.

It is desirable to know if other cultivators or florists have had a similar experience with this newly-introduced plant, or if other species of this large genus have exhibited irritating properties.

Harvard Medical School, Boston.

James C. White.

Editor of GARDEN AND FOREST :

Sir.—Will you kindly inform me whether *Cypripedium insigne* is best propagated by seed or by division of the roots, and when the division should be made?

Plainfield, N. J.

C. D. W.

[Raising Orchids from seed is a work requiring great skill and patience. The seeds are very fine, resembling chaffy dust. *Cypripedium insigne* is best propagated by dividing the crowns after it has done flowering, and care should be taken that each portion of the plant has some good roots attached. Each division should have two or three growths.—Ed.]

Recent Publications.

Contributions to American Botany, No. xvi., Sereno Watson. Proceedings of the American Academy of Arts and Sciences, vol. xxiv., and now issued separately.

Mr. Watson's sixteenth contribution to North American Botany is mainly devoted to the enumeration of a collection of plants made by Dr. Edward Palmer, in 1887, in the neighborhood of Guaymas, in Mexico, at Muleje and Los Angeles Bay, in Lower California, and on the island of San Pedro Martin, with descriptions of new species and critical notes. In the short introduction to this paper Mr. Watson calls attention to the fact that "the peninsula of Lower California and that portion of the Mexican mainland which borders the intervening gulf, though reputed a sterile land, have always, whenever they have been explored, yielded a rich harvest of novelties to the botanical collector. Much, therefore, was expected from so keen and careful a collector as Dr. Palmer, when he undertook to spend a season at Guaymas, and from that point to explore such other places as might be accessible to him. Though the season of 1887 proved very unfavorable on account of its dryness, the result has, nevertheless, been very satisfactory. Of the 415 native species collected, eighty-nine species—or more than one-fifth—are wholly new, and many others are of great interest in various respects.

"The larger part of the collection was made about Guaymas

itself, which town lies on the eastern side of the Gulf of California, in the State of Sonora, in latitude 28° N., and 250 miles south of the United States boundary. It is hemmed in closely by very rocky hills and low mountains (of 1,200 to 1,500 feet altitude), intersected by narrow valleys. The artificially watered gardens, with their irrigating ditches and brush fences, protecting and favoring the growth of numerous native plants, the rocky islands in the harbor, and the valleys and mountains around, were all alike searched."

"Muleje, upon the western side of the Gulf, ninety miles from Guaymas, is described as in a dry, barren and mountainous region, where, except in the very short, rainy season, the only green vegetation to be seen is along the banks of a small creek. This place was visited early in June, and again late in December. Of the forty-nine species collected there, twenty-four occurred elsewhere, mostly at Guaymas. Los Angeles Bay, also on the peninsula, about 200 miles north-west of Guaymas, was visited at an unusually favorable time, after a rain which was the first that had fallen in twenty-two months, and when vegetation was in full bloom. The surrounding country is very mountainous, some of the ridges having an altitude of 2,000 to 3,000 feet. About a month was spent here (from November 22d to December 20th), and 112 species were collected, of which twenty-three had been found previously by Dr. Palmer. The remaining station was the island of San Pedro Martin, lying about eighty miles north-west from Guaymas, of which a view has already appeared in this journal.

"The characteristics of the flora of the region bordering the Gulf of California, so far as shown by this collection, are for the most part those common to the flora of the whole arid region of the interior, from south-eastern California, Arizona and New Mexico southward into Mexico, distinct in a great measure from that of California proper on the one side and that of the Gulf States on the other. Nearly or quite two-thirds of the species range northward beyond the Mexican boundary. In the mountains about Guaymas we find a considerable number that are identical with or allied to species that have recently been collected by Pringle and Palmer in the mountains of Chihuahua. We have here also probably the northern limit on the Pacific coast of the tropical or sub-tropical genera *Rhizophora*, *Hæmatoxylon*, *Portlandia*, *Citharexylum*, *Pedilanthus*, *Ficus*, etc. The proportion in which the several orders are represented in the collection is remarkable. Of the 415 species, one-fourth are equally divided between the *Gramineæ* (50) and the *Compositæ* (50). Another fourth includes only the four orders, *Leguminosæ* (44), *Euphorbiaceæ* (32), *Malvaceæ* (17), and *Solanaceæ* (15). These are followed by the *Nyctaginaceæ* (15), *Convolvulaceæ* (13), *Asclepiadaceæ* (10), and fifty-three other orders with still fewer species. The important orders, *Ranunculaceæ*, *Rosaceæ*, *Saxifragaceæ*, *Umbelifera*, *Ericaceæ*, *Cupulifera*, *Conifera* and *Orchidaceæ*, are wholly unrepresented. Excluding the *Cyperaceæ* and *Gramineæ*, there are only five endogenous species in the entire collection."

Mr. Watson proposes the new genera for plants collected by Dr. Palmer: *Malperia* in *Agerateæ*, for an erect annual near *Hafmeisteria*; *Pelucha* in *Pelucheniæ*, a shrubby plant related to *Pelucha*; and *Pattalia*, an *Asclepiad* of the *Metastelma* group. Among the new species are apparently several plants of very considerable interest. Among these are three species of *Figs*, one with edible fruit, and a new *Palm*, referred to the small genus *Washingtonia*, of which the type is the now well-known *Fan Palm* of southern California. A few of Dr. Palmer's new plants which seem to possess real horticultural value have already been drawn, and will be figured from time to time, as opportunity permits, in the pages of this journal.

Mr. Watson's paper ends with the description of a few new species of plants lately found in the United States, chiefly in California.

Periodical Literature.

The January issue of *Hooker's Icones Plantarum*, being Part I. of the nineteenth volume, is of more than usual interest to American botanists, containing, as it does, the portraits of a number of plants of the Bahama Islands, which in their flora are closely united with the southern extremity of Florida. The Bahama plants figured are *Phialanthus myrtilloides*, a representative of a Rubiaceous genus confined to the Island of Cuba, with the exception of the present species, which is found also in the Bahamas; *Mimosa Bahamensis*, one of the few plants endemic on the Bahamas, the fruit now first made known by Eggers' collecting; *Acacia acnifera*, another endemic Bahaman species, which, as Mr. Baker points out, is closely related to the now widely-distributed *A. Farnesiana*

of our Texano-Mexican region; *Acacia choriophylla*, a small tree, now only known from these islands; *Salmea petroboides*, a Helianthoid *Compositæ*, a Bahaman representative of a large West Indian and Mexican genus; *Buxus Bahamensis*, a Bahaman species, now first described, and related to the Jamaican *B. Vahlia* and the Cuban *B. retusa* and *B. gonoclada*; and *Pinus Bahamensis*, a tree forty feet high, and described by Baron Eggers as forming dense woods on the Island of New Providence. *P. Bahamensis* was first described by Griesbach from a cone preserved in the Kew Museum, which Dr. Engelmann suggested ("Revision of the genus *Pinus*," p. 25), should, perhaps, be referred to *Pinus Cubensis*, a view which the present figure abundantly sustains. Indeed, judging from this figure, the Bahama plant, with the exception of the somewhat stouter mucros on the scales of the cone, is exactly identical with specimens of *Pinus Cubensis* from the Florida Keys, in which the leaves are in threes, while on the trees on the mainland of the North American continent they are often in twos.

This part contains figures of a number of Indian species of *Liparis*, and a continuation of the new Chinese plants now in course of elaboration in the Kew Herbarium. There is an excellent figure also of the great Peruvian *Ranunculus* (*R. macropetalus*), which sometimes attains a height of four feet, with large, globose-campanulate flowers, which are believed to be red. This is the species which M. Raimonde says is given by the Indians to their children "*pour les faire parler plus promptement*."

In the February number of *Scribner's Magazine* Mr. Austin Dobson writes a charming gossip article on "Old Vauxhall Gardens," the famed resort of English fashion during the latter half of the eighteenth century. The pictures from old prints which accompany his words assist them in showing that, while Vauxhall was undoubtedly an admirably designed place of recreation, it had little of the character which we usually associated with the name of garden. Miss Burney called it "formal," and so, in the extremest sense, it was. The garden covered about ten acres, and was divided by a Grand Walk, at the end of which stood a statue of Aurora, afterwards replaced by a "grand Gothic obelisk." "Beyond the end of this walk was a *ha-ha*, which separated the gardens from the hay-fields then adjoining it. Parallel to the Grand Walk ran the South Walk, with its triumphal arches; next to this again was the covered alley known indifferently as the Druid's, or Dark Walk. . . . and last came a fourth walk open at the top. Other walks, the chief of which was the Cross Walk, traversed the garden from side to side, and in the quadrangle formed by the Grand Walk, the Cross Walk, the South Walk and the remaining side of the grounds was a space of about five acres. This, which lay to the right of the entrance, was known as the Grove." The Grove was furnished with an elaborate music-stand, a building called a "Turkish Tent," and upon occasion, with supper tables in the open air. Colonnaded arcades flanked many of the walks; pavilions and statues were everywhere scattered about, and at one end of the Cross Walk stretched a large picture representing ruins and running water. Many other details are given by Mr. Dobson, but these may suffice to show the general lines upon which this famous garden was formed. As a garden, we repeat, it is not very interesting to read about, but the many notable persons whose footsteps can be traced within its borders, and the many mentions made of it in last-century literature—all these collected and gaily annotated by the author, serve to provide a most entertaining chapter.

Recent Plant Portraits.

STREPTOCARPUS PARVIFOLIA, *Botanical Magazine*, January, t. 7036; a native of the Cape of Good Hope.

MACODES JAVANICA, *Botanical Magazine*, January, t. 7037; a scarlet-flowered, terrestrial Orchid, the beauty of which "resides in deep green, velvety leaves, the light-green, longitudinal nerves of which are united by groups of transverse, snow-white, irregular streaks, much like those of *Dichorisandra mosaica*, but more delicate."

SCUTELLARIA ALPINA, *Révue Horticole*, January 1st.

CAPPARIS SPINOSA, *Révue Horticole*, January 1st.

SOBRALIA ZANTHOLEUCA, *Gardeners' Chronicle*, January 5th.

JACIADENUS CARINATUS, *Gardeners' Chronicle*, January 12th; "this is a pretty stove annual of the Gentian order. . . . The flowers are produced in autumn, and last over a month without fading. The corolla tube is white, from two to three inches long, the color of the lobes being bright purple. The plants like a well drained soil and plenty of moisture at the root always."

Notes.

Flowers of the Hepatica, gathered in the woods near Boston, were displayed before the Massachusetts Horticultural Society on the 26th of January.

Monsieur Hémie de Vilmorin, one of the best known and best liked horticulturists in Europe, has been elected President of the Botanical Society of France.

From a note in a recent number of *Le Moniteur D'Horticulture* it appears that M. Bleu, a well-known Parisian Orchid-grower, has succeeded in obtaining a cross between *Odontoglossum Roezlii* and *O. vexillarium*. Two specimens, showing slight variations themselves, have now flowered, the plants being only four years and nine months from seed. They are intermediate in character between the two parents.

Cherokee Roses in small quantities are at last to be seen in at least one Boston florist's window. It is surprising that they are not grown more frequently, for there is scarcely a flower which is more lovely. From the florist's point of view, however, the plants take up too much space, as they must be planted out and well established before good crops of flowers can be had from them, while only one crop, lasting from four to six weeks, is produced annually.

The Annual Report of the School of Forestry connected with the Indian Forest Department, and situated at Dehra Dun, shows that seventy-five students were under instruction during the year 1887-88. Of these, fifty-six were supported by Government, nine were deputed by native states and ten were private students. The copies of the examination papers joined to the Report indicate the thoroughness of the scheme of instruction, and show that a high standard of education is aimed at for the future guardians of the Indian forests.

Monsieur Joly, of Paris, has recently published a pamphlet in which he describes a famous Black Hamburg Grape-vine which grows on the estate of the Marquis of Breadalbane, in England, and is believed to have been planted in 1832. Its stem, at one foot from the ground, measures two feet in circumference, while its branches cover an area of some 4,275 square feet, and during the year 1888 it yielded about 3,000 bunches of grapes. These facts denote a vine almost equal in size to the famous one at Hampton Court, planted in 1769, which is likewise of the Black Hamburg variety.

At the meeting of the Society of American Florists in this city last summer a resolution was adopted setting forth the advantage to the trade of flower-pots of uniform size and shape, and a copy of the resolution was sent to all the potteries in the United States. In response to this call the Whilldin Pottery Company has already placed the standard pot upon the market, and other manufacturers will, no doubt, follow the example. Besides the evident gain from uniformity, the rim at the bottom of these pots saves a great deal of the loss from breakage when they are set down smartly on the bench to settle the soil. The added band stiffens them at the top, and they can be packed more closely and securely.

At a late meeting of the Massachusetts Horticultural Society a resolution was adopted authorizing the President to appoint a committee of five to consider the subject of national and state forestry, the need of further legislation to protect the forests on our national domain, and the best means to promote a greater interest in arboriculture. Dr. Walcott named as the committee, Charles S. Sargent, John Robinson, J. D. W. French, Francis H. Appleton and Leverett M. Chase. The appointment of similar committees by the horticultural and agricultural societies of other states would tend to encourage a more careful study of forest problems by thoughtful men, and their recommendations would doubtless prove of practical value.

So rapidly were the mountain sides in the neighborhood of Cape Town being denuded of their flowering plants by the reckless hands of cockney pedestrians, that the local government not long ago passed stringent laws for their preservation. Now botanists and tourists complain that these laws are so very stringent as to interfere with all lawful pleasure as well as all scientific research. "Here," says a correspondent of the *Gardeners' Chronicle*, "is the text of the definition of 'forest produce' which may not be touched under penalty: 'Game, fish, minerals, stones, earth, trees, timber, firewood, wattles, kraal wood, branch wood, slabs, chips, sawdust, plants, grass, reeds, thatch, rushes, bedding, peat, creepers, fibres, leaves, moss, flowers, ferns, fruits, seeds, roots, bulbs, galls, spices, bark, gum, resin, sap, charcoal, honey, wax, shells, horns, ivory, and generally anything growing or contained in the forest'!!! Anything else? Could it not be enacted that the respectable subject or botanical stu-

dent should be blindfolded before going up, to further atone for the stupidity of a few 'snobs' who could easily have been stopped without enacting such absurdities?"

A correspondent of the *Gardeners' Chronicle* makes the complaint so often heard in this country, that the trees on the streets and in the open spaces of London are annually mutilated by the saw and bill-hook of the ignorant pruner. He adds: "In my neighborhood—a south-western suburb—the young trees on the common were last year pruned in much the same fashion as a Currant-bush, and this has been the rule since they were planted in 1885. The result is seen in little conical heads, full of small twigs, the general outline of a tree being a *fac simile* of those of a German toy. It is possible by banishing the 'pruners' for all time, that the trees would throw out vigorous branches, and grow into picturesque objects, affording shelter from the rain and sun to the many young and aged persons who make use of the common, and become a pleasant picture to a district rapidly gaining in importance."

Mr. Flinders Petrie discovered not long ago in Egypt the remains of a number of Roses which had been bound into a garland and buried with the dead. The tomb from which they came was one of those which contained the encaustic paintings recently described and illustrated in *Scribner's Magazine*, and date from between the second and the fifth centuries after our era. Monsieur Crépin has examined these Roses, and recently read a paper relating to them before the Royal Society of Belgium. The nine blossoms he had secured were all imperfect, but evidently belonged to the same species. So far as he could judge, they resembled most closely a Rose cultivated in Abyssinia to-day, which was described by A. Richard under the name of *Rosa sancta*, as it is grown in the vicinity of temples. *R. sancta*, which is very similar to *R. centifolia* or *R. Gallica*, appears not to be a native of Abyssinia, but to have been cultivated there from a very distant period. Nor could the Roses found in the tomb have been of native origin, as no Rose grows wild in Egypt. But the flowers were doubtless obtained near the place of sepulchre, as Roses were largely cultivated in Lower Egypt and exported thence to Rome. The only native Rose known in this east African region is one that occurs in the mountains of Abyssinia—*R. Abyssinica*—believed to be a variety of *R. moschata*.

In a recent number of the *Revue Horticole* the following sensible words were printed: "Whatever may be the degree of intensity in the coloration of foliage, it can never play the same rôle as flowers in the summer decoration of a garden. A mass of *Coleus* or *Achyranthes*, a basket-bed or garland of one sort or another or a mosaic pattern in bright foliage, may be usefully employed in a decorative composition of considerable extent; but they cannot produce the same attractive and gay effect as flowering plants used in a mingled way or in distinct groups. Recently we saw an example that was pushed to an extreme point—a basket-bed entirely composed of *Coleus negro*, with dark, almost black, violet-purple foliage, and bordered with *Achyranthes*, the leaves of which showed a net-work of green and yellow. The impression made by this basket was inexcusably mournful. One vaguely imagined the existence of a *tumulus* under this mass of flowerless plants, and some sort of funereal urn would not have seemed inappropriate in the middle of it. This was certainly not the effect that had been desired, and we might cite many other cases where an injudicious use of colored foliage had produced negative or disagreeable results. The general rules to follow may be summed up thus: Reserve colored foliage for spots which are to be seen from a distance, in masses, and plant near the house and in all other much-frequented spots those flowering plants which, in addition to their elegance and their varied bloom, usually disseminate a grateful odor."

Catalogues Received.

A. D. COWAN & Co., 114 Chambers Street, New York;—Seeds.—HENRY A. DREER, 714 Chestnut Street, Philadelphia, Pa.;—Seeds, Plants, etc.—ELLWANGER & BARRY, Mount Hope Nurseries, Rochester, N. Y.;—Select Roses.—J. T. LOVETT Co., Little Silver, N. J.;—Ornamental and Fruit Trees, Plants, etc.—A. M. & J. B. MURDOCH, 510 Smithfield Street, Pittsburgh, Pa.;—Trees, Shrubs, Vines, Seeds, etc.—PITCHER & MANDA, United States Nurseries, Short Hills, N. J.;—Single Dahlias; also, Chrysanthemums.—JAS. M. THORBURN & Co., 15 John Street, New York;—Seeds.

PUBLISHERS' NOTE.—The publishers wish to state that the advertisement of L. D. Staples, Portland, Mich., which appeared in last week's issue of GARDEN AND FOREST was inadvertently inserted.

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State Forest-lands of New York.

THE Annual Report of the New York Forest Commission for the year ending September 30th, 1888, recommends legislative action to exclude railroads from state-lands, to enable the state to acquire forest-lands by purchase, and to encourage a system of tree planting and forest culture. The proposal that all building of railways on state-lands within the forest-preserve shall be prohibited, and all existing laws permitting state-land to be taken as a right of way for railroads shall be repealed, is entirely judicious, and its practical bearings are important. There has been too much railroad building on the state forest-lands already, and no more should be permitted. The Commission recommends the appropriation from the state treasury of a certain amount for the purchase by the Board of Land Commissioners, upon the recommendation of the Forest Commission, in the name of the state, of forest or wild lands, at a price not to exceed one dollar and fifty cents per acre, and in amount not to exceed in expenditure the annual appropriation for such purchase. If the state can acquire an absolute title to any considerable quantity of land on these terms, and can take care of it afterwards so that forest conditions shall be restored and maintained upon it, this would be a step in the right direction.

The Commission asks for an appropriation to encourage and begin "a system of tree planting and forest culture," and thinks a beginning could be made at a comparatively small expense. Undoubtedly the beginning could be made so small that it would cost very little, but if the system were continued and extended it would probably be at once the costliest and the most useless enterprise ever undertaken by the state of New York. The scheme is a visionary one, and the work which it proposes is unnecessary. If the denuded tracts are protected from fire, from pasturage and other injuries, nature will reclothe them with forests much more rapidly than it can be done by tree planting under the direction of the Forest Commission. The proposal illustrates the need of some degree of special knowledge and training in the management of forest interests of such importance. An appropriation for such a purpose

would not only be thrown away, but would tend to divert attention from the real requirements of the Adirondack region.

The Commission also desires to obtain authority to lease portions of the state-lands to individuals who wish to appropriate to their own use and enjoyment pleasant sites for residences on land which belongs to the state. This is a mischievous proposition. No authority to lease the state-lands for such purposes should be given to anybody. Some arrangement for hotels and lodging-houses for sheltering the multitudes of people who use the region as a summer-resort is, of course, indispensable, but beyond this there is no good reason for permitting residence on the state-lands. If a few persons are to be admitted to such residence, there is no sufficient ground for excluding others, and in a few years the best portions of the forest-region owned by the state will thus be wrongfully appropriated to private uses, and the value of the wilderness as a sylvan resort and sanitarium will be seriously impaired. No facilities should be granted for increasing the number of residents on the property of the state. Those who are there already, the "custodians" on the islands in Lake George, and the squatters on sites along the shores of the Adirondack lakes, should be required to vacate these places at once, no matter how much wealth, or social and political influence, they may be possessed of.

A joint committee of the Board of Trade of Minneapolis and the Chamber of Commerce of St. Paul recently adopted a resolution, which they will present to the Legislature, regarding the extension of the park systems of the sister cities. It is proposed to form a great River Park extending for a considerable distance along both banks of the Mississippi, and including the islands in its stream. The idea is to take a strip of shore averaging some 300 feet in width, but extending further inland at certain points where ravines and water-courses occur; to construct a stately boulevard, on the inward side of which residences will be built, and to preserve all the land between it and the water as ornamental grounds. Boulevards already exist on the St. Paul side, which would form a continuation of the new one and unite it with the remainder of the park system of the town. The existing State Park, on the Minneapolis side—which includes the Falls of Minnehaha—and the Fort Snelling military reservation, which may easily be opened to the public, can likewise be connected with the new work. The boulevard can be so disposed as to afford not only extensive views of the river, but glimpses down its steep banks in certain spots; and at the foot of these banks there are places which can be effectively laid out, and sometimes even give room for accessory drives, while their slopes are already beautifully wooded with a variety of large trees. Mr. Cleveland has sketched a plan to show what the general effect of the scheme would be, and even from hearsay one can understand why local journals predict in its accomplishment the grandest park in the world. The wonderful beauty of the Riverside Park, in New York, is too well known to be insisted upon; and although the upper waters of the Mississippi have not the grandeur, of course, of the Hudson near its mouth, they are very beautiful, and a vast gain will spring from the fact that not one side merely, but both, can be utilized. Too many charming river-fronts have already been sacrificed in America to the supposed needs of trade or to mere shiftless neglect; and it will be a serious mistake if the authorities of Minneapolis and St. Paul do not preserve their own in the manner now suggested. As Mr. Cleveland points out, the thing must be done now if it is to be done at all. If time is lost, buildings will intrench on the desired locality and the fine forests along the river will be ruined past repair. These wooded tracts, as Mr. Cleveland writes, instead of being the richest ornament, will become the most unsightly portion of the suburbs, "and future generations will only deplore the want of forethought which might have saved without cost such features

of natural beauty as no money could purchase and no art could presume to imitate."

Mr. Carl Schurz is well known as an ardent advocate of change in our national policy in many matters connected with the tariff, taxation and trusts, and yet in his recent address before the Commonwealth Club of this city, he declared, as the result of his deliberate judgment, that the forest problem was more important in its ulterior consequences than were other economical questions. "If I had the power," he said, "to choose for the country between an immediate reduction of tariff duties on the one hand and the introduction of an effective forest policy on the other, I should say, 'Let the people be burdened a little longer by protected interests, for at a future day they can change their system and retrieve their losses,' rather than let the destruction of our forests go on at the present rate, for that destruction may bring on a train of disaster from which the country may never recover." It is not the purpose of *GARDEN AND FOREST* to take part in the discussion of questions which divide the political parties of the country. The words of Mr. Schurz are quoted to invite attention to the estimate of the paramount importance of the national forest problem made by a man who has some knowledge of European forests, and who, as Secretary of the Interior, has been in a position to gain special information as to the wanton waste of the timber on our public domain.

The movement to preserve the celebrated prehistoric ruin of Casa Grande, in Arizona, deserves to succeed, and as there appear to be no antagonistic interests, it ought to be an easy matter to secure the requisite Congressional action. Fortunately, the structure stands on a "school section," and the territory of Arizona could be compensated by the cession of another section of the public land. Casa Grande stands in the midst of a region that was extensively cultivated under irrigation by the ancient inhabitants, and, after centuries of fallowness, it is now coming under cultivation again by similar means through modern enterprise. It is a rich soil, well adapted to semi-tropical horticulture, and the preservation of this ancient monument will add to the attractiveness of the section. The movement to save Casa Grande originated with Mrs. Mary Hemenway, of Boston, to whose public spirit science and philanthropy are already deeply indebted.

The Terrace Garden at Wellesley.

THE Terrace Garden at Wellesley, Massachusetts, which is shown in the illustration on p. 103, is by far the finest example of an "Italian garden" with clipped trees and hedges that exists in America. Indeed, so far as we know, it is the only important example of this style to be found here. In the year 1851, we may read in Downing's "Landscape Gardening," Mr. H. H. Hunnewell, of Boston, selected a portion of an old family estate of many hundred acres on the bank of Wellesley Lake, and laid out a country place of some two hundred acres, about forty of which were devoted to ornamental grounds in the vicinity of the house. These forty acres consisted of a "flat, sandy, arid plain which . . . was more or less covered with a tangled growth of dwarf Pitch Pine, Scrub Oak and Birch, all of which were cut down and plowed up." The ground was then prepared for planting, a nursery was established for which the stock was chiefly imported from England, and the place quickly assumed a cultivated and promising aspect. "The house . . . was then built, having . . . on one side a fine extent of simple and dignified lawn, and on the other a French parterre or architectural garden with fountains, bordered by heavy balustrades, surmounted at intervals by vases, with steps leading through a series of terraces to the lake, a fine sheet of water of about a mile in extent having a peculiarly varied and beautiful outline. From this French parterre stretches off on the right the ornamen-

tal or English pleasure-grounds, a part of the same view. . . . From this we pass along the lake to the Italian garden. . . . To Mr. Hunnewell we believe is due the merit of having first attempted to clip our White Pine, and the result shows that it bears the shears quite as well as the Hemlock or Yew; though in this garden are equally successful specimens of clipped Norway Spruces, Balsam Firs, Arbor Vitæ, the English Maple, the Beech, and Scotch Firs. From the Italian garden we cross the avenue into a wood through which winds a walk, planted on either side with a very extensive and satisfactory pinetum, containing all the rarest and newest Conifers and evergreen shrubs, which, with the slightest protection from the winter's sun, seem to thrive exceedingly well. Among other features of this place . . . are various vistas through different avenues planted for this purpose—some of Purple Beech, others of White Pine—all of which will in a few years become very interesting and effective."

The editor of the second edition of Mr. Downing's works wrote this in 1858, when the place had been in hand but seven years. Its success was already so well established and its beauty so great that he could take it as his text for declaring that "if two places of the same size were commenced the same day by persons of equal taste, knowledge and means, one a wood and the other a naked plain, at the end of ten years the naked plain would be the finer and more satisfactory."

Although his description dates from thirty years ago, it might be couched in the same words, though with increased emphasis, were it penned to-day. During the intervening years Wellesley has remained in Mr. Hunnewell's hands, and his reputation among American horticulturists is so wide-spread that there is no necessity here to explain that the place has constantly received the most loving and skillful attention. It is indeed a wonderful place to have been wholly created in less than forty years, and no stronger evidence of its owner's devotion to it could be cited than the way in which the Italian garden has flourished. Perfect results are absolutely necessary if topiary works are to be anything but ragged and hideous deformities. To fail to produce absolutely symmetrical, full and luxuriant forms is to spoil the trees that Nature had designed, and leave nothing but ruins in their stead. But at Wellesley there are no failures and no ruins. A great variety is shown in the formal shapes as well as in the species of trees selected; but in each case the form has been admirably attained, and the species has been made absolutely docile beneath the shears. It is hard to say which tree gives the best result, clipped thus to a smooth wall of green; but the White Pine, most interesting from its novelty in such a shape, is, perhaps, paramount also in soft delicacy and beauty of surface. This, in its natural estate the most picturesque of our native trees, seems the tenderest and most charming when it assumes the form of a solid mass of foliage. The hedge to the left of the foreground in our picture is of Hemlock, while the White Pine shows in the dark tree, cut into three stages, near its extremity. The hedge with the conical masses rising from it that leads away from the centre of the foreground is of English Beech; another White Pine, again cut into several stages, shows near the broad walk by the lake, and the slender pyramidal trees on the second terrace are Norway Spruces. Admirable results, strange as it may seem, have been obtained by clipping the European Larch, which had not before been used in this way. In early spring the compact masses of pale, tender green of this tree are particularly charming. The immediate vicinity of the lake and the classic shape of the boat-house give somewhat the illusion of a real Italian scene, and its effect as one comes upon it in the midst of characteristic New England scenery is very striking. Whether it is an entirely harmonious effect—whether such a garden is a thing to be desired in a rural situation in America—is a question that may be left to individual tastes to decide. Such gardens certainly should not be used everywhere or very often; but those

who have seen Mr. Hunnewell's garden must be glad that one exists in this country. To hundreds of visitors it must have given their first and only sight of the "topiary work" about which they had read so much in books of travel and description, and the man whose skill, patience and taste have supplied his country with a unique work of art is a real benefactor.

The pinetum of which so much was expected thirty years ago, has more than fulfilled all that was hoped of it. It is now by far the most interesting collection of Coniferous trees cultivated in America. The sandy subsoil is admirably suited to the growth of these trees, which have flourished wonderfully under Mr. Hunnewell's generous treatment. The collection is interesting on account of the large number of fine specimens which it contains, and, more especially, for the lessons about trees which it has taught those persons who have been privileged to watch its development. Where trees are concerned, a record of failure is not less valuable than one of success.

The collection contains many specimens of great beauty and interest. Some of the finest and the largest specimens of the Douglas Fir, raised from seed collected by Dr. Parry in Colorado, may be seen at Wellesley. There are fine specimens of *Abies concolor*, *Picea polita*, *Abies Nordmanniana*, *Picea orientalis*, *Abies brachyphylla*, *Abies Veitchii*, *A. Cilicica* (a tree too rarely seen in our gardens), *Picea Aganensis* (the *P. Alcockiana* of most gardens—a tree, by the way, which Mr. Hunnewell considers one of the most promising of all Conifers), *Thuja Japonica*, *Pseudolarix*, and, indeed, every Conifer which has been found capable of supporting the New England climate.

It is pleasant to know that the members of Mr. Hunnewell's family have built themselves country homes in the vicinity of his own, and that so long as the course of nature permits the witnesses to his life-long love of horticulture to survive, the hands of his descendants will give them fostering and loving care.

Sweet Cassava in Florida.

OF recent additions to the food plants of this country perhaps none deserves as much notice as the Sweet Cassava (*Manihot Aipi*). It seems to have been proved beyond question that on the southern border of the United States there are considerable areas admirably adapted to growing this remarkable plant as a staple article of home consumption, while in Florida, at least, its manufacture into starch, tapioca and glucose ought to become a leading industry. A considerable crop was grown in that state in 1885, and parties were about to engage in its manufacture, when a phenomenal frost destroyed nearly all the seed in the state. Such a reverse can be easily guarded against, however, and the fear of its recurrence will not deter any one from planting Cassava according to his ability or inclination.

In the winter of 1887-88 only a few persons in Florida had any seed for planting. Through the efforts of one of the agricultural journals of the state this seed was widely distributed and great interest aroused in the new crop. This winter Cassava-seed is advertised extensively, and it is probable that a large quantity will be planted and that the manufacture of it will be undertaken before the end of the year. An analysis of the Florida root made by Professor Wiley, of the Department of Agriculture, shows it to contain seventy-two per cent. of starch, while Bolivian Cassava has only a fraction over fourteen per cent. of starch. Professor Wiley thinks that good Cassava starch can be made in this country, and that the manufacture of glucose from Cassava will prove even more profitable.

It may here be remarked that the name Cassava is said to belong properly to the product of the *Manihot* rather than to the plant itself, but in the latter sense it has become too well established in this country to be set aside. In tropical America the plant is known as *Manioc* or *Mandioc*. It should be observed, however, that the plant there cultivated almost exclusively, and from which the tapioca of commerce is derived, is the *Manihot utilissima*. This plant, though very similar in botanical characters to *M. Aipi*, has some very obvious differences. Its roots contain a poisonous principle, which, however, is dissipated partially on being grated, and entirely by the heat employed in converting the starch into tapioca. Its roots

are of uniform texture, and do not boil soft, while those of the Sweet Cassava do boil soft except as to an axial bundle of tough fibres.

A small quantity of Florida Cassava-seed was obtained by a few Louisiana farmers last spring, and those who have reported results express themselves as highly satisfied. But we must look to Florida growers of Cassava for that extended experience with the crop which is necessary to a correct knowledge of its requirements and profitableness. In the southern portion of the state certain contributors to the agricultural press have had this plant under observation for many years, and to their efforts is mainly due the awakening of interest in this crop.

The Cassava plant is closely related to the Ricinus or Castor Bean, which it resembles in general appearance. It is a handsome plant, not having the coarse, rank aspect of Ricinus. It does not bear much seed, and it is not propagated from seed, but from cuttings of the larger stems, very much as Sugar-cane is propagated. It is a tuberous-rooted perennial, and though the top is killed by a moderate frost, if the stems are cut so as to leave a few eyes at the base (there are no eyes on the tubers), and these are protected by a light mulching or covering of earth, the top will be renewed each successive year. In south Florida the top has been known to remain green for three consecutive seasons.

Before it is time for frost the stems that are half an inch or more in thickness should be cut, laid in piles and covered with earth. It is said, also, that the stems may be kept where they will become quite dry without having their vitality impaired. When ready for planting, in January, February or March, the stems are cut in pieces about six inches long. These are planted four or five feet apart and three or four inches deep. The crop receives shallow culture till sufficiently grown to shade the ground and hold its own against weeds. It may be left to grow for two years with advantage, thus requiring a minimum amount of culture. The roots should be dug only as wanted for use, as they decay soon after being exposed to the air. Cassava requires mellow, well drained land, and responds readily to manuring. Florida's sand hills seem to be specially adapted to this crop, better, perhaps, than to any other.

As to the quantity of Cassava root that may be obtained from an acre of ground, no satisfactory estimates have as yet been made. It must vary greatly under various conditions. A single plant grown in Polk County produced fifty pounds of roots, the top measuring eight feet in height and ten feet in breadth. It had been highly manured. A person who has given special attention to the Cassava thinks that from ten to fifty tons of roots of one year's growth ought to be obtained from an acre of land, according to its quality. This is little better than conjecture, but certainly the plant yields enormously under favorable conditions.

The uses to which Cassava may be put are almost too numerous to mention. By manufacture it may be converted, with scarcely any waste, into starch, tapioca and glucose, and into substances of minor importance. If it will furnish a substitute for wheat flour, that should head the list of its uses in a region where wheat will not grow. Professor Wiley thinks it is too deficient in nitrogen to serve that purpose, and that it should rank in nutritive value with the Irish Potato. Probably it may best be used in combination with flour and meal. In the Tropics Cassava flour is used extensively for making a large wafer or cracker, which is quite palatable, and keeps without injury for months. Florida housewives have used it for making bread, puddings, custards, fritters, jellies, etc.; also as a vegetable it is used in all ways in which Irish potatoes are used.

It is as food for stock, however, that Cassava has excited most interest in Florida. It is greatly relished by cattle, horses, hogs and poultry, and seems to be a very wholesome article of food. The great tubers, sometimes three or four feet in length, may be taken from the ground at any time of the year and used as food for man or beast. It will thus be seen that the acquisition of Cassava promises to be a great boon to the people of the extreme south, while its manufacture should supply the place of at least one importation—that of tapioca.

Jacksonville, Fla.

A. H. Curtiss.

"It is in this way that the artist-painter modifies his picture (a picture so much simpler than the artist-gardener's), making this part prettier or more like nature, correcting a shadow here, putting emphasis there,—how then should the landscape gardener, who must work with such refractory and uncertain materials and bring unity out of a whole collection of pictures, hope to succeed at the first attempt!" *Pückler Muskau.*

Foreign Correspondence.

London Letter.

"A SCHOOL of scientific and practical horticulture" is the most important item in the programme of our Royal Horticultural Society for this year. Chiswick is to be devoted to experimental and test gardening, and is to be made ornamental as well as useful. If the Society can succeed in carrying through all that is aimed at in the Chiswick gardens, every one interested in horticulture will be gratified. There is a strong section of the Society in favor of departing entirely from Westminster to Chiswick, arguing that a horticultural society should appeal for support, not through flower-shows and city offices, but through solid work in the laboratory, *i. e.*, the garden. American readers will be interested to hear that in future first-class certificates will not be awarded by the Royal Horticultural Society to plants that are not of exceptional merit as garden-plants. A second-class certificate, called an award of merit, will be given to plants worthy of commendation. After all, the value of these certificates depends on the discriminative knowledge of those who award them, and the committees appointed being composed of leading horticulturists, both professional and amateur, we may feel confident that none but first-class plants will win their approval. It is also intended to certificate strains and not individual plants in such cases as seedling Begonias, Fuchsias, Primulas, etc. A healthy sign is noted in the desire shown by nurserymen and others to get certificates for their new plants. Many of the nurserymen who used to hold aloof from the Society now submit their new plants for its approval.

At the meeting held on the 15th inst. the following plants were exhibited and received first-class certificates: *Vanda Amesiana*, to which I have recently referred. Messrs. Low & Co., who introduced it, state that their collector saw plants with over 100 expanded flowers, and one upon which no less than 185 flowers were counted. The species is very distinct, and bears evidences of proving a most useful garden Orchid. *Primula Sinensis*, Swanley Mauve, is remarkable for the size and substance of its pale, mauve flowers; some of those shown measuring more than two inches across. Mr. Cannell has succeeded in obtaining a strain of Primulas remarkable for vigor and size of flower. He and the Messrs. Sutton have been most successful in Primula breeding. Some interesting information, both historical and cultural, on *P. sinensis* has recently been collected and published by Dr. Masters, in the *Gardeners' Chronicle*. The power of the plant-breeder when relying solely upon seminal variation is well exemplified in the success with this Primrose. The prototype is a poor plant, with flowers smaller than those of *P. poculiformis* or *P. obconica*, and correspondingly small foliage. Mr. Cannell's Swanley Mauve is only one of thousands of forms which have been the outcome of cultivation and selection on the part of the horticulturist. I do not think the importance of looking after seminal variation under cultivation is properly grasped as yet by horticulturists generally, yet it is a fact that better results are thus obtained than by hybridizing alone.

Mr. Frank A. Morgan, whose article in the *Nineteenth Century* on "Fruit-growing" you recently referred to, is not considered an authority by English professional men. Mr. Morgan gauges the whole question by his experience in a fruit-market, and quotes fancy prices paid by a few extravagant cockneys as a basis upon which to argue the question of fruit-growing for the whole of England. Mr. W. N. White, who has had twenty years' experience in the London Fruit and Vegetable Market, and is a grower as well, says: "I have, at the present time in my warehouse, apples from Herefordshire which cannot be sold at a shilling per bushel; I have also apples from Berkshire and Oxfordshire which cannot be sold at two shillings and sixpence per bushel, and yet a fortnight ago, I sold American apples as high as eighteen shillings per bushel, though I think it only fair to say that plenty of American apples are being sold at three shillings per bushel, and that during the past month of December I have received no less than 16,500 barrels, representing 50,000 bushels of apples from America. Some of your correspondents will say that this proves their contention that these can be grown in England. Permit me to inform them that they could not be grown in England, and that the worst apple I am at present receiving from America is superior to the best of any I am getting from the home country." Testimony from growers of great experience all tends to prove that fruit-growing in England is a poor panacea for agricultural distress. Mr. Morgan has urged, in a leading society journal, that we have only to plant the fields with fruit-trees, and engage a few laborers to

look after them, to ensure an abundant supply of such fruit as shall beat the foreign produce out of the English market!

BAMBOOS.—The two beautiful illustrations of Bamboos in Ceylon, which appeared in your issue of the 9th instant, would have delighted General Munro, who paid considerable attention to the cultivated Bamboos at Kew, where a large collection of both hardy and tropical species is grown. In the Palm house we have a clump of *B. gigantea* (*Dendrocalamus giganteus*) and another of *B. vulgaris*, with canes sixty feet high and five inches in diameter. In the gardens of the Duke of Northumberland at Sion House, situated on the Thames, just opposite Kew, is an equally large specimen of *D. Brandisii*. The quick growth of these canes—eighteen inches in a day—is most interesting; the shedding of the beautiful sheaths from the newly-developed cane, so well shown in your figure 85, being suggestive of the hatching of eggs. None of these giants have been known to flower here. The pretty *Arundinaria falcata* is cultivated for the decoration of rooms, some of our principal plant-furnishers growing it by the hundred solely for this purpose.

Grown in nine-inch pots the canes attain a length of six feet to eight feet, branch freely towards the top, arch over in the most graceful and plume-like fashion, and, being clothed with soft green, lance-shaped foliage, they form most useful decorative plants for large halls. When they get shabby all that is required is liberal treatment in a hot, moist stove for a few weeks, and they are as good as ever. Apparently the hardy Bamboos are little known with you, probably because your winters are too cold. Here *B. Metake* is a grand mass twelve feet high and as much through, the foliage of the richest green, and the habit as graceful as a fern. It is outside in a moist, shaded corner, and receives no protection whatever. *B. mitis* is another graceful, hardy kind; so, too, is *B. nigra*, *B. viride-glaucescens*, *B. hybrida*, *B. Simonii*, and about half a score of others under garden names. These get no protection, and are beautiful all through the winter. They like moisture and plenty of rich manure. M. Latour Marliac, a French nurseryman, has lately introduced a number of beautiful kinds of reputed hardiness, some of which have variegated foliage, or striped canes. The singular square-stemmed Bamboo (*B. quadrangulata*) is also quite hardy at Kew.

HERBACEOUS PÆONIES have suddenly sprung into favor here. Nurserymen are collecting and propagating them, and amateurs are inquiring into the merits of the many kinds offered. Except in the old-fashioned country gardens these plants were scarcely to be met with until lately. They are big, rich in colors, artistic enough to please the æsthete, and as easily kept as weeds. Not a little of their beauty is in their foliage in spring, which, as it pushes up, unfolds to view the richest of coppery and bronze colors. I know one famous garden where the proprietor prefers the foliage to the flowers, planting his Pæonies for spring effect. If we could grow the Montans no doubt many would prefer them, but they thrive in comparatively few localities in England. At Kew, for instance, they lose more growth in winter than they make during summer.

W. Watson.

Kew.

New or Little Known Plants.

Japanese Chrysanthemum—Medusa.

EVERY one who has raised many Chrysanthemums from seed has occasionally found flowers with drooping florets, and such plants are rare in collections chiefly because they have not been considered worth propagating. As long ago as 1816 a Chrysanthemum, with long, white, streaming florets was described in England by Sabine. Delaux has sent out one or two varieties of this form, although of different colors, but they did not prove to be favorites with the public and they no longer appear on his lists. The plants which produce this type of flower have not generally been of vigorous growth, and have not proved capable of much improvement. The one illustrated on page 101 came to this country from Japan, where some of the tasseled forms are said to be much admired in the Neesima Collection, which included the Mrs. Alpheus Hardy and other noteworthy varieties. It is better than any of this class which we have seen—pure white in color, and, as the illustration shows, not without a certain grace of form. It is certainly interesting as a curiosity, and it may be found of use as a parent of new forms when crossed with other varieties.

Cultural Department.

Green-house Plants—I. Correas.

THE genus *Correa* is composed of about half a dozen very variable species, all natives of Australia, where they are known among the colonists as "Native Fuchsias." They belong to the order *Rutacea*, and are nearly related to *Boronia*, *Crowea* and *Eriostemon*. They form compact shrubs, usually about six feet high, though at least one has been seen as high as thirty feet. Under cultivation, however, they rarely exceed a yard in height. All the known species have been in cultivation in England, where, from about 1820 until a few years ago, the *Correas*, along with many other Australian plants, were among the most popular of green-house flowering plants. Several reputed hybrid *Correas* were raised in England, and numerous varieties were known, so that at least a score of named kinds may be found mentioned in old lists. For garden purposes it will be most convenient to call the kinds by the names under which they are grown, as it is somewhat difficult to understand why botanists refer *C. cardinalis*, *C. Backhousiana* and *C. pulchella* to *C. speciosa*, the plants known in gardens under these names being abundantly distinct.

Correas are among the most beautiful of hard-wooded green-house plants. They are easily managed, form nice shapely bushes and blossom freely every spring, often continuing in flower till midsummer. They are rarely seen in modern collections, having been crowded out by quicker growing and more gaudy-colored plants. A beginner often fails with them through treating them as if they were *Fuchsias* or *Pelargoniums*, and, growing disgusted with their behavior, discards them as worthless. And yet a well-grown *Correa* when in full flower is a perfect picture of elegance.

When propagated by cuttings these should be about three inches long, and composed of ripened wood of the last year's growth. They should be planted in very sandy peat and placed in a close frame, where the temperature is about 65°. Here they ought to be rooted in about two months. Grafting is, however, the most common method, as good plants are obtained more quickly, and the weaker kinds thrive better when grafted on a strong-growing stock than when on their own roots. *C. alba* forms the best stock for all the kinds except *C. cardinalis*, which should be grafted on a sturdy variety of *C. speciosa*. The stocks should be young, and the grafts similar to the pieces preferred for cuttings. Side graft-

ing, close to the base of the stock, and allowing the top to remain, always proves successful. February is the most favorable time for this operation. The worked plants should be placed in a close frame where the temperature is about 60°, and if looked after they will be united in about six weeks. The top of the stock may then be pinched out, leaving the lower part till after the cion has made a little growth. The young plants should be grown in an intermediate and somewhat close temperature, and kept bushy by pinching out the tops of the strongest shoots. In winter a temperature of not lower than 45° at night should be maintained. In April the plants should be re-potted in a mixture of peat two parts, leaf-

mould one part, and a good addition of silver sand. The soil should be pressed in firmly. During summer a sprinkling of water overhead should be given twice daily. Some of the kinds branch freely and keep compact in habit, whilst others must be frequently stopped to prevent them from becoming leggy. The plants require sufficient water to keep the soil moist, without its ever becoming saturated. They like plenty of sunlight, shading only for an hour or two at midday during summer. As the plants get larger a shift into a larger pot every two years or so will be sufficient. By judiciously staking the young plants, handsome bushy specimens can be grown in about four years. Of course the plants flower freely and regularly every year from the first. Small specimens in four-inch pots make pretty table plants. The flowers are useful for cutting, and last several days in water. The robust growing kinds such as *C. alba*, *C. Laurenciana*, *C. Backhousiana* and *C. speciosa* will thrive well when planted in a bed in a sunny position in an ordinary conservatory. Large examples of these kinds have been grown by treating them in this way at Kew. They bear cutting back heavily without suffering; this treatment is recommended for leggy or unshapely specimens.



Fig. 97.—Japanese Chrysanthemum—Medusa.—See page 100.

The following are the best of the cultivated kinds:

C. cardinalis; introduced by Veitch in 1856. It has an erect, somewhat thin habit, the branches dark brown and shining when old, tomentose when young. The leaves are one and a half inches long, half an inch broad, recurved at the edges, dark green above, pale and wooly on the under side. Flowers drooping on the ends of the numerous small branches, one and a half inches long, tubular, bright scarlet, with segments reflexed, greenish yellow; anthers exserted, yellow.

C. speciosa-major; introduced in the last century. An erect, bushy species, covered with a rusty tomentum, branching freely, and crowded with oblong leaves one inch long.

Flowers on short axillary branches, tubular, one and a quarter inches long, erect or drooping; color, deep crimson, with bright green on the scarcely reflexed segments. An easily grown and handsome plant, the best forms of it almost equaling *C. cardinalis*.

C. ventricosa; very similar to the last mentioned, the only difference being in the form of the flowers, and which is described by the name.

C. pulchella; introduced by Low in 1824. It forms a compact shrub, about two feet high, freely branched, crowded with cordate-ovate leaves one inch long, which are wooly when young, smooth and dark green when old. The flowers are pendent, tubular, one and a half inches long, the segments spreading; color uniform, bright rosy red, calyx green, stamens exserted, yellow.

C. magnifica; a compact, much-branched shrub, about two feet high, with orticular leaves, every part covered with a brown tomentum. Flowers not always drooping, tubular, one and a quarter inches long, white, covered with minute stellate clusters of scale-like hairs. This is probably of garden origin, the result of a cross between *C. alba* and some other species.

C. Laurenciana; the largest grower of all. The type is not particularly handsome, having leathery leaves, one and a half to two inches long, smooth, shining above, tomentose beneath; flowers in pairs or threes on the ends of short branches, greenish. It attains a height of thirty feet in Australia. A large red-flowered variety of this has been discovered in Australia by Baron von Mueller, but although frequent attempts have been made to introduce it, this evidently magnificent shrub remains still unknown in gardens. Seeds of it do not appear to be obtainable.

Other species are *C. alba*, which has small greenish-white flowers, and is grown principally as a stock for grafting the weaker kinds upon; *C. amula*, with orbicular leaves and purplish flowers, sometimes met with in gardens under the name of *C. Colvillei*; *C. Backhousiana*, with ovate, thick, felt-like leaves, and tubular, yellowish green flowers; *C. longiflora*, very likely a form of *C. speciosa*; *C. Brilliant*, of garden origin, with long tubular flowers, and *C. Harrisii*, a hybrid of inferior merit. Those here described at length are really beautiful and useful plants for the green-house, where they flower from December to April, and even longer.

Kew.

W. Watson.

Roses.

Shallow Benches or Solid Beds for forcing Roses.—The question, Which possesses most advantages for Rose forcing, solid beds or shallow benches raised up from the ground, is still discussed among growers; and each plan has earnest advocates.

That both systems have advantages, under different conditions, has been frequently proved, but how to decide which method is the better adapted to particular circumstances has been a knotty question with many cultivators.

It has been stated in favor of the bench system that the condition of the roots was under better control, and that in consequence the plants were not likely to take so long a rest between crops, and the output was thereby increased, and also that there was less risk of over-watering.

Of course, it is quite natural that the evaporation will be much more rapid from a bench containing from three to four inches of soil than from a solid bed on the ground level. This is a strong point in favor of the bench system. Another advantage will be found by cultivators whose places are situated in large cities in the saving of soil by this method, this being a point of much importance where the supply of good soil within easy reach is limited, as frequently happens in such cases. And in any case there is much less labor to be performed in the preparation of the benches than in that of the solid beds. But there are other things to be considered. Prominent among them is the fact that many of the Roses used for forcing produced better flowers the second year than the first, as, for instance, Catherine Mermet, The Bride and Bon Silene, and it is undoubtedly easier to keep these plants in good condition during the summer months, when they are planted out in a solid bed than when they are planted on a bench exposed on all sides to the air, and liable to be heated all through by the sun to a much greater degree than is necessary for the welfare of the Roses.

It seems, therefore, that it would be wiser to adopt an intermediate practice rather than to condemn either system entirely, and use the bench plan for those varieties most sensitive at the roots, as Niphetos, Papa Gontier, Duke of Connaught and others of similar characteristics, and the solid-bed method for the stronger-growing more permanent sorts.

But the solid beds would often produce a better result if more care were given to their preparation, especially in regard to drainage, as a bed placed directly on a hard sub-soil is almost certain to become too wet during the winter.

A better practice is to make the total depth of the bed from fifteen to eighteen inches, all of which should be above the level of the ground, and to prepare it as follows, with such modifications as the circumstances may require:

Fill in the bottom of the bed to a depth of eight or ten inches with broken bricks, stones, clinkers or coarse cinders, and on this place a layer of good sod, grass side down, after which the bed may be filled up with the usual mixture of soil and fertilizers. A bed prepared on this principle will usually keep in good condition for several seasons, and may be refilled with soil without disturbing the drainage. And in the construction and preparation of benches for a similar purpose, due regard should also be had to drainage, as it will be found that a little care in this respect will be well repaid.

A good way to accomplish this is by building the bench of lumber six inches in width, with a space of from half an inch to an inch between the boards, as these spaces are readily covered by using the rougher soil in the bottom of the bench, thus forming a ready means of egress for the water.

Chestnut lumber will be found to last the longest for benching, but as this is not easily procured in all localities, it is not very often seen in use for this purpose, though where it has been thoroughly tested the report is usually favorable. W.

Shrubby Begonias.

THE great variety now to be found in Begonias has placed them in the front rank as decorative plants. Growing as they do without coaxing of any kind, always bright and cheerful in appearance, handsome either in foliage or flower, or both, they deserve a wider appreciation than is now accorded them.

In the spring of last year I made a selection of the best kinds, including many of the new French hybrids, and for the past two months, or since *Chrysanthemums* are out of bloom, they have been truly beautiful. They were treated as follows: Small plants in two-inch pots (two of each variety) were re-potted into four-inch pots about the middle of April last, and kept in a partially shaded green-house, without fire heat, until the end of May. They were then shifted into six-inch pots and the points of the shoots were pinched out so as to make them bushy. The soil used was a rich sandy loam of light texture. A few days afterwards they were placed out-of-doors in a shady place having a north-west exposure, watered as required, and finally shifted into eight-inch pots at the end of August, and removed to the green-house where they are to-day. The night temperature has been kept at an average of 55°. An occasional watering with liquid manure has been given, which helps materially to keep up a uniform growth. Several of the plants are now covered with bloom, while others have long scapes of brilliant coloring standing boldly out from the foliage. Some of the most striking kinds are to be found in the list which follows:

B. Gloire de Sceaux.—Bushy habit, with medium-sized, deep purple-bronzed leaves of a most exquisite shade; the flowers, literally covering the plant, are of a lovely peach-pink color.

B. Rubra (coccinea).—A very old species, with richest coral-scarlet flowers, flowering freely as small plants, but at its best when grown into large plants.

B. Incarnata. (Insigne).—Flowers large, deep flesh pink, plant bushy and very showy.

B. Diadema.—A distinct species, having palm-shaped leaves of bright sea-green, marbled with olive-green and spotted with white; flowers white.

B. Alba picta.—A little gem, having narrow lanceolate leaves, dotted all over with white spots. The flowers are greenish white, shaded with bronze, in panicles from the under side of plant.

B. Olbia.—Olive-green, metallic shaded leaves peculiarly formed and disposed, flowers very large, greenish-white, produced from the axils of the leaves on the main stem; an effective kind.

B. semperflorens rubra.—Bright, shining green foliage, with large panicles of carmine-red flowers. Another variety of *semperflorens*, *Amelia*, has larger and brighter flowers.

B. discolor, MADAM LENNET.—Leaves olive-green, marbled with gray-white, flowers large, deep pink.

B. discolor, M. HARDY.—Leaves deep reddish-bronze, marked with white, flowers rose.

B. PRESIDENT BONNEVILLE.—Leaves marbled silver, on bronzy shaded ground, flowers silvery pink, very handsome.

B. Manicata aurea.—One of the oldest species, with distinctly mottled yellow and green leaves; a very effective and beautiful plant.

Pearl River, N. Y.

John Thorpe.

Orchid Notes.

Stauritis (*Vanda*) *gigantea*.—As its name implies, this Orchid is of giant growth and noble appearance, but is only suitable for large houses. It is not by any means as attractive as *S. Batemanni*. The stout stem is closely clasped by dark green leaves about two feet long, tough and fleshy. The axillary racemes are very stout, pendulous, and bear twelve to eighteen thick, fleshy flowers, about three inches across, of deep yellow, blotched and spotted with reddish crimson. The small lip is incurved and channeled. This plant was introduced, thirty years ago, from Burmah, but it rarely blooms, though now it flowers here every year. It did not do so until it was nearly three feet high. It requires strong heat and abundance of water during growth.

feet long, bearing numerous bright yellow flowers of good size. The sepals and petals are wavy and specked with red. It is a native of Guatemala, and requires the temperature of the intermediate house, with very little potting material, which may consist of lumps of charcoal and a little moss. It should be kept moderately dry during the winter.

Angraecum citratum is a choice and attractive little Orchid, and the freest bloomer of the genus. It is dwarf and compact, with oblong, lanceolate, dark-green leaves, from the axils of which spring the slender, pendulous racemes, sometimes two feet long, closely set with pale, yellowish-white flowers in two rows. Sometimes as many as fifty flowers are on a raceme, and when four or five of these are borne on one plant it forms a very charming object, which remains in full beauty a long time. This plant was introduced, about twenty years ago, from Madagascar, and should be grown in moss and chopped leaves—in baskets—placed in the warmest house with a good supply of water, and should at no time be dry.

Lycaste (*Colax*) *jugosa* is an attractive little plant, with ovate, pointed bulbs and lanceolate, acuminate leaves. The erect



The Terrace Garden at Wellesley.—See page 98.

Phajus maculatus is a showy Orchid of strong growth, making a fine decorative plant, but of little use for cutting, as the flowers are as easily damaged as those of a Camellia. It forms large, ovate bulbs, terminated with ovate, lanceolate, plicate leaves nearly three feet long, dark green, copiously spotted with yellow. The scapes—generally two—are about two feet long, and bear fifteen to twenty bright yellow, fleshy flowers. The lip is streaked with reddish-brown, the middle lobe much crenated and margined with the same color. This plant is not seen as often as its merits deserve. It grows very freely in ordinary stove-plant soil, with the usual treatment of these plants. But when growth is finished it should be kept in a comparatively cool house. The variety *Intermedia* differs from the type only in the foliage, which is devoid of variegation.

Oncidium Cavendishianum.—An extremely useful species, lasting a long time in perfection, and especially useful for cutting. It belongs to the bulbless section, with thick, fleshy leaves, which are broad and about a foot long. From the base of the leaves springs the strong panicle, three to four

scape appears with the young growth, and bears three to four very handsome flowers, with sepals and petals of a creamy white—the latter barred and blotched with chocolate-purple. The small lip is of velvety texture; white, streaked and dotted with dark purple. It is a native of Brazil, and grows best with us in the warmest house, with copious supplies of water, and potted in peat and moss. Thrips are very troublesome to this plant, and a sure preventive is always to water overhead.

Kenwood, N. Y.

F. Goldring.

Epidendrum Endresii is one of the prettiest of dwarf-growing species but is now rarely seen. It is remarkable for its free flowering and lasting qualities, remaining fully eight weeks in good condition on the plant. The flowers of a well-grown plant are most beautiful, their snow-white sepals and petals contrasting agreeably with the lip, which is blotched with violet. In Mr. Wallace's collection at Paterson, New Jersey, a strong plant in fine health is now flowering, having a number of spikes covered with blossoms from the apex of thin grass-like stems. It is a native of Costa Rica, and thrives at an altitude of 6,000 to 8,000 feet, where it is cool at all seasons.

Many attempts have been made to import this plant in quantity, but every consignment, no matter how it may be packed, is almost worthless on its arrival, and very few plants survive the close and impure atmosphere to which they are subjected on their passage to this country. This Orchid will, in all probability, therefore, remain a rare plant for years to come. It grows very freely at the coolest end of the Cattleya-house in a shady situation, and should occupy a basket or pan suspended as near the light as possible, in a mixture of clear sphagnum and rough, fibrous peat, with ample drainage. In full sunlight its thin, fleshy stems will soon become weak and perish.

Summit, N. J.

A. Dimmock.

Some Choice Narcissus.—The beautiful little *N. Cyclamineus* has proved to be of easy culture. Collected bulbs flowering with us for the second season, show a marked improvement, both in size and quantity of bloom. Let us hope that this little gem, after having been lost to cultivation for more than 250 years, has come at last to stay. *N. triandrus*, from Portugal, is now opening in abundance its pretty, pale, pendent flowers. This is often considered hard to keep, but thrives well here under the treatment given to others of its class in a soil of two parts loam to one of peat. The varieties of *N. Bulbocodium* give a display for several months, commencing with var. *monophyllus*, which is white and of the characteristic "Hoop Petticoat" form. Var. *citrinus* comes next, with pale yellow flowers, which are just now at their best. *N. Bulbocodium* is the last in order of flowering, and comes a month later. We have also a form of *N. Bulbocodium* from Portugal which is quite distinct, no two bulbs producing flowers alike, but differing principally in the cut-off appearance of the corona. To the above may be added *N. serotinus* and *N. juncaefolius*, making an interesting collection for those who have small space at their disposal. All the above-named do well in five-inch pots at a temperature of 50° to 55°.

Passaic, N. J.

E. O. Orpet.

Principles of Physiological Botany as Applied to Horticulture and Forestry.

IX. CHANGES OF ORGANIC MATTER WITHIN THE PLANT (Continued).

WE have already seen that the first product of assimilation proper, that process by which the plant converts inorganic materials under certain conditions into organic matter, is probably some form of sugar. In the last paper it was pointed out that this primary substance bears peculiar relations to starch, the first visible solid product of assimilation. We are now to examine the physiological relations of the group to which sugar belongs and see in what way this is utilized by the plant as food.

There are three chief groups of sugars found in plants. They differ from each other in the proportions of hydrogen and oxygen which they contain, and they possess somewhat different physical properties. They are known as (1) the directly fermentable, (2) the indirectly fermentable, and (3) the non-fermentable; that is, they sustain different relations to certain microscopic organisms by which the process of fermentation is carried on.

The sugars of the first group may be represented by grape sugar, sometimes known as glucose, which occurs to the amount of five to thirty per cent. in certain ripe fruits. It is crystallizable, but lacks the high degree of sweetness which we associate with the type of the second class, namely, cane sugar. This latter is the sugar of the sugar cane, and of the sugar beet, and of sorghum, but it is generally associated with a certain amount of other forms of sugar, and by the very process of extraction a portion of the cane sugar may be more or less completely transformed into the less desirable kinds. The third group is represented by a substance which may be procured from certain Acacias, etc. Sugars of the last group are wholly incapable of ordinary saccharine fermentation; those of the second ferment only after they have become acted on by some agent which partially modifies their original character, while those of the first are very easily, and, as one may say, directly fermentable under almost any conditions. But all of these, like members of the starch series, are capable of undergoing oxidation, giving up thereby a portion of their energy of position, which reappears as energy of motion. The ultimate products of the complete conversion of these substances are carbon dioxide and water, the inorganic materials from which they were first brought together by the agency of the plant under the influence of the sunlight.

It should be borne in mind that the few sugars here

mentioned are only representatives of classes, and that these classes by no means exhaust the list. Moreover, it should be remembered that the sugars occur in different amounts in different plants, and, as is the case with many other substances, in different amounts in different parts, and, in the same part, at different periods of its development.

The second great group of substances containing carbon, hydrogen and oxygen, but no nitrogen, is that of the vegetable fats or oils. These are of very complex composition, and do not need to be here commented on from a chemical point of view, further than to take note of the fact that they contain relatively less oxygen than the substances before mentioned.

The fats or oils sustain peculiar relations to the living matter of the plant, especially while the latter is in a state of rest or of suspended activity, as in the case of ripe seeds. It is interesting to observe that the seeds of by far the greater proportion of species contain their food stored up, not in the form of starch, but of oil of some sort. In many cases the oil is capable of drying when exposed to the air, as is the case with that of flax seed (linseed oil), while in others it does not thicken rapidly, if at all. Oils of the first sort are extensively used in ordinary painting. The so-called volatile oils, such as the fragrant oils of the different members of the Mint order, are closely related to the turpentine, and are not to be confounded with members of the group of true fats.

It is a curious fact that in some, if not most, cases thus far observed, the fats or oils of seeds are in part transformed into other carbo-hydrates, such as starch, before they are utilized by the seedling. Thus the seed-leaves of the Castor-bean have been shown to take from the general supply a certain portion of the oil as such, and during conveyance to other parts, or somewhat later, to transform at least some of it into starch, which can be detected in the form of characteristic granules.

The third group of these substances free from nitrogen comprises the vegetable acids, such as Tartaric (in grapes), Malic (in apples), Citric (in lemons), and the like. Most of these are found in different proportions, and are never free from admixture, so that we may find even more than two of these in the same fruit, some of them occurring, perhaps, in mere traces only. One of the vegetable acids most frequently found is Oxalic, which is generally combined with calcium to form crystals of calcium oxalate, abundant in plants. In other cases it unites with potassium. In most instances there is also more or less of this acid remaining uncombined. It is difficult to form a clear conception of the direct use of these acids to the plant, except so far as they play an important part in the protection of the plant or some of its organs, as, for instance, its fruits, from unwelcome guests. This aspect of the subject will be examined at a later period, when we come to glance at the methods of dissemination of seeds.

Among the less important substances, which may be alluded to in connection with those now examined, are various astringent matters; for instance, members of the Tannin group. These occur in almost every part of the plant at some period of its growth. Widely different views have been entertained as to the origin and the probable use by the plant of these substances, some investigators holding that the members of the tannin series are waste matters, while others believe that they are reserve materials. In some cases they seem to have a very plain function in defending the plant from its enemies, but this, which is only a specialized office, will be incidentally referred to later. Associated with the tannin-like bodies are the curious principles which occur in certain barks, such as æsculin, in the bark of the Horse-chestnut, etc.

From the extremely long list of other substances free from nitrogen, only the following can now be noticed in passing: (1) the ethereal oils, compounds of carbon and hydrogen, and (2) the resinous matters, which are much the same as the last, but are combined with more or less oxygen. Both of these classes of substances are obscure in their origin in the vegetable laboratory, and in most cases it is difficult to hazard any reasonable conjecture as to their work in the plant. Probably they always have or have had some office of attraction (as is clear in the instance of the perfumes of certain flowers), or of defence, as is seen in innumerable cases. But we may possibly get a hint as to their office and occurrence when we remember that during the life of a given species its surroundings must have changed in many ways, and that possibly attractions and modes of defence required at an earlier stage are now no longer useful to the plants under existing conditions. And it is well known that a great many peculiarities of all sorts persist long after the conditions to which they were adapted, or which may have called them forth, have passed away.

In concluding this sketch of the substances free from nitrogen, we are now able to say that they fall naturally into two

classes—those which serve as treasuries of energy and those which subserve some minor but doubtless important end. We turn next to glance at that group of substances in which is found the vehicle of all these activities which present themselves when the energy treasured in the plant is released and manifests itself to us in some other way.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

The Forests of Michigan.

The first report of the directors of the State Forestry Commission of Michigan is a remarkably interesting and valuable document. It includes the law establishing the Commission, an account of a forestry convention at Grand Rapids, at which there seems to have been a much larger proportion of practical and sensible talk than is usual at such meetings, a list of trees and shrubs found in Michigan, and a large number of useful illustrations, which show the appearance and habit of growth of some of the principal trees of the state. The most important portions of the report are the brief and admirable discussions by Professor W. J. Beal of such subjects as forest-management in southern Michigan, forest-fires, the succession of forests in northern Michigan, cutting and removing logs for lumber, a lumber-camp, new uses for certain kinds of timber and the amount of pine yet remaining in Michigan.

The law provides for sending questions to the township-supervisors of the state regarding the area of forest-land, the origin and extent of fires and resulting damage, and the need of additional forest-legislation. The answers are not always very important, but the practice of sending out such questions has great value as a means of popular education regarding forestry subjects.

There are interesting communications from Professor A. J. Cook, Eugene Davenport, A. C. Glidden, A. A. Luce, T. T. Lyon (President of the Michigan Horticultural Society), Geo. D. Moore, W. K. Sexton, Professor V. M. Spalding, B. W. Steere, A. S. Kedzie, J. H. Moores, Geo. C. Nevins, and Hon. John T. Rich, Commissioner of Railroads. There is pretty uniform testimony that pasturage destroys the forest. But one gentleman says: "It is customary to pasture timber-lots. I consider it no injury to the trees, and but little benefit to the stock, except in the way of shade." If his judgment is correct, domestic animals might as well be kept out of Michigan woods.

There are several pages of apt quotations from this journal. The officers of the Commission are: Hon. Franklin Wells, President; Hon. Henry G. Reynolds, Secretary; Hon. Wm. B. McCreery, Auditor; Dr. W. J. Beal, of Agricultural College, and Hon. Chas. W. Garfield, Grand Rapids, Directors.

If every public library in the country could have a copy of this report it would vitally aid the work of popular education regarding forestry. An appendix contains the laws of Michigan relating to forests.

We make the following extracts from an address by Col. E. T. Ensign, of Colorado, at the Forestry Congress at Atlanta, last December, on the Colorado Forestry System.

The Colorado State Forestry Association was the first fruit of systematic local agitation of the forestry question. After its organization followed the enactment of a forest law in 1885. It created the office of State Forest Commissioner, and made the County Commissioners and Road Overseers through the state forest-officers for their own districts. The Commissioner has an annual salary, office equipments and traveling allowances. The county officers are paid *per diem* by the counties for services rendered. These officers are charged with the oversight of the public forests, they are to guard them against depredation and the outbreak and spread of fires, and they are to promote the culture of forest trees.

There are penalties for the willful or careless setting of forest fires, and for failure to extinguish camp-fires. The county officers must post notices conspicuously along the highways, warning travelers to put out their camp-fires, and citing penalties for failure to do so. Arboriculture is taught at the State Agricultural College, and provision has been made for the establishment of four experiment stations in different parts of the state. Forest-fires have become less frequent and destructive, and federal officers are aided somewhat to protect the timber on the national domain. Special effort has been made to show the intimate relations between the mountain forests and the streams of the state and its irrigation system. The forestry system of Colorado is an effort to improve local forest conditions. It deals with new methods, and seeks

to adapt itself to conditions unlike those existing elsewhere. It should be maintained until a more efficient system can be devised and put in operation.

Correspondence.

Forest Changes in Rhode Island.

To the Editor of GARDEN AND FOREST:

Sir.—When Roger Williams entered the Narragansett country and landed at what is now Providence, he had passed through a Pine and Cedar country. The slopes of the Moss-hassuck, of the Blackstone and Seekouk were heavily covered with Pine and Cedar. The stately Pine towered high and spoke to the winds; the Cedars were large and thick. There was Oak, but not in abundance. Now, confining myself to the region north of Providence, for a few miles of which I am familiar in ministerial work, I find that wherever the Pine has been cut down, not the Pine, but the Oak, has appeared. In Lincoln township there is abundance of Oak. Let us suppose ourselves in Pawtucket, a city adjoining Providence; we reach the end of Dexter Street, and for half a mile have woods. Much of it is little, scraggy Oak, in outer appearance like the Oak-forests I have often surveyed in central Illinois. Ascending the hill towards Saylesville, we see rising out of these puny Oaks perhaps twenty tall Pines, isolated and magnificent, and as graceful as any I ever saw. They stand alone like the pillars of the Temple of Jupiter Stator, monuments of a splendid arboreal age, when all those hills and valleys were filled with their brethren. In Saylesville itself, south of the bleacheries, and all alone, stands one of the most perfect and magnificent Pines in Rhode Island, its spreading branches a dark, rich, beautiful green. Above, around the rising hill, is the Oak. Between Saylesville and Pawtucket is a forest, a few tall Pines, but invariably where there has been a cutting is the Oak. Now, why is it that in this section of Rhode Island Oaks succeeds Pine? The Pines disappear. Tall and stately, and beautiful and strong, they have no successors. I tremble for that grand, unparalleled tree in Saylesville. It stands unique, and if your widely read journal can induce some Rhode Island photographer to take its picture I shall rejoice. It may be removed at any time from business necessity.

Providence, R. I.

Henry H. Northrop.

[The changes in the character of the forest-growth noticed by our correspondent in the neighborhood of Providence are gradually going on in many different parts of the country. They represent the bad effects which invariably follow ignorance in the management of the soil, whether it be the rich Corn-land or Cotton-land of the west or south, or the Pine-producing drift of New England. We are paying now, and dearly, for the mistakes made by earlier generations in the treatment of the soil in the first settled parts of the country, and we owe it to ourselves and to the generations which are to follow us, that the same charges are not made against us by our children's children. Land which produces large Pine trees does not produce vigorous or valuable Oaks. If the forests that once covered the gravelly plains and hills which surround Providence had not been disturbed by man; if the trees had not all been cut off and the surface soil licked up by constant burning, they would have been composed principally to-day of large White Pines and Cedars, as they were two hundred years ago. Fire and exposure are fatal to seedling White Pines. It is found that the seed of this tree does not germinate in soil which has recently been burned; and that the seedlings, when the seeds do germinate, perish when they are too much exposed to the sunlight, as is the case when the forest has been entirely cut away. The fact, however, that White Pines germinate freely and grow rapidly on abandoned pastures and old fields in many parts of New England, shows that the changed character of the soil consequent upon burning has more to do with the inability of this tree to reproduce itself upon ground recently cleared of a forest of Pines, than the exposure to light which follows clean cutting. The nature of the Pine and the Oak being understood, it is not difficult to see why, under the methods of forest-mismanagement which exist in this country, the latter is gradually taking the place of the former. An acorn may be carried by animals into the

midst of a Pine forest. It has the power of germinating and of existing almost indefinitely in deep shade. A feeble shoot only, perhaps, appears above the surface, hardly increasing perceptibly from year to year, while below the root goes on extending deeper and deeper. At the end of a century, perhaps, the Pines which shaded the Oak and checked its upward growth are destroyed, either by fire or by the axe. The Oak is broken off close to the ground, or fire consumes what appears above the surface. The Oak, however, has what the Pine does not have—the power to send up shoots from the stump—and the great root, which has been growing for years, at last has the opportunity to assert itself, and send up a strong, stout stem, or a cluster of stems, which occupy the ground, and so change the character of the next forest-crop. It is not probable, however, that there could have been enough Oaks growing in this way in any forest of Pines to change at once its character, and seedling Pines would appear among the Oaks, especially if the ground had not been burned over. But fires, if they do not do the damage the first year, are almost sure to come, sooner or later, and as they destroy the Pines and do not destroy the Oaks (for an Oak can be burned several times without destroying the vitality of the stump), every time a piece of ground is burned over the hold of the Oaks is strengthened as that of the Pines is weakened. This is why land which once grew large and valuable Pines now only produces small, stunted and worthless Oaks. This is what has been going on for a century or more all over New England and everywhere in the White Pine belt of the north. Mismanagement in the south is converting the valuable forests of the Long-leaved Pine into comparatively worthless forests of Old Field Pine. In Kentucky and in Tennessee mismanagement is gradually changing the forests of valuable White Oaks into forests of worthless Black Oaks, and all through the mountain forests of the West, Spruces and Firs and Pines are being replaced by miserable Aspens. Mismanagement growing out of disregard of the simplest laws of nature and of economy is slowly destroying the fertility and changing the character of the plant-covering of the whole North American continent. Such forces of nature work slowly, and the results, perhaps, are hardly noticed from generation to generation of men. But at length people, like our correspondent, begin to ask themselves, "Why is it that this land which, when it was first known, was covered with great forests of Pine, now only bears a feeble growth of stunted Oaks, and what has become of the fertility for which this region was once so famous?" It is easier to find the answer to such questions than it is to suggest the remedy for the conditions which give rise to them. But with such examples before our eyes as all the earliest-settled parts of this continent afford, there seems little excuse for the condition of things which already begins to prevail even in those regions where the balances of nature have not yet been seriously, or at least not irreparably, disturbed.—ED.]

To the Editor of GARDEN AND FOREST:

Sir.—It would not be safe, in my opinion, to trust to the innocuous character of that variety of *Rhus toxicodendron* with entire leaves upon such negative evidence as that presented in the communication published in your journal of February 6th. It is, of course, generally impossible for the physician to determine which variety has produced the cutaneous inflammation in individual cases, as the patient is almost always ignorant of such distinctions in the forms of leaves, even if able to recognize the plant at all.

I have in my office mounted, dried specimens of all the varieties of foliage of *Rhus toxicodendron* and *R. venenata*, and have frequently asked intelligent patients to point out which of the forms was the culpable agent in their case, and have seen no grounds for regarding the lobed leaflets of *R. toxicodendron* as more virulent than those with entire edges. I was certainly acquainted with one vine of the latter variety, which had been cultivated upon a building in ignorance of its nature, which severely poisoned at least two or three persons in one season. The great majority of persons are not affected by either variety.

It is interesting to know that persons "especially subject to Ivy poisoning" escaped last season, as described by your correspondent.

Boston, Feb. 7th.

James C. White.

To the Editor of GARDEN AND FOREST:

Sir.—In a recent number of a western horticultural journal I find the following: "Have you ever walked along the street of some city and observed the fragrance arising from the baskets of certain 'Rose seed' or 'Lavender bloom' venders? Well, when you do see them, don't invest in these wares unless you enjoy being fooled. The articles are offered for placing among clothes, and are 'warranted' never to lose their fragrance, but a dozen times a day the venders retire for a bit, and in some unobserved place squirt perfume over their stock to keep an odor about it. Anything that rattles in the envelopes does duty for the seeds or dry leaves."

Here in New York such frauds are common, and it seems as though there should be some way to prevent ignorant purchasers from being thus imposed upon. Not long ago I saw several peddlers on Twenty-third Street who were actually offering "Attar-of-Rose seed" for sale—the seed, that is, not of a plant, but of a perfume! There could hardly be a more transparent deception, yet it seemed to find many victims. From curiosity I ranked myself among them, and bought a ten-cent package of what looked like Pumpkin seeds. In twenty-four hours, of course, the strong scent which the package had emitted was wholly gone. On the other hand, the Lavender which is often sold on our streets in autumn seems to be the genuine article, may be bought either in dried twigs or in a powdered form, and keeps its delicate, fresh odor for a considerable length of time.

New York City.

W. K. G.

To the Editor of GARDEN AND FOREST:

Sir.—It may be interesting to note that *Nymphaea odorata* occasionally grows out of water. At Baur's Lay, on Buzzard's Bay, in 1888, pools which are such in spring, but which in summer are absolutely free from surface moisture, so as not to even dampen the shoes in walking over them, abounded with this plant. The leaves were large, but not unusually large, short petioled and healthy. The blooms had very short peduncles and the flowers were far larger than those that were found in water near by. It is not uncommon to notice the *N. odorata* blooming luxuriantly on the edges of ponds where the water has retreated, but this is the only instance I have observed of their growing when the ground was dry, without moisture in reach of discovery by digging with a jack knife.

It is not generally understood that some marsh plants will thrive far better in proper soil, different from their natural habitat, than in a state of nature. This instance given above is an analogous illustration with a water plant. It would be well for some of our cultivators to make a trial of growing the Pond Lily in the same manner as the Calla is now treated.

South Framingham, Mass.

E. Lewis Sturtevant.

Recent Publications.

Gartenkunst und Gaerten Sonst und Jetzt. Von H. Jaeger, Berlin, Paul Parey.

This book, the title of which may be somewhat clumsily translated as "Gardening Art and Gardens in Former and in Present Times," is one of the most valuable to the student of the subjects with which it deals that has yet been published. Its author holds the position of Royal Garden Inspector at Eisenach, and had published in 1877 a "Handbook of Gardening Art" for the practical instruction of members of his profession, which, we believe, is regarded in Germany as one of the best works of its class. The present work is primarily a popular history, not a theoretical or practical treatise. Yet the author's long personal experience in the planning and conservation of gardens, and the didactic habit of mind characteristic of the German intellect in general, have combined to bring within its covers many pages and incidental paragraphs of a theoretical, explanatory, and directly instructive sort. The reader, therefore, may learn from it not only what have been the efforts of gardeners in every age of the world, but how those efforts resulted from the point of view of abstract beauty, and also how they may best be utilized as precedents for modern practice. It is primarily a history, but, likewise, as its sub-title indicates, a general guide-book for the gardener, architect and amateur. The architect, especially, may learn much from its pages, for seldom has a treatise been written in which the respective qualities and claims of architectural and of gardening art are so systematically considered in the only right and proper way—that is to say, not separately, as the qualities and claims of two

rival arts, but together, as those of sister arts, each of which is dependent upon the other and neither of which can be properly practiced or appreciated if the other is left out of mind. Moreover, while most extended treatises on the history of gardening have been issued in large and costly tomes, this one forms but a single volume of about 550 pages of large octavo size, and costs less than \$5. Of course its illustrations are not so beautiful as those in more sumptuous and costly books; but they are very well selected; their number (250) makes up for their lack of size; the recent development of photographic art has permitted the inclusion of pictures of many gardens not hitherto familiar to the student's eye, and the numerous plans are clearly printed and sufficiently large to be easily understood. In short, the book is the most useful one of its kind of which we know; none in French or English exactly fills its place as being at once scholarly in point of view and popular in tone, and the gardener, architect or amateur who can read it in German is to be envied by his less fortunate fellows.

The introduction is one of the most interesting chapters in the book. It explains, among other things, that in all the earlier ages of the world, when a great part of the earth's surface remained in its primitive condition, formal gardens were exclusively created, natural gardens taking rank as works of art only when the savage beauties of nature had been so far subdued that a modified return to them meant novelty and refreshment for the soul of man. The first chapter deals with the gardening art of Egypt, Asia Minor, Persia, and Greece and its colonies. A long chapter on Roman Gardens follows, and a necessarily shorter one—for here the subject itself is less rich and sources of information are slenderer—on mediæval developments. The Italian Renaissance is then taken up, and its period of full bloom—when such men as Michael Angelo and Giulio Romano concerned themselves with the laying out of gardens—is fully treated. The spread of Italian ideas and their degeneracy into baroque, puerile and grotesque phases is then followed; next Dutch gardens are discussed, and then, at great length, the famous French period. The eighth chapter deals with the rise of true landscape-gardening in England. The ninth is devoted to the art of China and Japan, and the influence it had upon English development. Then this development is followed as it spread over the continent of Europe. Modern German gardens follow, then modern gardens in the rest of Europe, and in non-European countries, especially in America. German gardens in their estate to-day have a chapter to themselves, as do the useful gardens of the world—botanical gardens, cemeteries, winter-gardens, etc. And in a final chapter the present condition and the prospects of gardening art are theoretically considered. From this brief summary it will be guessed how rich Herr Jaeger's book must be in historical material. It is impossible within the limits of a mere review to summarize any of its historical chapters. Next week, however, we shall print some extracts having reference to American gardens, which we think will be of peculiar interest to our readers. And meanwhile we may quote a few counsels of a general sort which Herr Jaeger puts into particularly effective shape.

One of the great mistakes of modern theorists and practitioners, he says, is that they feel themselves obliged to take sides with one or the other of the great camps into which the gardeners of all time may be divided. They feel it incumbent upon them to declare distinctly in favor of the formal or of the natural style of gardening, and to exalt their chosen style to a degree which means the total denial of all worth or beauty in the other. In former times the same spirit has often manifested itself, as when, during the bloom of English landscape-gardening, countless beautiful old formal gardens were destroyed—in England itself and on the continent as well—to make room for novel arrangements often less harmonious and appropriate, and therefore less desirable in the given situation, than the arrangements they replaced. To-day almost every artist and amateur likewise professes himself a champion of the natural style, and refuses to consider the claims of architecture to a semi-architectural environment in the landscape. But the true aim of gardening art to-day, writes Herr Jaeger, should be "to unite both gardening styles—the pictorial (natural) and the symmetrical (architectural or formal)—or to use them alternately, as the exigencies of the site and of the dominant building demand the one or the other." His preference seems to be for a combination of both; not for a mixture of the two, in a disorderly, inartistic scheme, but for such a juxtaposition of contrasted elements, properly connected together and gradually leading the one into the other, as will properly support a building by symmetrical features and yet give true landscape beauty in remoter portions of the domain.

A certain measure of symmetry and architectural dignity in a garden is, indeed, naturally desired by the civilized eye; and when it is not supplied in right artistic ways is almost sure to be grasped in ignorant and inartistic ways. Theoretically, we ask only for natural effects in our gardens, and might be surprised to hear that we are always trying, in spite of theory, for symmetry and formality in line and color. But what other explanation can we give of the universal intrusion into our public and private gardens of geometrical ribbon-beds and borders, and of masses of exotic plants whose foliage is strictly architectural in character?

In this connection a final paragraph may be quoted from Herr Jaeger's pages. As bright-foliaged plants, he says, "form a contrast with the green of the main plantations, they ought to be very sparingly employed in their neighborhood. But to-day many gardeners and proprietors confuse rarity with beauty, and plant more of these bright-hued plants than is desirable—and sometimes such as are wholly insignificant intrinsically, or actually ugly. In general, the effort to introduce unfamiliar plants into a garden is a fashionable folly which can easily prove very dangerous to beauty in the result."

In conclusion, it is proper to say that Herr Jaeger's treatise has been somewhat severely criticised during the year since it appeared with regard to certain matters of historical detail. Dutch writers have accused him of patriotic bias in exaggerating the rôle which German artists played in Holland; and Austrian writers have accused him of unpatriotic bias in exaggerating the rôle which French artists played in Germany. Both accusations are based upon his account of certain individual gardens. But it must be remembered that the history of old gardens is often difficult to decipher, as they have largely lost their original estate under the successive retouching of generations of gardeners. And the main point, for the American reader at least, is not to know just who laid out this or that old garden, but to grasp the general course of the art, and the differences between its typical manifestations in this country and in that. As supplying a basis for such knowledge, we find Herr Jaeger's book all that a student could ask, while it is very pleasant reading even for those who have no serious desire to retain and put in practice the information it supplies.

Periodical Literature.

Bordeaux, which is one of the principal centres of the Vanilla trade, imports, according to the *Gardeners' Chronicle*, over 5,000 pounds annually. Most of the Vanilla imported comes from the French colony of Réunion, where the culture is of comparatively recent date. By the local dealers Vanilla is classified into four qualities. The pods of the first measure from seven to nine inches long; they possess the characteristic perfume in a greater degree than the other sorts. The Vanilla-vine, it is stated, is at times covered with efflorescence of a silvery brilliance, producing a crystallization similar to that found in the pod, and which in good specimens covers the outside of the pod. This is called Vanilla-vine, and is in great demand in the Bordeaux market. Two different methods prevail for preparing the pods for market. The first consists of harvesting the capsules after they have lost their green tint. Woolen sheets are spread upon the ground, and when thoroughly heated by the sun the pods are spread upon the sheets and exposed to the sun for a certain period; they are then put into the boxes, covered by a cloth and exposed to the sun. The fruit should assume a coffee color in twelve or fifteen hours after this last exposure. If this color is not obtained, the Vanilla is again submitted to the heat of the sun. This process occupies about two months, at the expiration of which the Vanilla is packed in tin boxes containing about fifty pods each and securely packed.

The second process consists of tying together about a thousand pods and plunging them into boiling water to bleach them, after which they are exposed to the sun for several hours, and then coated with oil or wrapped in oiled cotton to prevent the pod from bursting. During the drying the pod exudes a sticky liquid, the flow of which is promoted by gentle pressure of the pods two or three times a day. In the course of preparation for market the capsule loses about one-quarter of its original size.

The latest mail reports from Mauritius estimate that the out-turn of the coming crop in that island will be a small one, and will probably not exceed 34,000 pounds. The present market price in London for Vanilla is very good, ranging from eight shillings per pound for common to twenty-three shillings for fine sorts.

Notes.

During 1888, 100 car-loads of Lima Beans were shipped east from Santa Barbara, California.

Colonel E. T. Ensign has just been re-appointed to the office of Forest Commissioner of the State of Colorado, his present term being about to expire.

M. Godefroy-Lebeuf's new book upon *Cypripediums* is dedicated "*À la Gloire de la Maison J. Veitch & Sons, de Chelsea.*" The first part has just appeared.

Mr. H. A. Siebrecht, the well-known florist of this city, has been collecting plants in the West Indies. He writes that he has found a number of promising novelties in the mountains of Grenada.

The first number of a new Portuguese horticultural journal, "*O Floricultor*," has been issued. It is published in Oporto, and in Portuguese, with the exception of one column, "*pour les 'Etrangers.*"

At a ball recently given in New York, one apartment was exclusively decorated with Apple blossoms, another with Magna Charta Roses, a third with Orange trees in pots, and a fourth with Jonquils and blue Roman Hyacinths.

A German horticultural paper states that during the year which has recently closed no less than ninety-six new varieties of Roses were introduced into the European trade. Thirty-one florists shared in their introduction, and the list includes thirty-seven varieties of Remontant Roses and thirty-one Tea Roses.

The so-called "joss-sticks," the burning of which supplies incense for Chinese religious ceremonies, are made of the powdered leaves of *Lindera fragrans* mixed with the powdered roots of *Biota*. *Lindera fragrans* is a shrub of the true Laurel family (*Lauraceæ*), and its Chinese name means "Incense Leaves."

The Council of the Royal Horticultural Society of Great Britain intends to hold a Conference of Rosarians at the Chiswick Gardens on the 2d and 3d of July next. An exhibition of the species and varieties of Roses will be given the first day; and papers on Roses and their culture and origin are invited, and will be read and discussed during the second day.

The Royal Society of Agriculture and of Botany of Ghent will hold on the 23d of next November a grand international exhibition of Chrysanthemums, in honor of the centennial anniversary of the introduction of this now popular flower into Europe. Prizes are to be offered for the best specimens of primitive types, and for the best seedling varieties not yet in commerce.

The February issue of the *Kew Bulletin of Miscellaneous Information* is devoted to a list of the hardy herbaceous annual and perennial plants which matured seeds in the Royal Gardens last year. The seeds are available for exchange with other botanical establishments, but are not sold to the general public. This list makes a useful, although, of course, only a partial catalogue of the plants of this class cultivated in the Royal Gardens.

Flowers of the Japanese Apple (*Pyrus baccata*) have appeared this week in the window of a Broadway florist. Judged from the specimens displayed they seem to lack substance for winter forcing, and are less beautiful at this season of the year than might have been expected. The flowers of this tree are always more beautiful in bud than when fully expanded, and the branches should be cut before the flowers open if their real decorative value is to be obtained.

The twenty-second biennial meeting of the American Pomological Society was held at Ocala, Florida, on Wednesday, Thursday and Friday of last week. The attendance was large, all parts of the country being well represented. In the discussions, which were of the most interesting character, special attention was given to the fruits grown in Florida. The officers elected were: President, P. J. Berckmans, of Georgia; Vice-president, T. T. Lyons, of Michigan; Treasurer, B. G. Smith, of Massachusetts; Secretary, A. A. Crozier, of Iowa. Members were entertained with generous hospitality by the Horticultural Society of Florida, at whose invitation the meeting was held in that State. The exhibition of semi-tropical plants is said to have contained the most complete and best classified collection of citrus fruits ever made in Florida.

At a recent meeting of the Royal Horticultural Society of Aberdeen it was stated that one acre of Mushrooms in "our own country" (the exact locality not stated) had produced a

crop valued at about £1,450, of which more than £950 was clear profit, while near Leeds one-sixteenth of an acre had produced 3,000 pounds of Mushrooms, which means a crop worth about £1,600 to the acre. Another speaker, on the same occasion, treating of the forestry needs of the country, said that so long ago as 1457 proprietors were ordered by government to plant trees; that in 1503, in Scotland, a fine of £5 was imposed on any one who cut down a tree, so entirely had the land been denuded of wood; that thirty years later stringent regulations were passed with regard to the extent of land which the larger proprietors were annually to plant with forest trees, and the death penalty was affixed to the third offense in the way of tree-cutting. But the last decree of an analogous nature was passed in 1661, since which time no legislation has dealt with the subject.

According to the *Carpenter and Joiner*, New York is now the largest mahogany market in the world. Thirty years ago Mahogany was known commercially as "St. Domingo," from the island of St. Domingo, and "Baywood," or "Bay Mahogany," from the vicinity of the bay of Honduras in Central America. The Central American wood was soft, of light weight, and characterless; in later years it has practically ceased coming to this market, but one cargo having arrived at the port of New York during the last six years. St. Domingo Mahogany exists in name only. The original growth of this wood on the island of St. Domingo has long since been used, and the importation of small lots at exceedingly long intervals are only of the small and stunted growth, crooked, stained and defective. Individual logs of good size and quality can be secured only occasionally. The island of Cuba furnishes considerable quantities of a smaller size, more especially valuable for small work, which is hard and of good texture, but the great bulk of the mahogany used in later years is supplied from the forests of Mexico. Southern Mexico produces not only our largest and most beautiful grades of mahogany, but also some of the softer and less desirable grades, somewhat resembling the Baywood or Honduras Mahogany of olden times.

The schedule of prizes offered during the current year by the Massachusetts Horticultural Society, amounting to \$6,000, has appeared. One-half of the amount is offered for plants and flowers; \$1,700 for fruits; \$1,000 for vegetables, and \$300 for gardens and green-houses. There are also "prospective prizes" derived from the "Benjamin B. Davis Fund," for the originators of seedling fruits, flowering plants and vegetables which are not awarded until a satisfactory trial, extending through several years, has established the real merit of the variety. Such prizes as these last are calculated to develop horticulture in the most practical and useful manner. There are some curious anomalies in this schedule of prizes which will strike all practical horticulturists. For example, a \$3 prize is offered for four bunches of Radishes; \$4 for six pots of Roman Hyacinths; while the best specimen plant among the Indian Azaleas can win only \$4—no great inducement to any one to run the risk of ruining a good plant, which may represent twenty years' careful cultivation. Prizes of \$3 for ten cucumbers and of the same amount for a peck of Dandelions are certainly liberal, when the highest prize four Heaths can get is only \$8. The largest and best collection of blooms of hardy trees and shrubs may win \$6, and on the same day twelve Beets or twelve stalks of Rhubarb may aspire to carry away \$3 each. "Stove and green-house flowering plants," if they are not Orchids, do not get much encouragement, but on the 25th of June "two distinct named varieties" can carry away \$10, and on the same day twelve Beets, if they are good ones, can earn \$3. Beets seem to be favorites in Boston. The successful cultivation of Chrysanthemums is held to be most worthy of reward, as the highest prizes offered by the Society for flowering plants go to the best collection of twenty named varieties. Aesthetic considerations have, nevertheless, due weight when the garden prizes are in question, for \$60 goes to the "best House of Orchids in bloom," while the fortunate owners of the "best Strawberry-garden or the best vineyard of one acre" must each be contented with \$50.

Catalogues Received.

C. E. ALLEN, Brattleboro, Vt.;—Seeds, Plants, Small Fruits, etc.—R. & J. FARQUHAR & Co., 16 South Market Street, Boston, Mass.;—Seeds, Plants, etc.—GREEN'S NURSERY CO., Rochester, N. Y.;—Fruit Trees, Ornamental Shrubs, etc.—JOHN R. & A. MURDOCH, 508 Smithfield Street, Pittsburgh, Pa.;—Vegetable and Flower Seeds, Plants, etc.—VILMORIN-ANDRIEUX & Co., 4 Quai de la Mégisserie, Paris, France;—Seeds, etc.

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The Adirondack Forests.

THE complete destruction of the Adirondack forests is inevitable if existing conditions and methods of treatment are to continue. Unimportant improvements in the details of their management may be made from time to time; such improvements have been made within the last few years, and others are now proposed; but the processes of destruction are much more rapid and extensive than the effect of these comparatively insignificant means of amelioration, and there is at present no reason to expect that any effective provision will be made for the permanent protection of any part of this important region. Nothing can be done, indeed, without a thorough change in the system of control and administration of the forests on the state lands. The methods now pursued interpose no serious check to the influences which will extirpate the woods in a comparatively short time. If the devastation of the region, already far advanced, is completed, centuries of time will be required for any process of restoration.

The destruction of the North Woods will produce a change in the flow of the principal rivers of the state, and in the water-supply of the Erie Canal, which will cause widespread disaster to the interests of the people. There will be uncontrollable freshets at the times of heaviest rain-fall, and when the snow melts in the spring; the channels of the rivers will be choked by debris brought down from the hills; and in summer, when a full volume of water is most needed, the flow will be insignificant. If this ruin is consummated it will be a most serious blow to the prosperity of the state and of all classes of its people.

Not less important is the value of the region in its relation to the health and life of the people of the country, as a place of resort for the inhabitants of the towns, and for all who need the restorative and vitalizing atmosphere and influences of a region of sylvan beauty and peace. As our population becomes more dense, the need and value of wild, rough tracts, incapable of cultivation, will be greatly increased. Beyond the arrangement required for the subsistence and comfort of the multitudes of visitors, no settlement or inhabitancy should be permitted in any part of the wilderness. If the forests are destroyed the entire charm

and attractiveness of the region will be eliminated, and a scene of hideous desolation will be substituted which no one will ever wish to look upon.

The only plan by which such injury can be averted, and means provided for the permanent conservation of these invaluable forests, is the acquisition by the state of the entire Adirondack region. While portions of it remain in the hands of private owners, injuries to state-lands adjacent to their holdings cannot be prevented. But it would be senseless and wicked to expend the money which would be required for this purpose while the present system of control continues. It has proved entirely inadequate for the protection of the forests on the lands which already belong to the state, and it would be the extreme of folly to acquire property at great cost when there is danger that it might soon be dissipated and destroyed.

Unless a system of permanent control under competent direction can be put in operation, the people of New York may as well relinquish all thought of saving the Adirondack forests, and all interest in the subject. There can be no adequate or successful administration of a great forest-preserve while its management is subject to the possibility of frequent change because it is treated as a portion of the political patronage of the state government. Unless the care of the forests on the state-lands can be placed in the hands of men of such known and obvious character and qualification for this work as will inspire general confidence, no system of administration can be successful, and competent men will not accept a place of such responsibility and importance while their work is always liable to interruption by the agencies of partisan politics. The inadequacy and failure of the present system of control and administration are inherent in the system itself, and are inseparable from its relation to partisan change and caprice. The evil is not to be remedied by merely changing the persons who administer a system which is essentially vicious.

If the people of the State of New York have enough regard for their own interests to lead them to insist upon the adoption of a system embodying the essential features of competent direction and security from partisan interference, it will be safe and wise to acquire the whole Adirondack region by purchase. If they have not this perception of the importance of the object in view, and of the means which are necessary for its accomplishment, the forests will be left to their fate. The methods now employed are wholly useless and ineffective.

How Trees Grow Tall.

THERE is no question more often asked of persons who are supposed to have some knowledge of trees than one relating to the manner in which the trunk attains its height. It is difficult to convince people, sometimes, that the trunk itself does not elongate and stretch just as the body of a growing child elongates, and that a mark made in the bark at a given distance from the ground will always remain at exactly that height, no matter how tall the tree may become. A correspondent of the semi-weekly *Tribune*, of this city, raised this question some fifteen years ago, and the answer which Professor Asa Gray wrote is so admirably clear, and such an excellent example of his method of dealing with scientific subjects in a clear and simple way, that we reproduce it for the benefit of our readers, among whom there are some, it is pretty safe to assume, who do not very clearly understand, even if they have ever given the subject any serious consideration, how trees grow tall.

"When I was a boy a thrifty Balm of Gilead Poplar before my father's house, barely large enough for the purpose, was used to hang a gate upon. I remember that the passers-by said: 'That is all very well now, but as the tree grows, the gate will go up.' The gate, as I remember, served for years, and did not 'go up.' When I was a boy, a long row of Lombardy Poplars on the side of the road leading to Hamilton College was used for fence posts, rails being mortised into

their trunks. After I had come to manhood, and had come to be a sort of authority upon such matters, one day, when in the neighborhood, this question was brought up, and the prevalent opinion expressed that the trunks of the trees in such a case must needs separate the rails more widely, and carry them all further from the ground. This opinion was shared by some very intelligent men, who had walked past these trees day after day for many years. I proposed that we should examine the fence, then at least twenty years old. We did so. The lower rail throughout remained next the ground; the upper, apparently, was no higher than the first; the growing wood had formed itself around the ends of the rails, sometimes in remarkable protrusions, forming deep sockets for the rails.

"As for the analogy of the tree with the man, 'born, say, one foot long, and growing till he is six feet high,' but still keeping the same head at the top—that is just what the tree does not do. Let the large bud at the summit of last year's seedling Horse-chestnut tree represent the head, and let Mr. Harrison notice what becomes of it in the spring, when the new growth is made. Or, let him examine a Horse-chestnut tree of five or six years' growth, and notice by the set of rings on the bark, left by the bud scales as they fell, just where the head was each year. He will see that the tree has the advantage of a fresh head each year—a new growth story after story, each on the top of the preceding one; whereas, in the man, the 'one small head' had to 'carry all he knew' year after year. On the other hand, the man is alive all through; the older parts of the tree are dead and buried in the interior.

"The heart-wood of any tree is dead, therefore cannot grow. If the lower part of a trunk has increased in length, say doubled it, in a given number of years, either the central wood must have been torn asunder or stretched, or the outer layers have successively slid over the inner ones. An examination of the structure of the wood as clearly shows that neither of the latter alternatives has occurred, as ordinary observation shows, against the first alternative.

"Can our correspondent bring any one clear case of evidence that a limb has been raised by the subsequent lengthening of a trunk below, excluding all cases such as that formerly referred to in the *Tribune*, where a tree growing on a rock is bodily raised, more or less, by the thickening of the roots spreading over the rock's surface? When such a case is brought to view, then the case will be fairly and specifically before the court of investigation.

"But why do not the limbs always remain near the ground? Answer.—They do until they die off, as the lower over-shadowed ones are pretty sure to do. Hemlock and Pine trees show this perfectly, for the knots remain to show where the branches were. When dead and gone at the surface, the succeeding layers of wood, covering all smoothly over, make 'clear stuff,' but it is clear delusion to believe that there have been no branches there; near the centre the knots or their vestiges are still preserved and plain to see on any section which divides the centre. Does our correspondent suppose that those Sugar Pines of the West, with trunks 100 feet high, before a vestige of a limb is seen outside, actually grew to that height without a limb?

"But, then, why does not the new external growth bring the (horizontal) limbs each year closer to the ground? Answer.—It does, by so much as the branch increases in diameter, and also when, long and horizontal, the lower limbs are weighed down. In consequence of this, I have had to lop some White Pine trees which overhang the road, and which, as they increased in weight and leverage, with the increase in length, began to get in the way of teams. In English park trees, where the lower limbs are carefully preserved, it is very common for them to lie on the ground. But at the trunk they will be found to be five or six feet from the ground; when young, of course, they were as high as that throughout, but have declined by their weight as they increased in length."

A German Sketch of American Gardening.

IN Herr Jaeger's "Gardening Art and Gardens," which was reviewed in this journal last week, a number of pages and several illustrations are devoted to landscape-gardening in the United States. The information given is generally correct, and though one would have been glad to see some other picture of an American home replace the "View of Blithewood," which is evidently reproduced from Downing's book, written many years ago, nothing better could have been chosen to illustrate the skill of American artists in dealing with the most fundamental and difficult problems of design than the large scale plans of the Central Park.

During the rule of the Dutch in New York, the author says, a few formal gardens in the characteristic Dutch style were laid out, but the growing supremacy of the English race soon gave landscape-gardening proper the upper hand. Parmentier is honorably mentioned as the first gardener of importance whose name has been preserved, but to Downing is rightly given the credit of being the first noteworthy American artist in this department. His death, however, is curiously placed in the year 1885, instead of in 1852. His book on "Landscape-Gardening" is described as "amply fulfilling its aim as a hand-book," and being "especially distinguished above others of its class by its portrayal of the characteristics of various species of trees and their proper employment in gardening art." Nothman and Thomas Lee are likewise mentioned as having worked at the same period; and one is glad to note that this foreign author, unlike many native Americans, recognizes the importance of the piazza in American rural architecture and sees its distinctly local significance. A long list of older parks and country-places is given, taken, of course, from Downing. But all these are as nothing, Herr Jaeger explains, in comparison with the great parks and cemeteries that owe their origin to recent years. To illustrate their character he describes the Central Park, in this city, and Spring Grove Cemetery, in Cincinnati. The choice is a wise one, for this cemetery was the parent of the others of its class, and the Central Park represents the successful treatment of the most difficult problem with which any modern artist has had to deal. After quoting a long description of the appearance of the park that had been printed some years before, he says: "The ridge of land which traverses the whole island of Manhattan becomes in the Central Park a rocky 'comb,' which cuts through the park, but does not divide it, for everywhere tunnels and bridges are placed in such a way as to bind the parts together above and below. The rocks in many places have been made larger and more picturesque by the removal of earth; splits and chasms have been turned into romantic glens; and all this seems as natural as though the hand of man had merely laid out the paths and concourses." Then the following words are quoted from the pen of a well-known German writer, Otto von Corvin, who visited the park not many years after it was laid out: "When I entered the park a prospect presented itself which, in the neighborhood of a large city, and especially of New York, I had not anticipated. Although unfinished and lacking large trees, this park is the most beautiful in the world, as it is the largest [?] and most peculiar. Truly, it does not possess those immense stretches of green, or great, shady avenues we see in the parks of London. Although beautiful meadows do not lack, yet one seems to find one's self in a charming district of the Harz mountains or the Thuringian forest. Everywhere rocks appear, and their naked sides are picturesquely clothed with intelligently-planted creepers." The remainder of this description need not be quoted, however, for it recites details with which almost all our readers must be familiar.

Spring Grove Cemetery Herr Jaeger calls the "most beautiful graveyard in the world." Its creator, as every one knows, was Adolf Strauch, a German by birth. He himself often declared that he had got his idea for a park-like cemetery from the description of Chinese graveyards in Humboldt's "Cosmos;" but Herr Jaeger says there was no need for him to go so far afield since he might have seen in Germany certain cemeteries portions of which, at least, were laid out in a park-like manner. "But in truth," he adds, "they are not even remotely to be compared with such a work of art as Spring Grove." Many other cemeteries and parks are noted with approval but the words used about one or two of them are worth quotation as showing that all does not look fair and laudable in American gardening to intelligent foreign eyes. "In the South Park in Chicago," the author says, "flower-bed artisticities reach the verge of lunacy, for with bright plants there have been formed figures in relief and portrait-heads, etc., as much as six feet in height. . . . And the park in Boston (by which is meant the Common and the Public Garden taken together), in spite of its size, must be called petty in arrangement, presenting a monstrous mixture of Franco-Italian and English gardening styles, and being tastelessly encumbered with flowers."

In conclusion, Herr Jaeger says that great interest is now universally felt in all the thickly settled districts of our country with regard to private grounds and gardens; and he notes with approval the promising fact that in laying out new towns and enlarging old ones, landscape-gardeners are more and more frequently called upon to give their help. The character of his book being popular and historical rather than technical, he does not lay so much stress upon the ability of our

foremost artists in planning great public parks—the most difficult of all the landscape-gardener's tasks—as does Monsieur André in his more practical hand-book called "*L'Art des Jardins*." But it is pleasant to see that with all the wealth of material from which he had to choose, dealing with times old and new, American artists and their work were esteemed worthy of so considerable a share of attention and praise.

Conifers Injured by Squirrels.

That squirrels have the habit of biting off the cones of coniferous trees in order to get at the seeds more easily, is well known, but why quantities of the twigs, tips and buds of these trees are sometimes found upon the ground in winter and spring seems not to have been generally understood. Complaints on this subject have often been made by people living near Boston, and attention has been particularly directed to the Norway Spruce. In some cases bushels of tips, from two to four inches long, could be gathered under two or three of these trees. High winds, disease, insects, birds, squirrels and other agencies have been suggested, but proof seemed to be wanting to substantiate any theory. That it did not result from strong winds during cold weather was proved by the fact that the trouble was local, as the ground under some Spruces would be thickly strewn with the tips, while other trees only a few rods away were quite free from evidence of injury. Neither, on careful examination, could any trace of disease, or the work of borers or other insects be found.

The injuries have been noticed in other parts of the country, and in the *Gardeners' Monthly* for 1885 there are several notes concerning it. The editor, p. 166, considers the "matter mysterious," and says that "mice or squirrels cannot do it, as the twigs are not cut by teeth, but broken, as examination by a lens clearly shows."

On page 227 Professor W. A. Buckhout gives several good reasons for supposing it was the work of squirrels, but he had not seen them do it, and, in addition to the Norway Spruce, he mentions similar injuries to *Pinus rigida*. The editor mentions specimens received from New Hampshire which "were broken off at a bud—disarticulated as it were—which a squirrel could not do," and he further thinks "that after the rodent has cut the branch, and drying commences, disarticulation of the side branches results."

At the end of a note (p. 276) from a correspondent at Lexington, Kentucky, who complains of similar injuries to Norway Spruces there, for which he can give no reason, the editor says: "On our grounds (Germantown, Pennsylvania) we have no squirrels, and yet the trees are so thickly strewn with branches—broken at the articulation, not cut by teeth—that the ground surface beneath the trees is covered."

Several years ago I noticed gray squirrels cutting off twigs of Norway Spruce in the winter or early spring, but not until very recently have I had what seems to be positive proof that they do all the mischief. After having carefully watched them at the work I think there is not the least doubt that besides cutting off the twigs at any place, they can also, and naturally do, "disarticulate" the branches at the point where the last season's growth began. In this vicinity a very large proportion of the twigs cut from the Spruces are severed at the "articulation," probably because the squirrels generally find it the most convenient place. As the squirrels reach forward and grasp the little side branchlets to draw them towards themselves, they find the branchlets bend most readily at, or close to, the base of the year's growth, and at the same place a small space is left clear of the sharp-pointed leaves, at once giving an opening and a weak point at which to sever it, which the squirrels do quickly and neatly with their sharp incisors. "Disarticulation of the side branches" would not naturally take place after drying until long after the leaves had fallen and the branches had begun to decay.

The object of the squirrels in cutting off the twigs is to enable them to get at the terminal and lateral buds, the heart of which they dexterously extract and eat while they have a comfortable foot-hold on a strong branch. For the same reasons they cut the nuts from trees and retire to a safe place before eating. Many buds are eaten without cutting off the twigs. Both the red and gray squirrels cut the twigs of Spruces, and I have seen the two species at work on the same trees at the same time.

They seem to prefer the Norway to either the native Black or White Spruces when growing side by side, probably because in the former the branches are more supple, and the leaves less sharp and rigid.

On calm days, when the squirrels are at work, most of the twigs which they cut off and drop may be caught and lodged

by their leaves among the branches of the trees, and being blown to the ground during strong winds, their appearance in large quantities after a storm is accounted for. On the flat, sprayed branches, on the upper part of a large tree, I found little heaps of the detached twigs. Although walnuts and hickories were not abundant, there was a good crop of acorns and other tree-seeds the past season, and it is difficult to say why the squirrels eat the spruce-buds, as their doing so does not appear to be from necessity.

If the attack should be made upon the same trees for a number of years it would naturally result in giving the branches a tufted and deformed appearance, if not proving a very serious or fatal injury.

Near the Arnold Arboretum there are some European Larches, the slender, pendulous twigs of which have been bitten off by squirrels in the spring, for several years at least, and the branches are covered with numerous knotty swellings and tufts, which are quite conspicuous, especially in winter.

I have found only one authority who has seen and recorded this habit in our squirrels. Dr. C. Hart Merriam, in his work on "The Vertebrates of the Adirondack Region," in the article on the red squirrel, p. 116, says: He eats the little buds that may be found scattered sparingly along the small branches of the Spruce, and, in order to obtain them easily, bites off the terminal twigs and drags them back where the limb is large enough to allow him to sit comfortably on his haunches while feeding. Under single trees, both in the great forest and on our own lawn, I have found enough twigs to fill a bushel basket. The injury thus done is sometimes very extensive."

In European journals there are frequent notices of injuries to Conifers caused by squirrels; but, in some instances at least, the attacks are of a different and more serious kind. A writer in the *Journal of Forestry* (London) for January, 1881, p. 578, says of them: "After a severe winter, during which a scarcity of seeds has been experienced, these animals betake themselves to the young woods, and do great damage by nipping buds from the extremities of the branches, thus causing the trees to become bushy and straggling in the top; they also in the early spring and summer months denude many Pine trees of their bark, commencing their attacks at two to five feet from the top, sometimes peeling all around and sometimes in patches; in the former case, the heavy winds will cause the trees to break; but, as regards the latter, the injury, if not severe, will in time heal over, although usually producing what is subsequently known as a flaw in timber. . . . In like manner squirrels attack deciduous trees, such as the Beech and Plane, thus frequently causing the tops to die. . . . In woods where there is a good mixture of Spruce Fir, their depredations will be found to be of the most serious nature."

By far the most serious charge that I have seen against the squirrels, in connection with their injuries to Conifers, occurs in the *Bulletin de la Société d'Acclimatation de France*, April, 1881, p. 253, where M. Ed. Rénard gives an account of the ravages caused by squirrels on the Pines in the forest of Rambouillet. Here the writer relates that previous to the year 1874 there were no squirrels known in the forest of Rambouillet; but about this time they were introduced, having escaped from a neighboring château.

At first their presence in the woods gave pleasure; then he says: "But one day, after a strong gust of wind, I saw on the ground, to my astonishment, a considerable quantity of the leaders (*flèches*) of Pines from two to three metres in height. I did not know to what to attribute this devastation, which I soon knew must be the work of the squirrels; they had gnawed entirely around the bark of the Conifers, and the dead tops of my trees were thrown down and strewn on the ground."

The destruction of the squirrels was ordered, and over 200 were killed in the year, and the injuries decreased. Later, however, a new invasion of squirrels from another forest destroyed some thousands of trees of *Pinus sylvestris*, by completely girdling the stems several metres from the ground, causing the trees to have a spreading form, and destroying their value for timber.

Acorns having been scarce the preceding year, he thinks that the squirrels, in the absence of other winter food, were obliged to eat the bark.

The trouble had increased to such an extent from year to year, the squirrels attacking fruit-trees as well as Conifers, that the forest administrators had established a reward of half a franc each for all squirrels killed.

I do not know that the squirrels have been found to peel the bark of Pines in this country, but it is not improbable that they would do so in times of scarcity of other food.

In the spring they sometimes bite through the bark of

Maples to drink the sweet sap which flows so freely at that time, and, after growth begins, they eat great quantities of the buds of some deciduous trees, especially of Maples, but without seeming to affect the trees very seriously, probably because there are plenty of the small accessory buds remaining to replace those destroyed and repair any injury done.

Arnold Arboretum.

J. G. Jack.

Agaves.

PERSONS familiar only with Agaves, or, as they are popularly, although improperly, called, Aloes and "Century Plants," grown in pots, can have a very slight idea of their massive strength and beauty when planted out permanently in a region whose climatic conditions are favorable to their full and perfect development. Our illustration upon page 115, from a photograph taken in an Algerian garden, shows how these plants look under such conditions. For producing certain effects in gardening, especially where plants are needed in immediate connection with buildings or other structures, in moderately warm or dry countries, like those which surround the Mediterranean, where, although natives of the Mexican plateau, some species of Agave are now perfectly naturalized, or like southern California, where some of the small species grow spontaneously, the Agave is immensely valuable. Even in countries where it is necessary to protect them from the cold in winter, and therefore to grow them in pots or tubs, these plants are better suited to decorate dry and sunny terraces, or the entrances to large buildings, than any others, as they can support heat and dust and continue to grow and improve for many years, or until the development of the flower-stem ends their existence; for these plants flower only once, and as this does not occur until they are fully grown, they early acquired the name of "Century Plants," because, confined in pots, the plants first introduced into Europe grew so slowly that they did not flower for many years. It is now known, however, that in a state of nature the largest species reach maturity at the end of fifteen or twenty years, or, perhaps, even in a shorter time; and their tall, branching flower-stems, often more than thirty feet high, are familiar and exciting objects to all travelers in northern Mexico.

New or Little Known Plants.

Fendlera rupicola.

FENDLERA RUPICOLA,* of which a figure appears on page 113, is a low shrub peculiar to the dry south-western portions of the United States, being found growing in the crevices of cliffs or among rocks from the valley of the Guadalupe, in western Texas, to the western borders of New Mexico and south-western Colorado. Although scarcely known in gardens yet, it promises to become so, as it possesses many qualities which will make it a most desirable addition to the number of small shrubs suitable for cultivation in the rock-garden or along the margins of small shrubberies.

Fendlera attains a height of from two to four feet. The branches are upright or somewhat pendulous, slightly angled or grooved, pale gray, and covered with small, entire, opposite leaves, which are revolute on the margins, prominently three-ribbed, and densely covered on the lower surface with pale tomentum. The bluish white flowers, with their conspicuous yellow stamens, are very showy, and are produced in the greatest profusion from the extremities of short lateral branches, which spring from the main stems of the plant.

Fendlera has been cultivated in the Arnold Arboretum for several years; it is perfectly hardy, flowering the middle of June and ripening its seed in September. It is growing in ordinary, good garden soil, and requires no special care or cultivation.

The genus Fendlera, of which but a single species is known, commemorates the services to botany of the late Augustus Fendler, a German naturalist, long a resident of the United States, and, after Wislizenus, the first botanist who visited New Mexico, where he made large and important collections of plants. It belongs to the Saxifrage

family and to the tribe of the Hydrangeas, which consists of sixteen genera of woody plants all natives of eastern Asia, the Pacific islands and North America. Among them are Hydrangea, Deutzia and Philadelphus, and several North American genera, which, like Fendlera, are monotypical, Jamesia of Colorado and Carpenteria of California being its closest allies.

C. S. S.

Foreign Correspondence.

London Letter.

PROFESSOR MACOWAN, director of the Botanic Gardens at Cape Town, has recently discovered wild plants of a very distinct and remarkable Scrophulariad, which is likely to prove a useful garden plant. It was first found by Ecklon in Tulbagh, about 100 miles to the north-west of Cape Town, and was described by Bentham in 1836 under the name of *Ixianthes retzioides*. Dr. Harvey figured it soon after in his "*Thesaurus Capensis*," and recommended it to the notice of English horticulturists. Till now, however, its introduction has not been possible, owing to the extreme scarcity of the plant in a wild state. Professor MacOwan, who has sent seeds of it to Kew, writes: "I beat over nearly every square yard of the mountain side wherever there was oozing water every time I went to Tulbagh, and last October dropped on to five large plants, almost trees for size, most splendidly in flower. The long floriferous branchlets were just one mass of sulphur-yellow bells, as close as they could well stick. I have since secured seeds, a portion of which I send to Kew; the rest goes to Vilmorin, Andrieux & Co., Paris." The plant is of shrubby habit, five feet high, with densely crowded leaves two and one-half inches long, one-quarter inch wide, toothed, dark green. The flowers are bell-shaped, one-half inch deep, with five spreading segments measuring one inch across and of a bright yellow color; they are produced in pairs or threes on short peduncles from the axils of the leaves. The plant grows in wet places. Many of the Cape Scrophulariads are remarkable for the beauty of their flowers, but, owing to their being semi-parasitic on the roots of other plants, they cannot be cultivated. Such plants are Cycnium, Buttonia, Gerardia, Harveya and Melasma, of which we have obtained seeds again and again for trial at Kew. At present we have young plants of Cycnium, Buttonia and Melasma, but they grow very slowly. We have also lately sown seeds of Harveya on soil containing a plant of *Barosma foetidissima*, which is said to be the host plant of this species.

The Cape flora is exceptionally rich in plants of great beauty and interest both for gardener and botanist. No country in the world has contributed so largely to English plant-houses, and although many of the plants which were cultivated here with so much delight fifty years ago are out of fashion now, they are certain to come into favor again. From 1775 to 1835 Cape plants were quite the rage; English gardens were filled with Ericas, Pelargoniums (the species), Proteas, and such like beautiful shrubs, while the Iris, Amaryllis and Lily families were represented in thousands. The survivors of this reign of the Cape flora are principally such bulbous plants as Nerine, Vallota, Clivia, Ixia, Lachenalia and Gladiolus. Freesia was lost entirely till about five years ago, when Professor Foster drew attention to it, whilst even Lachenalias and Neries have come into notice again only within the last ten years. The Ericas have almost gone, if we except a very few of the soft-wooded kinds. No one grows Portea except, perhaps, at Kew. Nor are the delightful species of Pelargonium, Oxalis, Watsonia, many Gladioli, Cyrtanthus and Crinum known in gardens, save in a very few. Mr. Endicott, of your country, is, I perceive, doing good work in growing and calling attention to some of these lost plants. In like manner a few specialists in England are striving to popularize many of the best of the least known Cape plants. Nor have all the good plants of the Cape been introduced yet. Witness the discovery of the glorious Poppy-flowered Sun-dew by Miss North when she went on a sketching visit to the Cape in 1885. This plant has flowers as large and bright-colored as those of the field Poppy. It is satisfactory to be able to add that there are living examples of it at Kew. There are many grand garden-plants at the Cape of which we know practically nothing.

In England, with our dull, wet, foggy winters, the cultivation of the more delicate Cape plants is surrounded by great difficulties. In America you have only the cold to overcome; light you have in abundance all through the winter. I imagine that Cape plants, if taken well in hand, would prove a far greater success with you than in England.

* FENDLERA RUPICOLA, Engelm. and Gray; Gray, *Pl. Wright.*, i. 77, t. 5; *Pl. Thurber.* 300.—Baillon, *Hist. Pl.*, iii. 349.

Among the newer stove plants the most attractive now are the following: *Ardisia mamillata*, introduced by Kew from Hong Kong three years ago, and now a favorite stove plant here. It is less than a foot in height, similar in habit to *A. crenulata*, but the leaves are softer, densely papillose, covered with silky hairs, and dark green. The berries are borne on the branches exactly as in *A. crenulata*, but they are of a bright scarlet color. Plants are easily obtained from seeds, and grow to pretty little specimens in about a year.

Begonia semperflorens hybrids:—Monsieur Lemoine has raised and distributed some very useful new winter-flowering Begonias, obtained by crossing *B. semperflorens* and *B. Lynchiana* (Roezlii). They grow quickly into bushy plants two feet high, with medium-sized leaves of the glossiest green, and large bunches of red, crimson or pink flowers. These are developed in January, and last in beauty for about two months. They are great improvements upon both parents, a statement which does not always apply to hybrids. The ever-green Begonias are at last getting the attention which has been so long refused them, and we have already some distinct and beautiful kinds, thanks to Monsieur Lemoine, the Messrs. Veitch and a few others. Even such old hybrids as *B. Knowsleyana*, *B. Wiltoniensis* and *B. Lindleyana* are of considerable value as autumn and winter-flowering plants.

Aphelandra chrysops, a stout-stemmed species with large, silver-banded leaves and handsome terminal spikes of canary-yellow flowers; *A. aurantiaca*, smaller in stature than the above, but of sturdy habit with shining gray-green leaves and large spikes of scarlet and yellow flowers; *Eranthemum albi-florum*, with orbicular leaves and branched spikes of pure white flowers; *E. cinnabarina*, a tall, single-stemmed species, characterized by large, oblong leaves and long, arching, branched racemes of purplish-crimson flowers; these are all in flower now and will remain in beauty for some weeks yet. Tropical Acanthads are deserving of a great deal more attention than they get. Most plant-stoves are dull and almost flowerless at this time of year, although there are hosts of such plants as those here mentioned, which are bright and attractive with flowers all through the winter. They are easily grown, requiring only ordinary attention at all times. Aphelandras are best when grown from seeds, which they usually ripen freely under cultivation.

In the conservatory the Himalayan Rhododendrons have begun to unfold their magnificent flower heads. Large specimens of *R. arboreum*, with the richest crimson blossoms, and of *R. Nilagericum* equally handsome, but pale pink in color

are the first to brighten the house; and they will be shortly followed by such splendid species as *R. argenteum*, *R. Nuttallii*, *R. Aucklandia*, *R. Edgeworthii* and many others. I can imagine a large, lightly-built, low-roofed conservatory, without any staging, but filled with beds of peat soil and planted with these Rhododendrons, Tree Ferns, Lilioms—such as *L. auratum* and *L. giganteum*. Such a house would require very little fire-heat and much less attention than when the plants are in pots. The charm of it would be largely due to the absence of pots and stages, of which we are a great deal too fond where green-houses are concerned. The popularity of the great winter-garden at Kew is owing to the absence of pots except on the shelves round the sides; and that

the plants prefer beds to pots is proved by the magnificent health of such things as Acacias, Polygalas, Bossiæas, Palms, Tree Ferns and Rhododendrons. No one can form any idea of the beauty of the *Habrothamnus* until he has seen them as at Kew. The enormous bushes, twelve feet high, crowded with long, arching branches which are literally weighed down by the large clusters of flowers they bear, make pot specimens of the same plants look ridiculous. They have been full of flowers since the beginning of December. *Senecio Ghiesbreghtii* is still aglow with its massive heads of yellow bloom. *Staphylea colchica* is attractive with its many racemes of white flowers, pure and graceful, and suggesting orange blossoms. This plant is grown in thousands by the London market-gardeners. A pretty plant, uncommon in color and of lasting qualities, is the Blue Marguerite, *Agathæa celestis*. It forms a compact, globose bush a foot high, with dark-green, spatulate leaves and long-stalked Marguerite-like flowers one inch across, the ray-florets pale violet, the disc pale yellow. It is scarcely ever out of flower, and is useful for cutting.



Fig. 98.—*Fendlera rupicola*.—See page 112.

ORCHIDS.—The best of these in flower now are *Paphinia grandis*, much the handsomest of the genus, its large flowers of the richest dark chestnut-brown, with streaks of white. The plant is small, often smaller than one of its flowers. Unfortunately, it does not appear to be easy to establish, as plants rarely flower after they have been in cultivation two years. *Calanthe vestita gigantea* has no equal among the *Vestita* section of the genus. It is truly gigantic in all its parts. It also blooms much later than the other kinds, and retains its large leaves healthy and green even till after the flowers are over. The spikes are nearly a yard long, arching, and the flowers are over two inches across, white with a red eye. *Oncidium splendidum* is a king among the *Oncidiums*. It is evidently a

good grower, very distinct in foliage, and the spikes are erect, over a yard high, branching and bearing large flowers, the lip of which is canary-yellow, large, the sepals and petals barred with red-brown. The individual flowers of *O. splendendum* are not unlike those of *O. tigrinum*, a resemblance which led to its being called a variety of this species; in pseudo-bulb, foliage and habit the two are widely different. *Cypripedium Curtisii* is a beautiful species, related to *C. superbiens*, and one of the most distinct of all the recently-introduced kinds. Messrs. Sander & Co. have a large batch of it, a few plants of which are in flower.

Kew, February, 1889.

W. Watson.

Cultural Department.

Sparaxis and Ixia.

ACCORDING to Mr. Baker, of Kew, there are in south Africa about 800 species of plants of the Iris, Lily and Amaryllis families, whose underground portion is either a corm, a tuber or a bulb.

If we add to this number the bulbous and tuberous Oxalis, Pelargoniums, Othonnas, Crassulas, etc., we shall have a total of about 1,000 species, included under the popular name of "Cape Bulbs." Of these probably not one in twenty is cultivated either in this country or in England, though many showy hybrids of a few Ixias and Sparaxis are yearly offered for sale both there and here.

In horticulture as in other things, "the old order changeth, giving place to new." Cape Bulbs have enjoyed a period of popularity in the past, as the numerous plates of these beautiful flowers in the *Botanical Register*, the earlier volumes of the *Botanical Magazine* and other works will show. As a whole they have very much to recommend them. Nearly every one is of great horticultural interest for the grace, brilliancy or fragrance of its flowers. Hardly one is difficult to manage. Some are perfectly hardy; most of the others can be safely carried through a New England winter in a frame or in a raised bed, with a covering of leaves, and those which must blossom in the winter or not at all will do well in a sunny window.

The Ixia and Sparaxis, the former for the gracefulness of its tall spikes, and the latter for the extreme brilliancy of many of its forms, may claim a place in the very front rank of Cape Bulbs.

Sparaxis is a small genus, consisting of only three species, though there are several varieties of these found in a state of nature and a great many produced by the labors of gardeners. *S. bulbifera* has flowers of some shade of yellow, ranging from the lightest and faintest to very strong and bright ones, but always yellow. It is named from the elongated bulbs which it forms in the axils of its leaves, although the other species do the same with equal prolificacy. *S. grandiflora* is distinguished by its white and purple flowers. These two colors are always present, as far as I have observed. In some of its forms the purple is confined to the edges of the floral divisions; in others the whole flower is of a deep velvety purple except a white tip, or perhaps a light edge on the six segments. The third species, *S. tricolor*, is not outdone in brightness, in some of its forms, by any flower the whole earth can show. Its three colors are jet black, yellow of varying shades, and red of some very bright tint; scarlet or crimson, or some other as showy. These three colors in the best varieties form a whole more dazzling than any one not familiar with the flower could imagine.

I believe that the very numerous sorts offered by Dutch bulb-growers are varieties of these species, and not hybrids, for, though I have grown a very large number of them, I have never seen one in which the characteristic colors of two species met in the same flower. The stalk of the Sparaxis is from eight to ten inches high, and bears from four to seven flowers, each of which lasts several days. Its leaves are flat, long and somewhat blunt at the end, and grow more upright than those of the Tritoma, less so than those of the Ixia. The bulb is unusually white and clean in appearance, and is almost spherical. The plants sold as *Sparaxis pulcherrima* and *S. pendula* are not now included in the genus, but form the genus *Dierama*. I can say but little of them, and will say that little here. They are exceedingly beautiful, bearing long racemes of somewhat bell-shaped flowers of a lovely rosy hue, on gracefully bending, slender stalks four feet high. At least so we are told, and we must take it on trust.

I cannot make them flower, though I have had them for years under all kinds of treatment. The most skillful cultivator of bulbs in this part of the state has been equally unsuccessful. The plants appear to be like *Iris Robinsoniana*—most beauti-

ful things, whose beauty no one can cause to be developed. With covering *D. pulcherrima* will endure our winters; under glass it is evergreen.

The Ixias are very different from the Sparaxis in general appearance, their leaves being much longer, narrower and darker green, and usually somewhat twisted. During our shortest days, when the sun is only a few hours above the horizon and his elevation at noon is only about twenty-five degrees, the Ixias suffer more from deprivation of light than any other Cape Bulbs, except a few species of Gladiolus. For this reason better results will be obtained, I think, by planting these in February or March than by doing so in September or October. The flower-stalks of Ixias are slender and quite rigid and straight, and the flowers are clustered thickly at the top. The many kinds offered in Dutch catalogues appear to be hybrids, as they show peculiarities of two or more species in the same flower. These hybrids are, many of them, of exceeding beauty, and many are highly fragrant, having the delicious perfume of the Neapolitan Cyclamen.

The species, as far as I have cultivated them, are these:

1. *Ixia polystachya*; white-flowered, about twenty inches high, the stalk having from three to six lateral shoots, coming into flower at the same time as the central one.
2. *Ixia flexuosa*; twelve inches high, flower sometimes white, sometimes pink.
3. *Ixia hybrida* (*I. flexuosa* of Ker); white, with rose centre; highly fragrant.
4. *Ixia aristata*; white, pink or rose, according to variety, and frequently sold under fanciful names, as some others are.
5. *Ixia fragrans*; pink, if I have it true to name.
6. *Ixia patens*; generally deep crimson, a species sold by dealers under its true name and usually in its typical state.
7. *Ixia speciosa* (the *I. crateroides* of the catalogues); deep crimson, with lighter exterior.
8. *Ixia maculata* of Linnaeus (*I. conica* of Salisbury, and sold under both names); one of the most variable of plants; many varieties having centres of two colors, chestnut and blue, pink and blue, blue and crimson, etc., while the ground color is white, cream, lemon, buff, orange or light blue.
9. *Ixia columellaris*; also variable, but of soberer colors than *I. maculata*.
10. *Ixia monadelphica*, frequently sold as *I. columellaris*; pink, with crimson eye; yellow, with chestnut eye; purple, with blue eye, etc.
11. *Ixia paniculata*; a species I do not think worth growing; it has a very long-tubed flower of a brown paper color.
12. *Ixia viridiflora*; the most beautiful of all, having lovely sea-green flowers, with a purple centre.

There are six or seven others which I have never seen.

Canton, Mass.

W. E. Endicott.

Cultivating Wild Flowers.—With all the encouragement to skill offered by the system of premiums at our horticultural shows, specimens of extra good culture are seldom seen, except, perhaps, in the case of the Chrysanthemums. In the Old World visitors are sometimes surprised to see on exhibition some wild flower, taken in hand by a florist, who makes a wonderful specimen by care and good treatment. At a recent exhibition in Germany, one of the wild Orchids of that region was thus shown, and, according to the *Gartenflora*, a specimen was produced that far exceeded in beauty the rare Orchids of foreign lands, for which hundreds of dollars are sometimes given.

Improvement of the Pansy.—When, in the boyhood of the writer, some fifty years ago, the Pansy came to be some three-quarters of an inch in width, and the florists gave the varieties distinctive names, it was regarded as a wonderful achievement of modern skill. But an old work on horticulture in Britain, called "*Hortus Floridus*," has recently been brought to light, issued two hundred years ago, in which are pictures of Pansies just as large and fine. The query is, had the florists of these early times agents in their employ with exaggerated picture-books, or were the Pansies of those days as large and fine as those of our own time?

Maule's Quince.—*Pyrus Maulei* has flowered with us for several seasons past. English papers compare it with *Pyrus Japonica*, which the flower does to some extent resemble in form, though bright orange in color, and not red as in *Pyrus Japonica*. The flower also opens early, as it does in that species. But the foliage and habit are more like those of the *Pyracantha* (*Crataegus Pyracantha*) than those of the ordinary Japan Quinces. Like the *Pyracantha*, also, it has a disposition to be evergreen. It promises to be an excellent addition to our list of hardy shrubs.

Germantown, Pa.

Thomas Meehan.



Fig. 99.—Group of Agaves in an Algerian Garden.—See page 112.

Clematis paniculata—The question is often asked, "What is a good white Clematis to plant as a companion to *C. Jackmanni*?" To this may be replied *C. paniculata*. This Japanese species is of vigorous habit, floriferous, hardy, and, above

all, long-lived. Young plants with us last summer grew ten feet high and flowered from the ground to the ends of the shoots. In general appearance, *C. paniculata* somewhat resembles *C. flammula*, but the foliage is large and leathery, and the

flowers are produced in panicles often two feet in length, of a pleasing ivory-white color. They may be seen at their best about the second week in September, at which time the foliage is hidden by the flowers, which are followed by awned seeds with a reddish tint, and last until severe frosts set in. Although introduced in 1796, *C. paniculata* is by no means common in this country, owing to the difficulty of obtaining good seed, it being usually killed by frost before it is sufficiently matured to germinate.

Shortia galacifolia.—This interesting plant has proved perfectly hardy in New Jersey. When it has the protection of a cool house in winter it thrives better, however. The flowers are produced earlier, and last several weeks in good condition. Established plants flower freely. We have one in a four-inch pot with twenty-four buds, some of which are already expanded. Those who wish to cultivate this plant should, if possible, get established plants; collected ones are uncertain. *Shortia galacifolia* succeeds well in a soil composed of two parts peat and one of loam. It requires plenty of moisture at all times. We have also found that a half shady spot, such as a cool frame, is best suited to the plant in summer, as the sunlight is apt to scorch the young foliage.

Strong Vitality of Crocus Flowers.—In the latter part of November about fifty bulbs of a species of Crocus, probably *C. sativus* or *C. speciosus*, were received from a correspondent in Turkey. They came by mail, packed in dry cotton wool, and were, to all appearances, lifeless, but evidently belonging to the autumn-flowering section of the genus, as there were dried flowers of a purplish color attached to the bulbs. However, it was decided to plant them, and, shortly after this was done, signs of growth were visible in the production of leaves and the thickening of the leaf-sheath of the membrane. This thickening was thought to indicate the appearance of more blooms, when we were surprised to find that seed-pods and perfect seeds were formed, and this after the bulbs had traveled thousands of miles between the time of flowering and subsequent continuation of growth.

Passaic, N. J.

E. O. Orpet.

Sowing Acorns.—It is the popular belief that acorns and nuts must either be sown in the fall or kept in earth for spring sowing; but practice has shown that this is not essential. Indeed, walnuts very often fail entirely when sown in the fall. There is no objection to the preservation of such seeds in earth for sowing in spring, but anyone who has not done this may safely sow in April, if the seeds have not been allowed to become dry. A damp cellar, such as many nurserymen use for heeling in plants in winter will suit admirably. If the acorns and nuts have lost nothing in weight by drying since they were collected, they may be sown with assurance of success.

Germantown, Pa.

Joseph Meehan.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

X.—A FEW OF THE NITROGENOUS COMPOUNDS FORMED WITHIN THE PLANT.

IN the previous papers of this series we have followed the course of inorganic materials into the plant, and we have investigated some of the products resulting from the chemical processes which go on in the assimilating and the elaborating cells. Thus far our attention has been confined to the cell-wall substance, the starches, the sugars, the acids, the fats, and the like, all of these being products which are devoid of nitrogen. The way is now open for a brief consideration of certain groups of substances, of which nitrogen is an essential constituent.

The element nitrogen enters the plant in some combination, as we have already seen, and its destination is the formation of what are known as albuminoidal matters, or proteids. The living matter in plants and animals alike, consists essentially of various proportions of these albuminoidal substances, in which, for the time, certain special activities are manifested.

When the living matter, with its associated albuminoidal substances, is subject to proximate analysis (that is, an analysis which stops just short of resolving it into its ultimate constituents), it is easy to discriminate between closely allied compounds which are almost the exact equivalents of the albuminoids found in the animal kingdom. In fact, they are commonly called vegetable albumin, vegetable casein, and vegetable fibrin, to distinguish them from their allies in the

animal kingdom. This nomenclature, although correct in its main features, is not sufficiently exact for the needs of modern science, and hence other terms, more precise and significant, have been bestowed upon most of them. For our purpose, however, it is sufficient to regard them as a whole, and to keep in mind the important facts regarding their bearing upon the work in the plant. First of all, then, it must be observed that the chemical changes which take place in the living matter of the plant, by which nitrogenous compounds are formed, are akin to what has been called dissociation. In a general way it may be said that the protoplasm itself contributes of its own substance to form these other products, but the processes of repair in a healthy cell keep pace with the destructive changes.

By what is recognized as an oxidizing process, or a sort of "fermentative" process (to use the term of one of the most recent and careful investigators of this subject), substances known as amides are formed from the albuminoids of the plant, and these may give rise to very complex combinations, some of which are immediately broken down, while others are maintained as distinct compounds in certain cells. A few of these compounds are occasionally broken down until their products appear as compound ammonias of a volatile character. Such are sometimes found in a few plants at the time of flowering.

In the form of these compound ammonias a little of the combined nitrogen of the plant may escape as a sort of excretion, but, aside from this, which is very special and limited, there is no true excretory process answering in the slightest degree to the elimination of urea in animals. From what we know of the very close similarity between animals and plants in their physiological relations, it is highly probable that some excretory process may yet be made out clearly. The behavior of a peculiar substance known as asparagin has led some investigators to look in this direction for a solution of the problem, but as yet there has been no conclusive evidence that this product plays such a part, or even assists, in such a way in the vegetable economy.

Among the more complex nitrogen compounds of the plant few possess greater interest from the point of view of useful applications than the so-called alkaloids. For the most part these occur in small amount, and, as a rule, are characteristic of certain plants. Thus alkaloids, of which we may take Quinina as the type, are characteristic of the Cinchonas; Morphina and its allies are found in the Poppies; Atropina occurs in Belladonna. In the plants closely allied to these there may be kindred but not identical alkaloids, so that it is at present impossible to assert beforehand, from the affinities of a plant, whether or not it possesses alkaloids of a certain character. In fact there are many indications that closely related alkaloids may occur in plants which belong to widely separated orders, a good example of this being afforded by the active alkaloid of Coffee, Tea and the like.

A practical point of some importance is to be here noted—namely, that, by judicious selection, the amount of an alkaloid characteristic of a given plant may be measurably increased. This is a consideration of much greater significance to cultivators in tropical and the warmer parts of sub-tropical countries than to residents of temperate climates, since, under those skies, the amount of the alkaloids is generally larger than in cooler regions.

A curious fact of no practical importance may be mentioned at this point—namely, that it is possible for one to kill an alkaloid-producing plant by the very alkaloid which it yields. For instance, by watering the soil with a solution of morphina, it is possible to destroy the Poppy.

Another interesting group of nitrogenous bodies found in plants comprises the unorganized ferments. These bodies have the extraordinary faculty of causing changes in other substances, without always, if indeed at all, undergoing change themselves. Thus an unorganized ferment, known as diastase, has the power of converting starch into soluble substances very readily utilized by the living matter of the plant. There are other ferments which are inert as regards starch, but act efficiently upon nitrogenous substances. The best cases of this class are met with in the so-called insectivorous plants and in the fruits of the Papaw, a tropical plant. In these and a few other plants active principles akin to the digestive ferments of the animal world are found in surprising amount. That which is characteristic of the insectivorous plants is related to if not identical with the ferment known as pepsin, while the Papaw fruit yields one more closely resembling those which can act in an alkaline fluid. There is good reason for the belief that these plants are not anomalous, except in the relatively large amount of the ferment which they

duce; on the whole, it is not unlikely that some similar substances are always active in the seeds of certain plants at a certain period of their germination. The fact that these ferments have an important office in the life of certain plants, and that others are found in almost all plants, leads to the question as to the possible use to vegetation of the alkaloids and other powerful nitrogenous principles which are found so widely diffused, and which appear to have no office in digestion or nutrition. It is usually said that these have the office of protecting the plant from invasion from unwelcome insects and other animals, and this is doubtless true, but it is not improbable that some of them may share with certain resins the power of resisting the attacks of more insidious enemies—namely, destructive fungi.

We have now passed in very brief review some of the more important substances which the plant forms in its laboratory. Looking at them all from the point we have now gained, we may say that they fall naturally into the following classes: (1) Those which are, or are allied to, the primary product of assimilative or constructive energy, depending on the reception of solar radiance; to this class belong the members of the sugar series; (2) Derivatives of the former class representing nearly or quite the same amount of stored energy, such as the cell-wall substance; (3) proteids, having nitrogen as an essential constituent, and forming the source of the living matter of the plant; (4) waste substances, both of the nitrogenous and the non-nitrogenous series, which are turned to account by the plant in protection, attraction, and so on.

The green cells of the plant, exposed to the light and air, are the seat of those activities which result in the construction of organic matter. Any other cells of the plant, provided the temperature is sufficient, may serve as the seat of any or all the many activities by which these primary organic products are converted into other matters. In short, to use a familiar expression, the energy of solar radiance winds up this marvellous machinery, which in its rapid or its more tardy running down, gives us all the phenomena of plant life. But it is to be remembered that, so long as the sun shines on an active plant which is properly supplied with the raw materials for its work, the machinery is being constantly wound up, and, as one may say, faster than in the economy of the plant, the supply of energy can ever be used. This excess is left for the use of other organisms, or it may accumulate, as in fact it has accumulated, in the stores of unused carbon of our living forests, and the forests of the past, our coal of to-day.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

The Forests and Woodlands of New Jersey.—IV.

THE largest Holly trees I have ever seen are at Wildwood, on Five-mile Beach, which lies along the Atlantic shore above Cape May. Many of them are more than a foot in diameter, with lofty and spreading tops, and in winter when these towering masses of dense evergreen foliage are decorated with an almost unimaginable profusion of bright scarlet berries, the effect is indescribably beautiful; and when, as sometimes happens here, the trees are wrapped for a few hours in a fleecy, feathery mantle of snow, the forest looks like a picture—a scene from an enchanted land. There is a fine, umbrageous forest here, almost immediately on the beach. It is nearer the ocean, indeed, than any other forest of equal beauty along our coast, so far as I have observed. Besides the Hollies, many of the Oak, Cedar, Sassafras and other trees are also very large. It is pleasant to note that the proprietors of the place have an appreciation of the charm and glory of fine forest trees, and that they intend to preserve many of them permanently. At Holly Beach there are also very fine trees.

In many of the towns of our country noble trees are often sacrificed to the notion, held by the street officers, that wide, wind-swept expanses of dust, bordered by straight walks from which all trees have been removed, are an indication of superior "enterprise" on the part of the inhabitants, and of energetic administration of the supervisor of roads. I have seen trees thus destroyed which had been the source of much greater good to the community about them than had ever been wrought by the man who murdered them. A curious feature or accompaniment of this vandalism, which may be observed almost everywhere, is the mockery of tree-planting along the same streets from which trees of great beauty and of historic interest, the product of centuries of growth, have been ruthlessly cut away. When the thoroughfares and roadsides of the town have been completely devastated, the officers proceed to

set out young trees along the streets. But the planting is usually performed in such fashion as to kill or permanently cripple most of them, and for a generation or two the inhabitants will see a miserable array of dwarfed and stunted bushes and spindling saplings where once stood the great trees which were the pride and glory of the village.

THE GREAT OAK OF SALEM.—There is a remarkable White Oak at Salem. It stands in the burying-ground of the Society of Friends. I cannot learn that any one knows its age exactly, but it is said to be at least two hundred years old. It is a wonderful tree for its size and symmetry, and for the great number and spread of its branches. It was measured in 1884, and was then eighty feet high; the trunk was eighteen feet four inches in girth, and the spread of the branches was 360 feet in circumference. The circle covered by them was 114 feet in diameter and its area 10,207 square feet. I am indebted to the courtesy of Mr. H. M. Rumsey for these measurements.

To see this tree is well worth a summer day's journey from Philadelphia to Salem. Any such tree is a credit to the town in which it stands. Its existence indicates a degree of civilization, an appreciation of the beauty and majesty of noble trees, which is by no means so general in our country as is desirable. In too many places such insensibility and vandalism prevail that no tree ever has a chance to attain to imposing proportions, the beauty of complete development, or the interest which attaches to great age. I am sorry to say that this fine tree has been seriously injured within the last few years by neglect of the wounds made by the removal of several large branches. The large cut surfaces are exposed to the weather and to the attacks of enemies of all kinds, without any protection whatever. They should have been covered at once with a thick coat of coal-tar or paint. While unshielded they invite the entrance of the spores of various fungi, or toad-stools, which will ultimately destroy the tree. Their mycelium is a perennial growth, and spreads through the sound wood until the entire tree is inoculated with a fatal disease. It is probable that in a few years this grand tree will begin to show symptoms of decay.

LARGE TREES IN CAPE MAY COUNTY.—There are some very large Oaks and other trees still standing in swamps, or on ground surrounded by swamps, in Cape May County—trees which were doubtless there when white men first visited the country; but there are, I believe, no considerable tracts of unbroken primeval forest in that region. Mr. Richard S. Leaming and Dr. Coleman F. Leaming told me of a White Oak which was nine feet across the stump, and forty feet to the first limb, and this limb was over two feet in diameter. At this height the tree was more than four feet through, and all below this was sound. A Methodist clergyman counted over 800 rings of growth. The same gentleman told me of a Tulip-tree ten feet in diameter, with a clear trunk forty feet or more in length. Both the Sweet and Sour Gums grow very large in that region. Mr. Richard Leaming is a ship-builder, and has had much experience with different kinds of timber. He says that Cape May County oak and gum timber is more durable than any other with which he is acquainted, except some kinds of wood from certain parts of Virginia.

THE OAKS OF MAY'S LANDING.—May's Landing, in Atlantic County, is remarkable among the towns of the state, and, indeed, among the towns of the whole country, for having been built—a large part of it, at least—in a very heavy Oak forest, without destroying the trees. Many of the house-lots or door-yards have never been cleared up. The great umbrageous White Oak trees stand close up to the very door-steps of the dwellings. The court-house and the churches are in the same way embosomed and embowered in a forest of wonderful beauty and interest. This characteristic of the town is so prominent and vital, that a visitor is soon led to inquire regarding its origin and the means of its perpetuation. The proprietors of the great Colwell forest domain, who formerly owned the land on which the town is built, and who still own much of it, have from the earliest times set the example of preserving and protecting the trees, and when selling lots in the town they have always impressed upon purchasers their desire that this policy should be permanently followed. The streets at some points have been moved to new lines, and turned this way and that, to avoid injury to the trees, and great Oaks three or four feet in diameter stand unharmed in the middle of the sidewalks, while generation after generation of the people of the old town walk reverently around them from youth to old age, till they lie down to sleep at last under the benediction of sheltering boughs and leaf-curtained canopies in the village cemetery.

PECULIAR HOLLY TREES.—From May's Landing the track of

an abandoned railroad leads the explorer into the heart of the woods. Young Pines are growing up between the rust-eaten rails, and the forest is again taking possession of the right of way. A mile or two from the town, at the edge of an old field, also abandoned, are some very remarkable and peculiar Holly trees. The trunks are densely "feathered" quite down to the ground, and the whole top of each tree is a solid mass of branches and foliage, wonderfully symmetrical in form, and nowhere penetrable by either eye or hand. I can hardly remember any trees so pictorial as these, except some Live Oaks in Louisiana, which will haunt me as long as I live. All about this region, as in many other places in the southern part of the state, the Mistletoe is an object of interest to visitors from lands where it does not grow, and some of it is gathered and sold for Christmas decorations. The fruit of the Persimmon should also be added to the list of forest-products which have a commercial value. It is always on sale in Philadelphia in its season, and perhaps in other cities.

Franklin Falls, N. H.

J. B. Harrison.

Correspondence.

Fruits for Cold Climates.

To the Editor of GARDEN AND FOREST :

Sir.—Under this title the position is taken by a correspondent in your issue of January 23d, that the Russian fruits have no prospective value in the Prairie States.

Such general statements are difficult to deal with in the narrow limits of a half column, but something should be said on the other side. Perhaps this can best be done by giving briefly the estimate of some well-known directors or officers of our Iowa Horticultural Societies, who have had much personal experience with the Russian fruits.

In the northern district of the state, containing forty-two counties of rolling prairie dotted with cities, villages and fine homes, only four varieties of the apple are now recommended for general cultivation, viz., Duchess, Whitney, Letofsky and Wealthy, and of this brief list Wealthy can only be grown profitably in the most favored portions. In this trying district, at the recent meeting of the Northern Iowa Society, Mr. J. B. Mitchell, of Howard County, exhibited the wood of about thirty varieties of the Russian Apples, as clean and white as that of Box Elder, while the best specimen of the wood of the Duchess he could find was colored. He also made an exhibit of Russian winter Apples, of good size and quality.

At the same meeting, Hon. R. P. Speer, Director of the Iowa Agricultural Experimental Station, stated, and has since published in Bulletin No. 3, that, "all of our American Apples, as well as the Apples from west Europe, have proved much too tender on ordinary prairie soils." After giving his experience on his home farm at Cedar Falls, Iowa, with Russian varieties from the Department in 1874, varieties from Mr. Tuttle in 1881, and varieties from the College in 1882, he says: "The winter of 1884-'85 was the coldest since 1855-'56. In April I found that nearly all the varieties from central Russia were hardy, while many kinds from western Russia proved tender. I also found the severe winter and unfavorable spring had killed more than 40,000 of my three-year-old trees of such varieties as Walbridge, Plumb's Cider, Fameuse, St. Lawrence, Wolf River, etc. My bearing orchard of 1,500 trees I also found contained no sound trees except of Whitney, Wealthy, and varieties which had come from Russia."

Then follows a list of Russian varieties "which have never shown any signs of blight, and which, on my grounds, seem to be as hardy as Duchess." This list contains fifty-eight varieties. Then follows a list of seven equally hardy sorts, which have shown traces of blight in a few cases where near blighting sorts. Still following are lists of sorts liable to blight, or not hardy on his own grounds, containing forty-three varieties of coast Russians or north Silesians.

Again, W. C. Haviland, of Fort Dodge, Iowa, has tried in orchard and nursery 120 varieties of Russian and north Silesian Apples, and at the recent State Horticultural meeting he exhibited the wood of sixty varieties as clean and white as that of Duchess, and in many cases much better.

Still again, John C. Ferris, of Franklin County, in north Iowa, has had for a number of years many varieties in orchard and nursery, and finds fully half of them as free from blight and as hardy as Duchess.

In addition we have over 200 experimenters in north Iowa with the central Russian fruits, who report a still larger per cent. of perfect varieties.

In the central and south districts of Iowa the need of hardier sorts is not so apparent on the loess and timber-ridge soils,

but the great prairie sections east of the Missouri divide must have varieties as hardy as Duchess if they prove long-lived and regularly productive.

But the final selections from the east European varieties will here be made from those imported from interior south Russia. Some of these, already fruited in south Iowa, have proved fine winter Apples, and the reports from trial-stations show the trees to be hardy up to the forty-third parallel. As an instance, Varonesh Rosy has proved as large, handsome and good as Rome Beauty has in the south district, and the fruit is found to keep as well as Grimes' Golden, yet its wood is as bright as that of Duchess when grown up to the forty-third parallel.

But your correspondent says that not one of the Russian Apples has been recommended for general cultivation by our Horticultural Societies of Iowa. Manifestly it would be hasty to attempt a selection as yet. Not a friend of the Russians in the West has urged it. It is yet promising experimental work, to be undertaken from the Atlantic to the Pacific, and in the Southern States.

As to unfruitfulness and low quality of Russian Apples, I can say that the fault of many varieties is to overbear when young. It is yet too early to decide that the sorts later in coming into bearing will not prove most valuable.

As to quality, we will grade them as Regel, Schröder, Fischer and other Russo-German pomologists have done. Those listed in Russia for dessert use are proving good in quality here, and those listed for cooking are prime for this use alone. This holds good for the 100 varieties fruited in Iowa the past year, so far as the Russian estimate is known.

As to the Russian Pears, Cherries and Plums, the story of experience is told in recent Bulletins of the Iowa Experiment Station as to their prospective usefulness.

Ames, Iowa.

J. L. Budd.

The Kentucky Coffee Tree for Street-planting.

To the Editor of GARDEN AND FOREST :

In your issue for February 13th you say that the Kentucky Coffee-tree "is an excellent tree for street-planting, possessing the merit for this purpose of not putting forth its leaves until late in the spring." Will you kindly explain why you think this characteristic a merit? It seems to me that trees that must often be the sole harbingers of returning summer which the dwellers in cities can enjoy should be of those species which put forth their leaves as early as possible. In the country, where a thousand minor forms of vegetation early delight the eye, the leafing time of the trees may be less regarded; but I, for one, rejoice most in those city trees which earliest cover themselves with green, and regard, for instance, the Willows in Madison Square with a peculiar degree of affection. A tree which puts forth its leaves very late hardly has a chance to play its part acceptably before the sun and dust of July destroy its freshness of aspect. In the unpaved streets of a village it may be desirable that the ground shall dry before the trees cast a dense shade. But does this argument apply in the paved street of a larger town?

New York City.

J. B. K.

[Perhaps not. One hardly associates street-planting with bricks and mortar, trees are so rarely planted in the thickly-settled parts of American cities; and in more rural regions, trees which come into leaf early keep the roads and walks under them wet and muddy late in the season. The heat of the sun, too, is not unpleasant when it first begins to make itself really felt, and there are people who object to being deprived of it by the early leaves of many kinds of trees.—Ed.]

Winter Care of Conifers.

To the Editor of GARDEN AND FOREST :

Sir.—It would seem fitting that a word of caution should come from GARDEN AND FOREST at this point in the season, following an open winter, as to the care of Coniferæ and plants with the evergreen habit. I am reminded of this by recalling a season not many years ago, when at this period, there being no snow upon the ground, there prevailed for several days an exceptionally low temperature. A severe unchecked frost followed, penetrating the ground four or five feet, and occasioning widespread disaster to plants, such as enter into the composition of many plantations in this neighborhood—choice varieties, not always easy to get or to raise successfully. It is very possible to have a recurrence of just such conditions for the first two weeks in March. The snow which comes to-day

is usually gone to-morrow, owing to the sun's position at this time of the year and to the influence of the sea air in this vicinity. The safeguard is simple enough: to cover valuable plants with any material likely to arrest frost—manure, straw, earth, evergreen cuttings, etc.

New York.

Jno. Y. Culyer.

The American Pomological Society.—I. Orange-Growing in Florida.

THE twenty-second biennial meeting of this Society, held a fortnight ago at Ocala, in the heart of the orange-producing section of Florida, and during the height of the orange season was naturally devoted largely to semi-tropical and tropical fruits. We present herewith extracts from a paper by Hon. G. E. Fairbanks, on the "Orange industry from a commercial standpoint," and in future numbers we hope to give the substance of several other papers read at the meeting and prepared, like this one, by members of the Florida Horticultural Society. Some of the more important features of the meeting will also be described.

It is hardly fifteen years since orange-growing gained any prominence in Florida, but this industry has already become the leading and by far the most important commercial industry of the state. Where but a few hundred small groves existed twenty years since there are now over ten thousand. Cotton, corn, sugar, rice, grazing, all require large areas. Orange-growing is the most compact and productive of all agricultural industries. An acre of land devoted to the culture of cotton will produce perhaps fifty dollars worth of cotton or twenty dollars worth of wheat, corn, or other grains. A well-established, mature orange grove can be relied upon to produce an orange crop worth \$300 to the acre, even at the low price of one dollar per box. One railway car will carry the product of twenty-five acres of cotton, but can only carry the product of a single acre of Oranges. A grove whose product is 10,000 boxes of Oranges will furnish freight for a train of thirty-three loaded cars, while a large cotton plantation producing 250 bales will furnish freight for only three or four cars. This illustrates the commercial advantage of orange-growing in building and sustaining railways. If we estimate the crop of Florida at present at 3,000,000 boxes, it requires 10,000 car-loads of 300 boxes to the car to move the crop, and calculating the average freight to all parts of the country at sixty-six cents per box the crop pays the railways \$2,000,000 on freight alone. The value of the box stuff used would be \$390,000; the nails \$30,000; the paper for wraps \$12,000, labor in gathering and packing \$600,000. Thus making an output of \$1,140,000 for simply preparing the fruit for market. If to this large sum we add the cost of cultivation, of fertilizers, of packing houses, teams, tram roads, and the tools and implements of labor, we can begin to realize the commercial value of this industry, even at this comparatively early stage of growth. When we realize that not more than one fiftieth of the Orange trees in Florida are bearing we are amazed at the possible and probable future development of an industry limited to this single state, and small areas in Louisiana and California.

In view of the vast area of groves still to come into bearing, and the natural increase of those now productive, the question naturally arises, What will be the future of the orange industry of Florida? Some, in a general way, say that we cannot overstock the market; but within ten years we may anticipate that the increased production of Florida and California will be very large, and if all the trees now planted in the United States were to come into bearing, there is no question but that the supply would exceed the demand. In facing this fact, our advantages and disadvantages for the culture of Citrus fruits may be briefly stated.

Our climate is adapted to the production of oranges in their greatest perfection, being neither too cold nor too warm, too dry nor too wet. Again, our orange-growing section lies within a thousand miles of the principal markets of the United States, and consequently transportation should be both rapid and cheap. On the other hand, our fruit matures or comes into market in the months of November and December, January and February, a period when naturally the demand is not so great as in the summer months, and when the transportation is at more risk on account of freezing weather. Again, we have the disadvantage of competition with inferior West India and Mediterranean fruit; and, in the third place, we have an inferior service by rail and steamers, with higher rates of transportation than for foreign fruit. And even for this brief period of our shipping season there is

always the risk of injury to the fruit by cold in December and January if it is allowed to remain on the trees. Labor, box stuff and commissions, are comparatively high, so that even at present prices of fruit more than half the money received in market is absorbed in expenses of placing and selling it.

It may be admitted at the outset, therefore, that lower prices are to be looked for. Nevertheless, orange-growing will never fail to yield a fair profit in Florida.

The increase of productive groves will not equal more than twenty-five per cent. of those set out, because a large percentage of groves have been planted in unsuitable localities, and will have to be abandoned. As the groves grow older there will be alternation of bearing and fruitless years, which will reduce the output one-half. The expense of caring for and working groves will be greatly reduced. The cost of preparing fruit for market will be lessened. Transportation will be made better and less expensive. System and co-operation will be introduced in the methods of marketing, so that a fairer average market price will be obtained. As the cost decreases the consumption of our fruit will increase. Even if eventually the net return to the shipper should be only fifty cents per box, allowing for a production of 250 boxes to the acre, the return would give a handsome per cent. upon the outlay.

To bring orange-growing to the best conditions of success fruit of the best varieties and of the greatest excellence as to quality must be produced. We cannot afford to send to market inferior fruit. All inferior groves, either in location or quality of soil, had best be abandoned, and only first-class groves maintained. The problem how to preserve our fruit and extend the period of supply safely over a longer period is yet to be solved. And meanwhile the highest success in orange-growing must be sought in the reduction of expenses and in improving the quality of our fruit.

Notes.

The United States government brought suit last year against the Sierra Lumber Company to recover damages of \$2,217,254.20 for cutting timber on public land in Tehama County, California. The trial has at last been decided, and the jury returned a verdict in favor of the government. The damages, however, were assessed at \$41,000 only.

The New York Central and Hudson River Railroad Company is to build at once four country stations from plans by Shipley, Rostan & Coolidge, the pupils and successors of H. H. Richardson. The stations will be of stone and of the general character and design of the rural stations built by Richardson and his pupils during the last ten years along the line of the Boston and Albany Railroad.

The *Ruellia macrantha* is getting quite common in Philadelphia as a window-plant. Certainly one more worthy it would be hard to find. Its large, trumpet-shaped, rosy flowers are produced for a month or two in succession. Another favorite window-plant is the old *Linum trigynum*, a member of the Flax family. Its yellow flowers, one to two inches in diameter, are well supported by its deep green leaves.

"Lime," states the *Garden* (London), "is said to be a good preserver of timber. Ships and barges used for the transport of lime last longer than others. . . . A platform of pine planks was used to mix lime on during three generations; then, being no longer required, was neglected, and at length hidden by grass that grew over it. Sixty years afterwards, on clearing the ground, it was discovered sound and well-preserved."

A farmer in Lockport, New York, was recently indicted by the grand jury for "neglecting to remove and destroy diseased Peach trees." The case will be an interesting one to horticulturists, as it will be the first one of the kind tried in this state, and will therefore test the validity of the law with regard to diseased fruit-trees. The trees in question were examined by a Commissioner appointed by the law and found to be affected with the yellows.

"There is no such thing," says the *Garden* (London), "as a blue Primula, although one might, from the descriptions in catalogues, suppose that the hybridist's highest hopes had been realized. What the florist, or whoever he may be, calls blue, and what is strictly that color, are two different things. The flowers that are called blue are invariably of a mauve shade, sometimes pale lilac, never self blue. That we are approaching closely to the long-wished-for shade we cannot doubt, and the hybridist, if he perseveres, will doubtless attain his object; but to call those Primulas blue that go under that name is misleading. When we do have a blue Primula we shall have a prize indeed, such as will justify high praise and commendation."

The Pennsylvania Horticultural Society has fixed the dates of its exhibitions for the current year. An exhibition of bulbous and other spring plants will be held on the 2d, 3d and 4th of April when prizes of \$100, \$75 and \$50 will be offered for the best collections of Orchids in bloom; and from the 11th to the 16th of November a Chrysanthemum show will be held, when prizes of \$100, \$85, \$65 and \$50 will be awarded for the best collections of twelve plants in twelve varieties.

The seeds of *Araucaria imbricata* are eaten in Chili as an after-dinner dainty, and with this custom is connected the origin of the oldest specimen of the tree in Europe. Towards the end of the last century, Menzies, the surgeon on Vancouver's ship, while dining with the Governor of Chili, preserved some of the *Araucaria* seeds which were offered him, and sowed them in pots on the voyage home. Five of them germinated, and one of them still stands near the green-houses at Kew.

In the collection of products from Lee County, Florida, now on exhibition in the Semi-tropical Exposition at Ocala are some remarkable Bamboos, grown near Fort Myers, which are large enough for fence-rails. This giant Grass survived the freeze of 1886, and it is probable that the cultivation of the Bamboo will be as profitable there as it has proved in southern California. As far north in Florida as Jacksonville a slender species, which reaches a height of twenty-five feet, survives the winter and is very useful as a decorative plant. No doubt it would serve more utilitarian purposes, and it has been suggested by Mr. A. H. Curtiss that if cut into proper lengths and woven together with two courses of wire, it would make a cheap, light and durable fence.

An excellent illustration of fruiting branches of the small Japanese Orange, known in this country as the Satsuma, from photographs taken in Japan, is published in a recent issue of the *Pacific Rural Press*. Of this plant Professor Georgeson recently wrote to *Orchard and Garden*: "The Japanese oranges are as different from our idea of an orange as they can well be, separating from the peel almost as easily as a grape, dividing into sections at the slightest pull, each section like a separate fruit, dissolving its piece into your mouth with a flavor of cherries, leaving no pulp behind, very good, excellently good they are. They, the latest of her fruits, add the crown of excellency to the already overflowing cornucopia of this 'Beautiful Land of the Sunrise.'" The Satsuma is now grown quite largely in Florida, where it is considered the hardiest of oranges, and during the last two or three years many thousands have been planted in California.

The Common Council of Philadelphia has authorized, without a dissenting vote, the Mayor of that city to negotiate for the purchase of Bartram's Garden to serve as a public park—the simplest method, on the whole, of putting into practical execution the scheme lately advocated in GARDEN AND FOREST. The plan, however, should be extended so that some stable corporation, like the Academy of Natural Sciences or the University of Pennsylvania, may have control of the management of the new park. The fact that the people of Philadelphia are securing a series of small parks is largely due to the public-spirited and tireless efforts of Mr. Thomas Meehan, the well-known horticulturist, who has been a member of the city government for several years, and who has recently been re-elected by a sweeping majority. Many generations of Philadelphians will have good reason to remember with gratitude his disinterested efforts for the improvement and happiness of his fellow men.

The *Gardeners' Chronicle* condenses from one of our consular reports an account of the isolated British settlement on Norfolk Island, in the south-western Pacific, about midway between the north cape of New Zealand and New Caledonia, and about 380 miles from each. The island is about five miles long by three broad, with a total area of 8,600 acres. It is just outside the tropics, the extremes of temperature are never reached, the climate is most equable, and the thermometer never ranges higher than 84° in the summer and never lower than 46° in winter. At one time the island was densely wooded with the native Pine (*Araucaria excelsa*) and other trees, but now it is covered with open, park-like downs, interspersed with this Pine. Originally used as a penal settlement, it was in 1856 made over to the descendants of the famous mutineers of the Bounty, who had increased and multiplied beyond the sustaining power of Pitcairn Island, and who were presented with Norfolk Island. The soil is exceedingly fertile, being composed of a dark chocolate loam, or decomposed basalt. There is a complete absence of frost, and almost every temperate and sub-tropical plant grows in luxuriance.

But three plants, or weeds, are so destructive to all other vegetation that a portion of every year is given by the whole community to their destruction; but in spite of this they are increasing. These are two *Solanums* and the *Cassia lavigata*. The whole island is parceled out into fifty-acre lots, held at a peppercorn rent; the original immigrants received fifty acres each, and for some years each married couple received the same grant; this was reduced to twenty-five acres. The native vegetation of the island is wholly peculiar. Besides the famous Norfolk Island Pine already mentioned, there is a Tree Fern (*Alsophila excelsa*) and a Palm (*Areca Baueri*); there are besides upwards of thirty different kinds of Ferns.

A correspondent writing to the New York *Tribune* from Ithaca, New York, gives the following recipe as the best for poisoning English sparrows: "Dissolve arseniate of soda in warm water at the rate of an ounce to a pint; pour this upon as much wheat as it will cover (in a vessel which can be closed so as to prevent evaporation), and allow it to soak for at least twenty-four hours. Dry the wheat so prepared, and it is ready for use." It should be distributed in winter in places where the sparrows congregate, but where domestic fowls will not be endangered, and a quick decrease in their numbers is certain to follow. This is a somewhat exacter form of the advice given by the United States Agricultural Department in its Commissioner's report for 1887; and to explain the necessity why it should be widely employed, the writer calculates the rapidity with which English sparrows multiply where they already exist, and spread further and further westward—covering the surface of the United States and Canada, he says, at the rate of 500,000 square miles yearly; and adds many instances of their powers of depredation. In cities, we all know, they do considerable damage, but how much is exemplified by the fact that "the sexton of St. John's Church, in Providence, Rhode Island, took 970 eggs and two cart-loads of nests at one time from the Ivy upon the church," and that "the luxuriant Ivy formerly covering portions of the Smithsonian building at Washington was thus totally destroyed." Every farmer, at least in the neighborhood of our eastern towns, is aware what enormous injury sparrows inflict upon ripening crops; and it seems indeed as though concerted action should be taken to prevent their becoming an intolerable pest throughout the whole country.

The great public parks in German cities are undoubtedly the most artistic, in scheme and execution, which have been laid out in recent years. It is a double surprise, therefore, to find, from time to time, in German horticultural journals, signs of bad taste exhibiting themselves in directions which have no parallel, we believe, in other countries. For example, one of the chief horticultural journals of Germany has recently devoted many pages to the praise of artificially constructed ruins, and has given illustrations to show how they may best be constructed. Of course, ruins which are essentially picturesque objects, and speak as strongly to sentiment as to the eye, are peculiarly beloved in the sentimental Fatherland; and artificial ruins are found there at almost every step—in the parks of wealthy land-owners, in the gardens of poets, on top of pretty hills that are laid out as public promenades, and in the depths of rocky ravines. Now they serve as studies or garden shelters, now as booths for the sale of refreshments, and again as outlooks affording a picturesque prospect. And, it must be confessed, they are usually placed in exactly those spots where, if they were only genuine, they would have the best possible effect. But the fact that they are not genuine so degrades them in the eye of sensible folk that they excite laughter or contempt rather than the poetic sentiment they are intended to serve. Most travelers believe, we fancy, that these artificial ruins are creations of the earlier years of our century, when sentimentalism ran riot in Germany, and expressed itself in a thousand other ludicrous ways. But it seems, from the evidence of the articles to which we refer, that the taste for them is not yet extinct; and it is either amusing or distressing, according to one's turn of mind, to read a serious discussion with regard to the best ways of placing them, of utilizing them for one practical purpose or another, and, especially, of making them "genuine." Truth, we are told, should always be considered in their formation—they should be well built, of dignified materials, and a strict regard should be paid to the dictates of style as revealed in the genuine ancient constructions. And all this effort after truth is to be expended in undertakings, the object of which is to embody a lie! It is almost needless to say that whatever may be the effort after truth in the matters of detail, it is the lie which makes itself most clearly felt in the result.

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The Railroad in Horticulture.

THE service which the railroad is capable of performing in the development of horticultural taste and knowledge is considerable. Every inhabitant of a town visits the railroad-station, and if the town is in the neighborhood of a city, a considerable portion of the population passes through the station six days out of seven. The impression it makes, therefore, is powerful and lasting. Railroad-managers, or some of the more far-sighted among them, long ago perceived that a well-built and well-equipped station is the best advertisement that can be set up in a country town, and that the first impressions received by a stranger in arriving by rail have much to do in determining his choice of a home, and railroad-gardening has, therefore, come to be considered a necessary part of construction and maintenance among prosperous and progressing companies seeking to develop local passenger business. It must be confessed, however, that up to the present time railroad-gardening has failed, with few exceptions, to accomplish what the public has a right to expect of it from an artistic point of view, and that instead of using their opportunities for increasing the taste and knowledge of the communities they serve, railroad managers have generally been satisfied to reproduce all that was glaringly bad in the prevailing horticultural fashion of the time. This was, perhaps, inevitable, and it will be inevitable so long as men trained in other pursuits and engrossed in absorbing occupations feel that in these matters of taste and special knowledge they need not call for the advice of an expert of a higher class than the ordinary jobbing gardener. It is the old story—a man employs an architect to build his house, but thinks he needs no advice in laying out the park that surrounds it. The principles which underlie good railroad-gardening are simple. They relate—so far as such gardening has yet been attempted—to the improvement of the immediate surroundings of country stations, and to the shaping and turfing of the slopes rising or falling from the permanent way.

The essential features in the surroundings of a station are: convenient and abundant approaches, and some treatment of the ground not needed for the approaches. This treatment should be at once economical and permanent, and of a character simple enough to be successfully maintained by the station-master and his assistants, under the inspection and with the occasional advice of a higher officer charged with the management of the horticultural affairs of the corporation. The selection of a general system of treatment is the only difficult part of the undertaking, and it is here that railroad-managers have usually failed. Most railroad-gardens—and this is as true of Europe as of America—consist of a badly laid out and constructed approach, bordered with turf in which are cut as many large and often grotesquely-shaped beds as can be crowded in, filled during four months of the year with the most showy and ill-assorted plants and quite bare of all covering during the remaining eight months; of a few shrubs, mutilated almost past recognition by bad pruning, and a clump of Pampas grass to complete the decoration. Not infrequently this arrangement is varied by the introduction of the name of the station printed in bold characters with large white stones, or by pattern-beds of gay-colored sand or pebbles—mere “toys,” as Bacon wrote three centuries ago, “you may see as good sights many times in tarts.” Station-grounds thus arranged are not artistic, and therefore are bad from the point of view of the public. They are enormously expensive and difficult to maintain, and therefore are bad from the point of view of the railroad. It is evident that no railroad corporation, however prosperous, can go on year after year decorating station-grounds on a system which requires a large annual outlay. If railroad-gardening is ever to become a potent and permanent means of public education, it must be organized upon a more economical basis, and with more regard to the laws of good taste and of good business than has yet been shown in the United States or in Europe. This is a subject which has, however, occupied the attention of a few thoughtful men, and we feel confident that some progress has at last been made in railroad-gardening—a view which will perhaps be confirmed by an examination of the pictures of some of the suburban stations recently built by the Boston and Albany Railroad, which we begin to publish this week. The grounds surrounding these stations have been laid out with a view to convenience, neatness and simplicity. They contain no beds of brilliant flowers, and make no attempt at startling effects. They rely for their attractiveness upon convenient and well-kept roads, neat turf, a few good trees, and masses of well-selected and well-planted flowering shrubs among which herbaceous and bulbous plants are allowed to grow. The scheme is simple and, when thoroughly carried out in the beginning, is easy and inexpensive to maintain. And as true art, which consists in adapting any creation of this sort to its surroundings and to the requirements of everyday life, always impresses itself in the long run upon those who are brought in contact with its results, these simple station-yards are already exerting an influence which is shown, in the communities of which they are the centres, in a truer appreciation of what is most beautiful in gardening. The best scheme for treating railroad slopes and banks has not yet been worked out. The two extremes are the carefully graded and turfed bank, generally adopted in England when railroads were first built, and the rough, gullied slope, usually bare of vegetation or covered with an occasional growth of native shrubs which do not long escape the annual butchery of the track-gang. Some system intermediate between these two extremes is needed. The turfed slope, in spite of all the money that has been expended upon it, has not been successful even in England, where the climate is much better suited to the development of good turf than in any part of the United States. The grass slopes there are now generally in a bad condition, cut with gullies, filled with weeds, and really less satisfactory

than if Nature had been left to shape and cover them according to her own devices.

At least one company in this country has expended enormous sums of money in grading and turving its slopes, but the result, as might have been expected, is even less satisfactory than it has been in England—our hot sun and long droughts keep the turf brown through the greater part of the year, even when they do not kill it out entirely. What is needed is a covering which will be more permanent than turf, which will not require the constant cutting and attention that turf requires, and which can be secured without the excessive first expenditure for accurate grading and the deep soil that are needed to make a grass-covered slope presentable.

It has been suggested that a railroad slope covered with dwarf, hardy shrubs would be more secure and would look better than one covered with turf of the poor quality, which is all we can hope to secure in our climate in such positions. The value of this suggestion lies in the fact that such shrubs as might be used—wild Roses, dwarf Willows and Sumachs, Sweet-fern, Bayberry and several others—would, when once established, prevent the surface-soil from washing, would not grow tall enough to interfere with operating the road, and, if destroyed by fire, would grow again from the roots and soon cover the ground. There can, of course, be no doubt that a bank covered with any of these shrubs would present a more inviting and pleasant appearance to the eye of the traveler than a stretch of such turf as can be grown without great expense for annual renewals and for mowing, rolling and watering. The Boston and Albany Railroad Corporation has recently established nurseries near Boston, in which large quantities of native shrubs are now grown, with a view to testing the possibilities of covering with them the slopes in its suburban division. These experiments will be watched with much interest.

One of the important and interesting results of Mr. Pringle's botanical exploration of northern Mexico is his discovery of a vast forest of Oaks and Junipers covering the mountains of Chihuahua and extending north and south for a distance of nearly a hundred miles parallel with the lines of the Mexican Central Railroad, and in some places less than a hundred miles distant from it. When the Mexican Central Railroad was built, sawed-pine ties, cut from the mountain slopes of northern New Mexico and southern Colorado, were used; these were soon ruined by dry rot, and the company has now for some time been replacing them with *Arbor-vitæ* ties, cut in the swamps covered with this tree, which abound in the northern portion of the states bordering upon the great lakes. These ties cost the company \$1.12 delivered in their yard at Paso del Norte, and yet there is, Mr. Pringle believes, Oak and Juniper timber enough in this great forest-belt of northern Mexico to supply all the railroads of that country with ties for many years.

A plant with which to make a lawn that will remain green during the summer, without irrigation, in a dry region like central and southern California, has long been desired. Our advice has been asked upon this subject, and we have referred the question to M. Naudin, who directs, in southern France, the garden in which are now the largest collections of dry-country plants, and who has an unrivaled knowledge of such plants. His answer is as follows:

"We have at the Villa Thuret lawns of *Bromus erectus* (a European grass) which remains green without irrigation during the long droughts of the Provence summers. These lawns, however, are less beautiful than those of "Ray Grass," which will not flourish here.

"*Achillea Millefolium* is spoken of now for this purpose. It grows freely, even in the driest weather, and makes a handsome turf. It must be cut over, however, frequently,

to prevent it from throwing up flower-stems. This plant does not succeed in soil strongly impregnated with lime, but it grows freely in poor, gravelly, arid soil. It would succeed admirably, no doubt, in California. There is a native perennial plant here which covers the most barren gravel, and which, I believe, would make an excellent lawn in dry regions. It is the *Trifolium frugiferum*. The stems and branches are prostrate, and spread over the ground. This plant is very tough and hardy, and it produces freely heads of pale, rose-colored flowers, which resemble ripe strawberries—a resemblance which is the origin of the specific name. A lawn composed of this plant would not require cutting.

"It is possible that there exists in Algeria a grass or some other plant capable of resisting drought and great heat, and suitable for making turf, but heretofore no one there has thought of this matter. I will make inquiries of my African correspondents, and perhaps we shall find just the plant we need."

A correspondent of the *Southern Lumberman*, writing from Byram, Mississippi, calls attention to the value of the wood of the Tupelo Gum (*Nyssa uniflora*) for woodenware, especially for fruit and vegetable boxes. The wood is very light, nearly white in color, and its peculiar fibre prevents it from splitting. The supply is practically inexhaustible, and as this tree grows in swamps which cannot well be cleared and drained, it will not soon be destroyed. The wood has been valued locally for a long time for bowls and other articles of domestic use; and it now seems probable that it will soon become an article of considerable commercial importance, as it combines lightness and toughness in a greater degree than any American wood existing in such large quantities.

The changes in population which are likely to result from the exhaustion of the Pine supply of the forests about the head-waters of the Mississippi River and in the region of the Great Lakes will have a serious effect on the business of the railroad and steamboat lines of the north-west. They have hitherto been largely employed in carrying lumber and other supplies for the inhabitants of an extensive region which would have remained, to a great extent, unsettled and undeveloped had it not been for the stimulus and assistance which this great timber-supply has given to business and industry of all kinds.

Not only will the quantity of lumber to be transported soon be inconsiderable, but the occupations of the people of the country will be interfered with and crippled, and there will be a marked decline in the wealth of the region. The relation of these forests to the subsistence of multitudes of people who have never seen the woods themselves, is a conspicuous illustration of the importance of forestry subjects in their economic bearings.

Recent Botanical Discoveries in China.—I.

THE flora of the far east—of China and Japan—is so totally different from that of western Europe, so much richer, especially in ornamental shrubs and trees, that from the earliest intercourse with those countries Europeans have borrowed therefrom to embellish their gardens and green-houses. Yet, with few exceptions, the introduction of Chinese element dates within a century of the present time. So far as the British Islands are concerned, the plants of eastern Asia will flourish in the southern and western parts, at least, in about 10° or 12° higher latitude than in their native homes, and in eastern North America in probably about the same latitude as at home; but on this point my information is too meagre for me to write with authority. Here in England we were not altogether without evergreen shrubs and trees, though practically limited to the Holly, Yew, Juniper and Ivy, with the color-giving heather and furze, which cover and beautify so many miles of the least productive parts of the country. Now, the dwellers in towns, especially on our southern and western coasts, are more familiar with the varieties of *Enonymus Japonicus* and *Aucuba Japonica* than they are with native shrubs. Prominent among the

numerous other hardy plants of the Chino-Japanese region it is sufficient to name the incomparable *Wistaria Sinensis*, *Clematis patens*, *Ampelopsis Veitchii* and the China Aster; among more strictly green-house plants, though they thrive out-of-doors in the milder parts of the country, the Camellia, Chrysanthemum, Primula and Azalea.

But it is not my intention to dwell upon what we already possess; rather on that portion of the flora of eastern Asia which is still known to us only from dried specimens and the necessarily imperfect descriptions of travelers. Russians, French and English have recently contributed largely to the general fund of information, and it happens that each nationality has collected for the greater part in a different region or regions, the floras of which are so diverse that few of the novelties from these different sources are the same. Collectively their explorations have led to the discovery of an enormous number of new species, and no inconsiderable number of new general types. Considering the highly ornamental character of many of the Chinese denizens of our gardens, it was not to be expected that the later discoveries would surpass in beauty, grandeur, elegance or singularity what was previously known of the flora of the Celestial Empire. Nevertheless, as I shall presently show, the existence has been revealed of many herbs, shrubs and trees that would grace the gardens of our western countries.

Mr. Maximowicz is engaged on the Russian collections of Przewalski, Piasetzki, Potanin and others, but his numerous duties prevent him from making very rapid progress. M. Franchet has already published the collections made by the French Abbé David in northern China and eastern Mongolia and Tibet, and, in part, the exceedingly rich collections made by the Abbé Delavay, chiefly in Alpine regions, in the western province of Yunnan; while to the writer has fallen the task of the final elaboration of Forbes and Hemsley's "*Index Flora Sinensis*," which appears in the *Journal of the Linnean Society* of London. The last contains an enumeration of all the plants known to grow in China proper and the contiguous islands, with references to the publications in which they are described or figured, together with their synonymy, distribution in China and extensions beyond, with descriptions of new genera and species. Since the issue of the first part of the "Index" the materials in the herbaria of the British Museum and Kew have been largely augmented, the former by the acquisition of the herbarium of the late Dr. Hance, who spent nearly forty years in China and devoted his spare time, which was very little, to the elucidation of its botany; and the Kew establishment by numerous small collections, but more especially by very large collections made by Dr. A. Henry in the central province of Hupeh, and a considerable collection from the province of Szechuen, made by the Rev. E. Faber, a German missionary.

I propose passing in brief review such new species, or new genera, as are of interest to gardeners, not forgetting older ones of merit that have not yet been brought into cultivation, and interspersing notes relating thereto by the collectors themselves.

Clematis.—About thirty species of this genus are recorded from China in the "Index," and subsequent discoveries have added ten or a dozen more; some of them are quite new, others new to China. Among the latter a pink-flowered variety of *C. montana*, a species which is specially valuable on account of its hardiness and early flowering. The Chinese variety was collected on the mountains near Ichang, and was in flower in May, so that it possesses the merits of the typical Indian form, with a variation in color. *C. Henryi* ("*Icones Plantarum*," t. 1819) is a very distinct new climbing species, having simple, cordate-oblong three-nerved leaves and solitary axillary flowers, with thick, waxy-white sepals about an inch long, with a little pink in the middle on the upper surface. Flowering specimens were collected in Antelope Glen, Ichang, on the 5th of February; and Dr. Henry states that the flowers were seen peeping out of the heavy snow the same winter; therefore it must be a desirable plant for introduction. A very narrow-leaved variety of *C. recta*, having white flowers, succeeded by golden, feathery carpels, looks very pretty in the dried state. Of equal interest to the new species were wild specimens of *C. florida*, from the neighborhood of Ichang, where, however, it was only found in one spot. *C. Armandi* ("*Planta Davidiana*" ii., p. 2) is a tall, climbing shrub, with ternate leaves and ample terminal panicles of white, fragrant flowers about two inches in diameter.

Davidia involucrata is one of the most remarkable of the Abbé David's discoveries in the province of Moupin, Eastern Tibet. It is an elegant tree, between sixty and seventy feet high, with foliage singularly like that of a Lime-tree, and in

inflorescence and floral structure so peculiar that its place in the natural system cannot be determined with certainty in the absence of more complete material. The conspicuous part of the inflorescence consists of two oblong-cordate white bracts, six inches long, nearly opposite each other, and tapering at the tips. A little above these, and terminating the stalk on which they are borne is a flower, or cluster of flowers, consisting of a pistil and numerous stamens with red anthers. Its affinity is with the *Hamamelideæ*. The late M. Decaisne, in a letter to Sir Joseph Hooker in 1871, the year after the discovery of the tree, states that he was given to understand that it was in cultivation in the nursery of A. Leroy, at Angers; but, although Leroy may have had seed, it does not appear that he succeeded in raising plants. The Abbé David, in an introductory chapter to Franchet's "*Planta Davidiana*," states that it grew at an elevation between 6,000 and 7,000 feet, associated with a *Cerasus* bearing small red fruits, a gigantic *Corylus*, a *Quercus*, various *Laurineæ* and numerous species of *Ficus* of the most varied aspect. He mentions, too, that he collected good seed of several species of *Rhododendron* and three of *Magnolia*, which was lost in consequence of arriving in France during the war with Germany.

Magnolia.—Imperfect specimens were received at Paris of an arboreous species, between ninety and one hundred feet high, which bears very large white and purplish odoriferous flowers, similar to those of *M. Campbellii*, and produced in April and May; and Dr. Henry has sent specimens of two very fine species from the Patung district. They are both large trees, with huge deciduous leaves and large terminal solitary flowers, red in one species and white in the other.

Abutilon Sinense.—A very conspicuous shrub or small tree, with cordate leaves and showy yellow flowers, campanulate in shape, and from two to two and a half inches long. It inhabits mountain-woods to the northward of Nan-t'o, and attains a height of twenty feet. Should this prove hardy, it will well pay for introducing.

Decumaria Sinensis.—This is specially interesting on account of its being a member of a genus of which previously only one species was known—namely, *D. barbara*, a native of the Atlantic States of North America, from Florida to North Carolina, thus adding one more link in the chain of connections between the floras of these two widely-separated regions. Dr. Henry describes the Chinese species as a creeping shrub, hanging from the wall of the cliff in the Ichang Gorge, with beautiful clusters of fragrant white flowers. It bears a general resemblance to the American species, and is figured in the "*Icones Plantarum*," t. 1741.

Itea ilicifolia.—A distinct species with Holly-like (*Ilex Aquifolium*) leaves and long, narrow racemes of white flowers. Common about Ichang in rocky places on the tops and sides of cliffs. Judging from the dried specimens this is the most ornamental of the genus, which is restricted to eastern North America, the mountains of northern India and to China and Japan. Figured in the "*Icones Plantarum*," t. 1538.

Chimonanthus nitens.—A very well marked species of a genus previously supposed to be monotypic. From dried specimens it appears to be an evergreen, and even if not evergreen the white flowers are certainly produced with the thick shining leaves. A shrub five or six feet high, inhabiting the neighborhood of Ichang. Figured in the "*Icones Plantarum*," t. 1600.

Liriodendron.—We have imperfect specimens of a Tulip-tree from the Lushan Mountains, Kiukiang, from two different collectors. Whether they belong to a distinct species or to the North American species is uncertain. There is evidence of the early introduction into China of a considerable number of American useful plants, and there is always the possibility that the Tulip-tree may have been introduced. On the other hand, there appear to be differences. The Chinese Tulip-tree is described as of spreading habit, which is at variance with the upright habit of the North American tree as it grows in England; and the one flower seen is much smaller than any of the North American we have for comparison. The leaves, however, offer no distinctive character. Further information respecting the Chinese tree is awaited with great interest. It is noteworthy that no specimens of this tree have been sent in the very complete collections made by Dr. Henry.

Lonicera.—Upwards of thirty species of Honeysuckle have been detected in China, including seven or eight new ones in the later collections. Among the latter *Lonicera fuchsoides* is remarkably distinct and ornamental, reminding one much of some of the Andine species of *Fuchsia*, having ternate verticillate leaves and erect flowers. It was discovered by the Rev. E. Faber on Mount Omei, Szechuen, at an elevation of 5,000 feet. *L. Henryi*, from the Patung district, has terminal

clusters of small red flowers, and is most nearly allied to the Indian *L. glabrata*. *L. similis* is a slender twining shrub with elegantly formed lanceolate leaves of a pale color beneath, and slender flowers in pairs on axillary peduncles, shorter than the leaves. The name was given in allusion to the strong resemblance it exhibits in its foliage to an Indian variety of *L. macrocarpa*. *L. tragophyllum* is a handsome species allied to the European *L. Caprifolium* and the North American *L. sempervirens*, having even larger flowers, described as yellow. This also is from the Patung district.

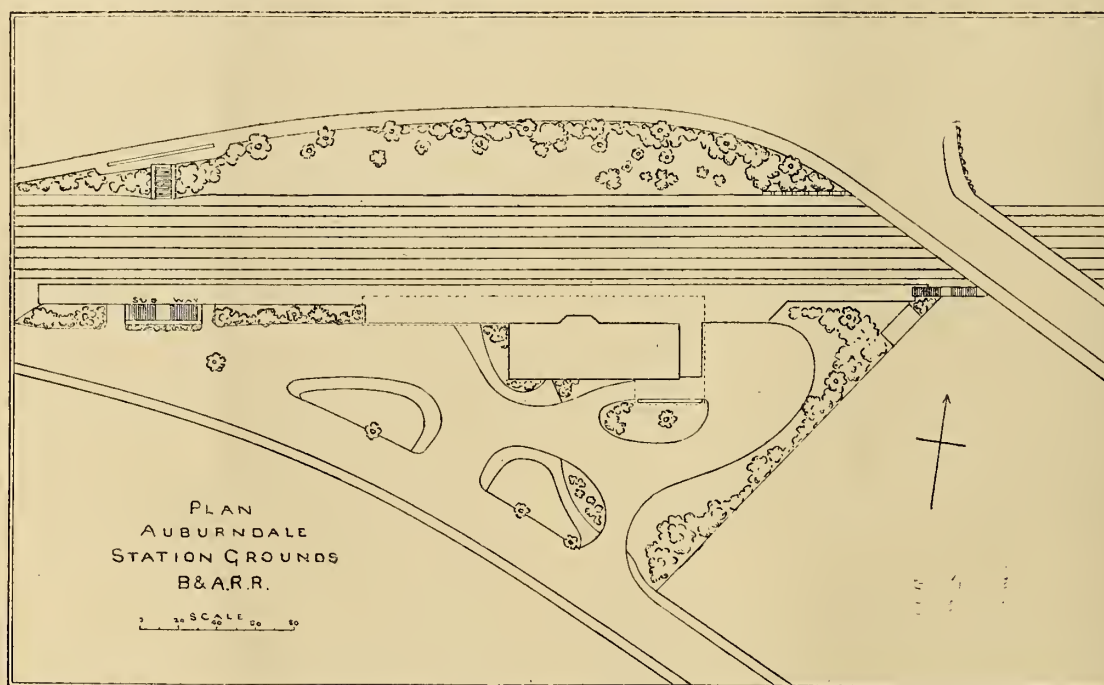
Viburnum.—A genus of the same order as the Honeysuckles and almost as numerous represented in China. Seven are described as new, and two or three of them are very marked in character. *V. rhytidophyllum* has large, coarsely wrinkled leaves, densely felted beneath, and *V. Henryi* is a trailing shrub with foliage very much like that of some of the Lauro-cerasus section of *Prunus*. *V. propinquum* is nearly related to the common *V. Tinus*, though probably less attractive, as the flowers are smaller. Wild specimens of the old *V. macrocephalum* were sent by several different collectors from distant localities. In these only a few of the outer flowers are neuter.

Actinotinus Sinensis.—This is an arboreal *Viburnum*, with large palmately compound leaves, like a Horse-chestnut or Buckeye. It is figured in the "*Icones Plantarum*," t. 1740, and is without doubt one of the most striking novelties from the

The Railroad-Station at Auburndale, Massachusetts.

THE station at Auburndale, near Boston, on the line of the Boston and Albany Railroad, has a peculiar interest as being the first of the series erected by the late H. H. Richardson.

It is almost needless to explain that until Richardson began to build rural railroad-stations none had been erected in America which deserved much consideration as intelligent and pleasing works of art. Among our great city termini a few existed which were reasonably appropriate to their purpose in external appearance as well as admirably planned for the convenience of trainmen and passengers. But the best of our small country stations were plain, cheap structures, looking no more like stations than like buildings of some very different kind, while the average varied between grotesque and fragile attempts at picturesqueness of aspect and shabby make-shifts disgracing the very name of architecture. We had vulgar little stations that looked like exaggerated kiosks, and brick or wooden boxes which merely displayed the railroad company's desire to expend as little money as possible; but



Plan of Auburndale Station Grounds, Boston & Albany Railroad.

Patung district of Hupeh, though the flowers are not very showy. In floral structure this does not differ from the genus *Viburnum*, which is numerous in species spread all round the northern hemisphere and extending to the Andes in America and to Madagascar. In all these species the leaves are simple and undivided, therefore the Chinese plant was separated generically. Dr. Henry states that it inhabits the high mountains and is evergreen. Leaflets seven, petiolate, six to nine inches long, borne on a terete petiole six to ten inches long.

Ilex.—China is rich in Hollies, several new species having been sent since the part of the "Index" dealing with the genus was issued; but there is nothing among them to equal the beautiful varieties of *I. Aquifolium*. The new *I. Pernyi* ("*Icones Plantarum*," t. 1539) is similar to Fortune's fine introduction, *I. cornuta*, with comparatively small leaves, and Dr. Henry has sent a highly remarkable variety of *I. cornuta* with almost exactly square leaves, each angle terminating in a spine. *I. macrocarpa* ("*Icones Plantarum*," t. 1787) has an unusually large blackish fruit, but is not of a specially ornamental character.

Kew, February, 1889.

W. B. Hemsley.

"One should first seek out the natural character of the place to be changed into a park, in order to maintain this character and to draw out all its good points. This rule is but seldom observed."—Hirschfeld, 1777.

no rural stations that gave pleasure to the passing traveler's eye, accommodated him comfortably while he was waiting for a train, or showed that an architect worthy of the name had had a hand in their erection.

No problems, however, appealed more strongly to Richardson than those which were utilitarian in character; none delighted him more than those which had hitherto been neglected by art; and he was as eager to put his best thought into small problems as into large ones. Therefore, when the Boston and Albany Railroad Company asked him to design their station at Auburndale he showed for the first time what such a building ought to be. The plan, of course, in so small a station is very simple, there being but two waiting-rooms of almost equal size for men and women respectively. But the rooms are well proportioned and the ticket-office is well placed, projecting as a prettily designed bay upon the platform. The interior walls are wainscotted with brick, as being cheap, durable, pleasant to the eye, and easily kept clean. The woodwork is simple throughout, but, although no carving exists, it is carefully distributed and profiled and gives a look of refinement very different from the parsimonious nudity or the cheap elaborateness which the average country station

shows. Here, as well as in the architectural features proper, we feel that the hand of an artist has been at work.

Simplicity, dignity and solidity likewise characterize the exterior of the building, while its outlines and proportions are such that its true purpose could not be mistaken. A station is not a house to live in, but a house to wait in—a mere temporary shelter. The roof, therefore, not the walls, should dominate in its expression, and this prime fact Richardson never forgot, no matter what was the size of the station he was designing. The walls at Auburndale are low, and their windows are not conspicuously emphasized; but the roof is broad and massive, and the adjacent sheds are not mere adjuncts but integral parts of the building, their roofs being vitally united with its own. In a dwelling-house a more ornate chimney would have been appropriate as accenting the importance of the family fire-side, but nothing could be better on a railroad-station than Richardson's simple chimney. An interesting point is the design of the wooden posts which support the sheds. Here again there is no ornament. But the plain square-sectioned posts with their massive braces, affording three points of support to the beams, admirably express the nature of the material, and the slightly curved form of the braces prevents any look of stiffness or monotony in outline. The roofs of the sheds are open, showing the timbered construction. The walls of the station are of granite, trimmed with red sandstone, and the roofs throughout are slate, with terra-cotta ridges.

But a station like this would be shorn of half its comfort and beauty were it placed and surrounded as the American country station usually is. The railroad company was as wise in asking Mr. Frederick Law Olmsted to design its grounds as in asking Richardson to build it. Whatever the art, and however small the problem, only the best talent can produce the best result. If the accompanying plan is studied for a moment its excellence will make itself plain. The high-road passes obliquely by the station and from it, towards the right, diverges the approach in an easy curve, while near the porch underneath which passengers alight is a wide space for turning, and the little lawns are so disposed towards the left as to admit of the passage of numerous vehicles without danger of over-crowding. A path-way encircles the station, and the platform may thus be approached, without entering the building, either on foot or in a carriage. Under the superintendence of Mr. E. L. Richardson, who has charge of all the horticultural concerns of the Boston and Albany Railroad, these lawns have been covered with neat turf and adorned with hardy flowering shrubs, naturally disposed yet grouped in effective masses. The boundary fence to the right is hidden by shrubbery, and masses of it are so disposed around the walls of the building that, with their luxuriant covering of Japanese Ivy (*Ampelopsis Veitchii*), they almost seem part and parcel of Nature's handiwork. In summer this effect is the most charming that can be produced in a rural situation, while even in winter the delicate tracery of the naked vines and the bare masses of the shrubs preserve it to a considerable degree. No detail better shows Mr. Olmsted's good taste than the way in which, in laying out his path, he permitted planting close to the walls.

A single tree placed by the carriage-porch—which admits to the women's waiting-room—already groups agreeably with its roof, and in future years will be still more effective, throwing its shade over the spot where the idea of shelter is most conspicuously emphasized by the lines of the building itself. A sub-way runs under the tracks to a strip of lawn on the opposite side, which has its fence "planted out" with shrubs, thus affording the traveler a pleasant, verdurous prospect whichever way he may turn his eyes.

"A mountain range should be viewed in sections, and only once in its entirety; a city should be divided in like manner, and we should avoid getting the same view repeatedly. To break up a fine prospect effectively is, however, a much more difficult matter, than to expose it completely." *Pückler-Muskau*.

Foreign Correspondence.

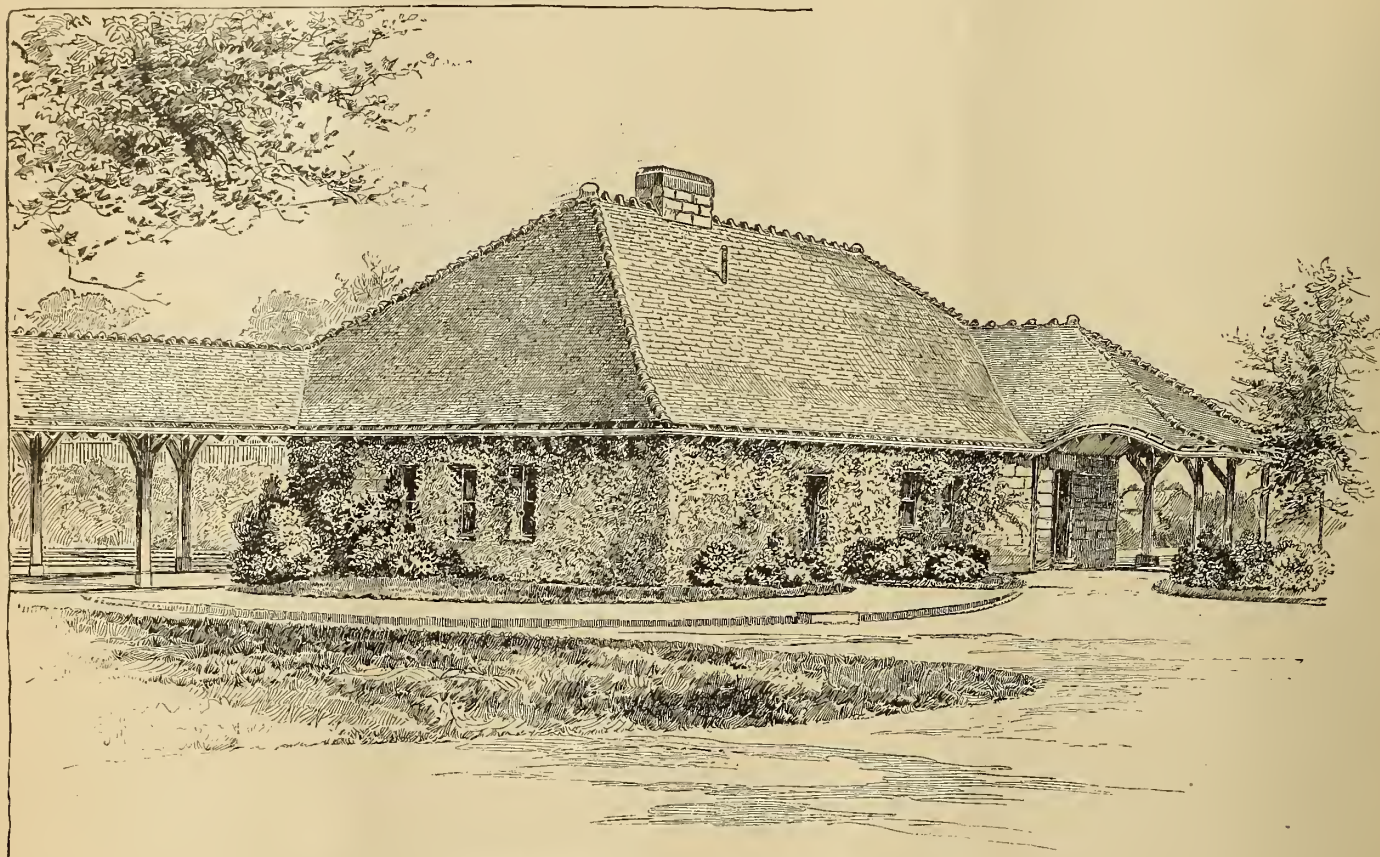
London Letter.

SINCE my last letter we have had a coat of snow six inches thick, which remained with us two days and was accompanied by severe frost. Then came the south-west wind, and the snow disappeared as suddenly as it came. Before the snow the weather was genial, coaxing into bloom many out-door plants, amongst them many kinds of Crocus, Snowdrop, Snowflake, *Eranthis hyemalis*, the beautiful *Anemone blanda*, *Scilla bifolia* and several kinds of Muscari. Many of the dusky Hellebores were in full flower, and the deliciously fragrant Chimonanthus was gay with flowers. Planted on a warm border against a south wall this shrub never fails to bloom freely here. Its companion, *Jasminum nudiflorum*, with its long wands of bright yellow flowers, also was in full beauty before the snow and frost came. Even now again the branches are full of newly-opened flowers and buds. The flowers of *Nuttallia cerasiformis*, which was almost in full bloom, were destroyed by the cold. In England this shrub does not fruit, whereas in France and other continental countries its large, plum-like fruits are its chief attraction. Perhaps the most pleasing of the shrubs now in flower outside is the Japanese Witch-hazel, *Hamamelis arborea*. Your native species has little floral attraction, but the two species from Japan, *H. arborea* and *H. Japonica*, are beautiful flowering shrubs. *H. arborea* is probably only a large form of *H. Japonica*, but for garden purposes the two are quite distinct. At Kew, *H. arborea* is a pyramidal shrub six feet high, with numerous branches clothed with primrose-yellow flowers, one inch across, the calyx being of a deep claret color. In Japan this species grows to a height of twenty feet. It was introduced in 1862, is perfectly hardy, and is just the plant to be used for massing in positions where its bright yellow flowers would be seen from a distance. The Hellebores (*H. orientalis* or Lenten Rose) above referred to are frequently grown in pots for the conservatory. They are wanting in brightness of color, although some improvement in this respect has been made by breeders, especially in Holland and Germany, where Hellebores receive special attention. De Graaf, of Leiden, has raised many improved kinds, and he grows them in thousands. They are as hardy as the Christmas Rose, much easier to cultivate, and if only we can get brighter and clearer colors into them they will be of immense value as winter flowers. The best I have seen are Apotheker Bogren (rose-purple), Comm. Benary (white with crimson spots), Gertrude Jekyll (pure white), Peter Barr (purple) and Colchicus coccineus (rosy purple). At Kew, large clumps of these Lenten Roses are taken up from the ground late in the autumn, planted in pots and brought into the cool-houses to flower. When the flowers are over, the plants are returned to the borders, and they do not show any signs of having suffered from the treatment. Spring Crocuses are gaily in flower whenever the weather will let them push through the soil, and the sun woo them into expanding. I counted fourteen species in bloom to-day, *C. Imperati*, with its beautiful purple feathering on a buff ground, the color inside being bright rose-purple; *C. versicolor*, variable in its colors, but all the forms attractively marked; *C. Alatavicus*, *C. Korolkowii*, the earliest yellow, *C. chrysanthus*, with several other bright yellow, and one white-flowered species were amongst them.

The meeting of the Royal Horticultural Society was to some extent spoilt by the snow and cold, which prevented intending exhibitors from bringing their plants. There was, however, a varied and attractive display, rendered still more so by the unusual appearance of things outside. The most interesting exhibit was a collection of Narcissi grown in six-inch pots, some of them bearing as many as ten flowers. For the middle of February the display was unusually good, and the plants had not that drawn, weakened appearance which early, forced Daffodils generally have, the leaves of Mr. Barr's plants being short, sturdy and full green; many of the flowers were almost as good as the best of unforced ones. Amongst the yellows I noted, as first-class kinds for forcing, Spurius, Golden Spur, Obvallaris (Tenby Daffodil), Henry Irving, Santa Maria and Maximus. These were excellent in form, clear in color, and good in substance, in fact, perfect flowers. Many people spoil their Daffodils in forcing by placing them in a close house or frame. The secret of Mr. Barr's success is the use of bottom heat, with abundant top air and a low temperature. The pots are plunged over a bed of manure in a frame with a southern aspect, and the lights are removed in favorable weather, whilst even in the coldest weather plenty of ventilation is given. This treatment induces vigorous roof-action and keeps the leaves short and dark green.

The variegated form of *Yucca filamentosa* was shown in capital condition, by means of a dozen plants in eight-inch pots, the leaves being one foot long by two inches broad, bright green, with broad marginal bands of creamy white, the characteristic curly filaments being of a pale brown color. Such plants take a long time, at least six years, to grow from small suckers, and it is difficult to keep

strong language, such as few practical men will indorse. There can be no question that it is worse than waste of time to graft many plants which do as well, or even better on their own roots. Roses are a case in point, few of these plants being better when grafted than when raised from cuttings, whilst many of them are much worse. It is a fact that very few of the Pome and Drupe families existing in English gar-



Auburndale Station, Boston & Albany Railroad.—See page 124.

them in health. But when grown as those exhibited were they are exceedingly handsome. They color better and keep their health better also when grown in a warm frame or greenhouse than when kept cool. Out-of-doors this variegated form succumbs to the cold and wet of our winters.

A collection of variegated Kale attracted much attention, owing to the clearness and prettiness of the colors—creamy white, with very crisp margins, and the narrowest band of emerald green; others bright purple with green edges, others magenta and green, and so on. In cool conservatories these plants might fill the place in winter which Coleuses occupy in summer. Several collections of Cyclamens were shown, all of the plants being good, although not above the average attained by London growers of these plants. Messrs. Veitch sent a collection of flowers of the Javanese Rhododendrons, which seem to be perpetually in bloom with them. They also exhibited plants of *Cypripedium Lathamii*, a hybrid raised from *C. Spicerianum* and *C. villosum*. It is at least as good a plant as *C. Leeanum superbum*. Singularly enough the floral committee did not consider it worthy an award of any kind. Another hybrid called C. J. B. Haywood, the offspring of *C. Druryi* and *C. superbiens* was poor in color, in fact, one of those hybrids which ought to be destroyed as unworthy of their parents. When is selection to operate amongst the hybrid *Cypripediums*?

Some fine collections of Apples were exhibited by Messrs. Rivers, Bunyard and others. A collection of fruits of Oranges, Lemons, Shaddocks, etc., and a small bush covered with pale yellow fruits was exhibited under the name of Bijou Orange.

The value of grafting and budding in horticulture is being discussed in the *Garden* in such a manner as is likely to throw a good deal of light on a subject of vast importance, especially to fruit-growers. Some of the writers condemn grafting of all kinds whatsoever, one declaring that it is "jugglery," "a sham, very often a fraud, and nearly always a delusion." This is

dens are on their own roots. If all this proves to be wrong, we shall stand convicted of one of the biggest mistakes ever perpetrated in horticulture. That this cannot, however, be, I know from a very simple but conclusive bit of evidence no older than last October. One night toward the end of that month we had a severe frost. In a London nursery, where Peaches and Nectarines are grown in thousands, I saw many rows of low-budded, fan-shaped trees, every one of which was frost-bitten at the collar, just above the stock, whereas on the same ground not twenty yards away a bed of standard-grafted Peaches was unaffected. The difference between the temperature on the ground and six feet above is about five degrees, and the scion was unable to bear the temperature which the stock had safely weathered. To what extent is grafting practised in America? It would be easy to mention hundreds of failures attributable to grafting, more especially among Coniferæ and among many other trees and shrubs. In a great many cases it is by far the best plan to use stocks of the same kind as the scion. In a great many more it would be preferable to raise the plants direct from cuttings.

Kew, February 15th, 1889.

W. Watson.

"There is no part of improvement in which cautious operation is so necessary as in opening scenery. Injudicious planting may be remedied; but the evil resulting from injudicious removal can never be repaired, at least in the lifetime of the owner who has fallen into this common and destructive error. I was once consulted upon the improvement of a place on a large scale. The striking fault was the want of trees on the foreground connected with the house. I therefore marked several places for groups and single trees to supply this deficiency. But what was my astonishment when the owner told me he had cut down the trees that had occupied the very situation I had selected for planting."—From Gilpin's "*Practical Hints on Landscape Gardening*."

Cultural Department.

Forwarding Vegetable Plants.

YEARS ago we thought it essential to success in growing early cabbages that the seed should be sown in September and wintered over in cold-frames, or, south of Baltimore, planted out on the sides of elevated ridges. But this practice has been generally abandoned. We have found it more satisfactory to sow the seed in February, in boxes in a green-house or in a hot-bed; to transplant into other boxes as soon as the plants are large enough, and then to harden the plants in a cold-frame. Plants raised in this way are better than those from fall-sown seed, for they make a more rapid growth in spring, come in as early, and form a better crop, since they do not run to seed.

We use green-house boxes in preference to hot-beds for all kinds of plants, always taking care to get them into a cold-frame as soon as the character of the plant renders it safe to do so. This saves the trouble of preparing manure and making hot-beds, and handling, covering and airing through snow, slush and rain. The work can be comfortably attended to inside. Besides, by the use of shallow boxes not only is the irksome work of transplanting into a frame avoided, but the plants are kept in good shape for removal to the garden. A plant lifted from the box on the point of a trowel, and set with a lump of soil and manure on its roots gets a good start of one pulled from a frame.

Many amateur gardeners think when they make a hot-bed and sow tomato seed thickly therein that they are forwarding the plants for the garden. But a good, healthy plant started

purpose a well-prepared cold-frame is better, if not used too early. Here we sow our tomato seed in February, in green-house boxes, transplant into other boxes as soon as the plants are large enough to be handled, and then into frames for hardening by the middle of March. In the latitude of New York a month later than these dates will be the proper time. Plants thus transplanted are stout, stub-pointed and vigorous, if care is taken to expose them, after they go into the frames, to the open air whenever practicable. Such plants, set out here late in April, will give ripe fruit late in June or early in July. This practice involves more trouble, for which, however, the gain in earliness fully compensates. Egg plants and Peppers will not harden well in frames like Tomatoes, and the effort to make them do so will only result in stunted, unhealthy plants. We always pot Egg-plants and shift them, like any hot-house plant, until the weather is settled and the ground is warm—generally about the middle of May in this latitude. After this treatment, when the plants are put out, they are large and robust, and do not easily succumb to the Colorado beetle, which is fonder of them than of the Potato. A few early Cucumbers and early Musk-melons, treated in the same manner as the Egg-plants, will do well and give an early crop. Seeds of these very tender plants should not be sown even here before March, and a month later at the North. While the cold-frame is waiting for the tender plants some seed of early scarlet Turnip-radish may be sown in it. These, with care, will be out of the way by the time it is safe to trust the Tomato plants in the frames. Of course, during the fall and winter, the frames are kept at work with Lettuce and Cauliflower. The Lettuce being cut out, the Cauliflowers can be left without the glass when the time comes to sow Radishes in March, and with an extra



Auburndale Station, Boston & Albany Railroad.—See page 124.

in the open ground a month later will surpass in vigor, earliness and productiveness the tender and bleached plants raised in a hot-bed. If a hot-bed is to be used, the seed should be sown in a small bed; a week or so later a larger bed should be prepared, and into this the young seedlings should be transplanted as soon as large enough to be handled, though for this

frame the same sashes that grew the Lettuce and Cauliflower may be used for the Radishes and for hardening the Tomato plants. Few amateur gardeners understand the full capability of an ordinary cold-frame. A few sashes can be kept profitably at work on frames from November to June or later.

Crozet, Va.

W. F. Massey.

White Sports among Roses.

THESE peculiar developments or accidental growths, discovered from time to time among our Roses, are of a most interesting character, and they have either become more frequent of late years, or they have been more closely observed and cared for. In any case, the list of such variations has been much extended within recent years.

Botanical authorities have expressed the opinion that white variations, or albinos, as they are sometimes termed, may be expected among all colored flowers, and that, consequently, it is not surprising that they should be found among Roses. Up to the present time it is believed, however, that white sports have appeared only on the pink varieties, and have been most numerous in the Tea class. Some varieties appear to have a greater tendency in that direction than others. *Souvenir d'un Ami*, for instance, produced white sports, both in England and in the United States, at nearly the same time. As far as can be judged from descriptions the flowers of the two sports seem to be very similar, though there has probably not yet been a comparative trial of the respective merits of *The Queen*, the American sport, and *Souvenir de S. A. Prince*, the English variation.

Both the above-named sports have been much lauded, but it is rather premature to express a decided opinion on their merits, either for bedding-out or for forcing, though their origin is good, the parent having been a very popular variety for several years.

Another instance of a sport appearing in duplicate was that of *The Bride*, whose parent, Catherine Mermet, produced a white flower at nearly the same period in two different establishments, though one of these sports exhibited a tendency to a pink tinge in the centre of the flower.

So slight a difference as this, however, might easily be caused by a different soil or some peculiarity in treatment.

Another addition to the list of white sports, of comparatively recent introduction, is the *White Bon Silene*, the origin of which is clearly indicated by its name, the flowers being similar in size and shape to the type, but pearly white in color.

It seems somewhat strange, however, that after preserving its original characteristics for over forty years, the *Bon Silene* should, in 1883, produce a white sport.

In the hybrid perpetual class white sports have not been of so frequent occurrence, though the cause of this has not been explained unless it be that a majority of Roses of this class are of stronger growth and more vigorous constitution than the Teas, and therefore may not be so likely to produce sports of the character indicated. The absence of color may be due to some inherent weakness of the plant, on the same principle by which the white variegation of the leaves of plants has been accounted for.

The most notable instance of albino development among the hybrid perpetuals is that of the *White Baroness Rothschild*, which was introduced in 1882 by Paul. It is much like the type in growth and general appearance, and though a lovely Rose when in perfection, yet, like its parent, it does not flower very freely.

Holmesburg, Pa.

W. H. Taplin.

Orchid Notes.

Cattleya Percivaliana.—When some six years ago this grand *Cattleya* developed its handsome blossoms in our collection, there was much discussion as to whether or not it was an inferior variety of that Prince among *Cattleyas*, *C. Mossia*. After a season's growth, however, the plant proved to be entirely distinct, of most easy culture and worthy to rank among the foremost of this noble genus. It is a winter-flowering *Cattleya*, enriching our houses with its lovely blossoms when Orchid bloom is always acceptable. Four and five large flowers are produced on a single stem of a rich and charming rose color, the labellum being bold and very beautifully marked with deep, velvety purple, and finely fringed. For cutting and decorating purposes it will be found a valuable acquisition, remaining in bloom on the plant for four and five weeks. Varieties of this Orchid are many, and among the numerous plants now cultivated, several white forms have appeared which are still (like most white-flowered *Cattleyas*) extremely rare. During the summer months this species is in active growth, and an abundant supply of air and moisture will then be found necessary to insure good results, but the direct rays of the burning sun must be carefully avoided.

Dendrobium thyrsiflorum.—A group of this *Dendrobium* when in bloom is truly a magnificent sight, and when arranged with ferns and foliage plants its beauty is enhanced. It makes a splen-

did object for exhibition purposes, its lovely racemes of white and orange flowers are strikingly effective. Its culture is quite easy, producing blossoms in great profusion during April and May, which will remain in good condition three and four weeks if kept in a cool and dry atmosphere while growing. The plants should be so placed that abundance of light and air is available, and during bright weather occasional syringings overhead will prove very beneficial until growth is completed. It will then be necessary to remove them to a cooler situation so that the bulbs may mature thoroughly before they bloom. They should be left in these quarters until the flowering nodes at the apex of the bulbs show signs of swelling, when they may be returned to their former position to enable the handsomely racemes to develop. Pots or baskets will suit this species, with very little compost about the roots. During January and February the home of this *Dendrobium* is thoroughly searched by collectors, who ship large quantities to this country. Plants can thus be obtained at a low price. Rarely, however, are such masses received as are frequently developed under cultivation. Out of an importation of several thousand plants it is unusual to obtain a score of good-sized specimens. Large plants of this species still remain rare, therefore, and somewhat difficult to procure.

A. Dimmock.

Summit, N. J.

Principles of Physiological Botany as Applied to Horticulture and Forestry.

XI.—THE PHENOMENA OF GROWTH.

ALL growth in the vegetable kingdom depends on the multiplication of cells and the increase of these in size. It is hard to realize that the organs of the plant with their orderly arrangement and their beauty of form are dependent on the increase in number and size of the microscopic masses of living matter which we have examined in a previous paper of this series. In the cells of the plant the living matter exists as a comparatively shapeless mass of a soft and yielding substance, and yet this formless matter has given shape to the shell, if we may call it so, in which it is confined.

Moreover, these shells, or cell-walls, are of extremely diversified form and character. Hence it is still more difficult to understand in what way these formless masses can, in one case, give one shape, and in another, another shape to a cell-wall, always with such precision that the sum of these creations appears before us as a plant so definite in the unity of all its parts that we think of the whole as an individual and speak of it as such. Furthermore, each plant has its own shape, and the various species are recognized as such, even small deviations from the standard or type being detected by the observer. And yet all of these multiform structures spring from microscopic masses of a formless substance.

This statement, although correct in the main, may be somewhat misleading without further explanation. It is only at the earliest period of growth of new cells that this control over the shape of the imprisoning walls can be exercised. During this early period the living matter determines in all respects the architecture of its prison. Later, the hardening walls are no longer plastic, and, then, in the interior of the cavity, the living matter seems to lie helpless and shapeless except so far as it conforms to the shape of the firm walls around.

FORMATION OF NEW CELLS.—In the living matter of a young cell capable of multiplication there exists a roundish body, somewhat firmer in its consistence than the rest of the protoplasm. This body is known as the *nucleus*. When a cell is about to produce another, by the process termed multiplication (or, by a strange use of language, division), this nucleus undergoes certain changes in its internal structure. The word structure is used advisedly, for, although under high powers of ordinary compound microscopes, it may appear structureless, yet, with the very best modern lenses and with appliances for staining the nucleus, a tangled network can be plainly discerned, which sooner or later assumes definite lines resembling in no slight degree the lines of a map of the earth, with its meridians of longitude and its parallels of latitude. At a certain period in the development there is an accumulation of masses at the two poles, and a sort of an equator can be made out without much difficulty. These accumulations at the poles and the equator characterize the distinct separation of the nucleus into two parts, each of which becomes a new nucleus, each one in its turn to become the seat of similar activities and changes.

The nucleus is believed to have much to do with the distribution of nutritive matters in the forming cells, but exactly how it governs the arrangement of building material is as yet

unknown. It is enough to say that the division of the nucleus accompanies the multiplication of cells. Just here it is well to glance at the wonderful character of a process by which these nuclei give rise to new nuclei and their enclosing cells, and the latter in their turn give rise to others, and so on, the new ones assuming shapes unlike the earlier ones as the growth proceeds. The cells of the Maple produce in their multiplication the leaves, branches, flowers and fruit of the Maple, each new organ appearing at its proper time and place, while the similar cells of the Oak give us all the organs of the Oak. Yet between the early cells of the two, it would be hard to find any differences by which they might be distinguished. The cells of the one have inherited from their ancestry one set of characters, namely, those of the Maple, while those of the other have come down to us from an ancestry of Oaks.

FORMATION OF TISSUES.—The cells constitute tissues, or coherent clusters of cells more or less modified, and the coherent tissues make up, of course, the masses which we recognize as the organs of the plant. In their young state the cells which constitute these tissues may appear to be almost indistinguishable from each other in form and other characters, and the tissues may very closely resemble each other. As the tissues become older, the newly-formed cells increase in size, and the nature of the constituent walls may become modified. But these new cells of the tissues do not all change in the same way. Those of the interior of a stem in its youngest state are more or less compressed or hemmed in by the cells outside of them, and thus arise what are called *tensions*: the outer portions of a group pressing more or less on the parts within. Now, since all of these tissues are more or less yielding, it is plain that any force exerted on one side of a very young organ would change its tension, and there would be a resultant change of form. Such changes of form do take place, not only from external influences, but by internal forces and the resultant changes of form may go on with a good degree of rapidity. The various movements of plants are to be referred to this cause. The external influences exerted by the force of gravity, by light, by heat, by excess of moisture, or by shock, all result in changes of form of the tissues and the organs which they compose. Exactly what is the cause of the fluctuations in the internal forces is as yet unknown, although in many cases there is plainly a direct relation between changes in the osmotic force and the changes in form.

MOVEMENTS.—It may be said, in concluding this brief reference to the growth of tissues, that all young parts of all plants are capable of spontaneous movement. In a few cases, notably those of the twiners, like the Morning Glory and the Hop, the movement can continue even after the parts have grown somewhat older, and in many instances there are movements, attributable to differences in the tension of tissues, which are distinctly associated with the relations of leaves and the parts of flowers to light, moisture, and heat.*

RESPIRATION.—The chemical phenomena which accompany the growth of tissues can be passed over very lightly. There is, of course, an expenditure of building material and a slight consumption of oxidizable matter by which latter is procured the force requisite to put the former in its place. The consumption of this oxidizable matter (sugar or its equivalent) is practically a process of oxidation, and consequently there is a production and elimination of the two products—namely, carbon dioxide and water.

In all growth there is more or less heat evolved. This physical phenomenon can best be studied in such cases as the so-called Calla Lily, in the scroll of which, during the maturing of the flowers, there is an appreciable elevation of temperature.

This series of processes during the various phases of growth constitutes, when taken together with the oxidations necessary for other activities in the plant, what is called the *respiration*. Carbon dioxide is given off, but the amount exhaled from a plant even during its period of most rapid growth is very small indeed, and, so far as hygiene is concerned it may be disregarded in the air of our houses. There are, however, processes of oxidation which sometimes occur in the rich soil in which house-plants are grown which render it doubtful whether it is not better to exclude such flower-pots from the sick-room. Furthermore, when a plant is in full flower the amount of carbon dioxide given off is larger than at other times, and there are odors evolved by flowers which may prove annoying to the sick. But on the air of the rooms in which healthy people are living the respiration of plants cannot exert any deleterious influence.†

Cambridge, Mass.

George Lincoln Goodale.

* See Bessey's Botany, page 193.

† Many interesting facts relating to this subject are presented in a popular manner by Dr. Andrus in his HOUSE PLANTS AS SANITARY AGENTS.

Correspondence.

The Drayton Garden.

To the Editor of GARDEN AND FOREST:

Sir.—Magnolia-on-the-Ashley is little more than a dozen miles from the city of Charleston, and it has been in the possession of the Drayton family since 1671. Many of the Live Oaks, which were great trees then, still shade the lawns and walks of this garden, and it is full two centuries since the lines of stately Magnolias which rival the Oaks in massiveness and dignity were planted. Early in the history of the place the grounds were laid out with a broad, Oak-bordered meadow in front of the mansion, with another spacious lawn on the river side, and the stream which here drops into the Ashley was expanded into a pair of quiet lakes by two massive dams. Then more Oaks and Magnolias were planted, with some flowering shrubs and herbs, and the paths were bordered with Box. But the minor details of the plan were neglected after a time, while the trees, whose roots found the best of nourishment in the phosphate beds which underlie this whole region, kept on making marvellous growth. In 1841, when the present proprietor, the Reverend J. G. Drayton, D.D.—then a young man with health, to all appearance, shattered beyond hope—returned to the home of his ancestors, he found the great trees, and besides them only some dimly outlined walks, a few specimens of Gardenia, Calycanthus, *Illicium anisatum* and some wild shrubs on the border. The young student began his gardening and the life in the open air, which offered the one slender chance for recovery, by planting two Rose bushes. He knew little about plants then and less about work, but since that day his own hands have done most of the planting which has made his garden famous the world over, in some of its features.

It was six or seven years before Dr. Drayton found he had a chance for life, and in 1848 he planted the first Camellias and Azaleas of his remarkable collection, in which they are now counted by the hundred. Of Camellias there are some 300 varieties, many of them seedlings of his own raising. The plants, too, are remarkably large, strong and floriferous. Many specimens are trees more than twenty-five feet high, with trunks thirty inches and more in circumference, and now carrying thousands of flowers. The Azaleas are quite as numerous, and equally remarkable for variety, vigor and size. There are probably 150 distinct kinds, with individual specimens from ten to fifteen feet high and fifteen to twenty feet in diameter. Of course there are other noteworthy trees and shrubs in the garden. So fine an example of *Thuya gigantea* can hardly be found on this side of the continent, and there is a *Cupressus funebris* worth a journey to see, with immense specimens of Box Tree, and Rhododendrons, Kalmias and flowering shrubs in abundance. But after all, to northern eyes, the Camellias and Azaleas are the glory of the garden in early spring. From this part of the coast region all, who can, escape in summer to the highlands of the interior. Dr. Drayton leaves for his summer home in North Carolina as early as the first of May, but the Azaleas are in bloom a month before, and the wealth of glowing color along the avenues and on the borders of the lawn, where these shrubs are massed, can hardly be imagined, while the Cherokee Roses are flinging out their white banners from the very tops of the forest trees on the lake shore and covering them all over with flowers, and the Magnolias fill the air with fragrance.

While the Azaleas are in flower there seems no room for anything else, but a month or six weeks earlier the Camellias appear to fill the garden. Last year they were at their best a fortnight before the great snowstorm fell upon New York, and certainly they never can be more beautiful than they are to-day, and have been for a week past. Numbers and measurements give no idea of the dazzling abundance of flowers among the bright green leaves on the long lines of Camellias that stretch away in every direction, flowers single and double, and showing every tint from snowy-white to almost crimson. Glimpses of the shining river are caught through vistas of flowers, and under the moss-draped branches of the Oaks. The bright colors are all heightened by the dark masses of Magnolia that rise behind them. On the lawn the turf is beginning to warm into a tender green, and sheep are nibbling in the meadow, already at their work of keeping it closely cropped. And all this just at the close of February. No wonder the place is so attractive to visitors from the cold North, and no wonder so many of them feel a debt of gratitude to Dr. Drayton for throwing open all this beauty to be enjoyed by strangers.

Charleston, S. C., March 2d.

S.

The American Pomological Society.—II.

The Meeting at Ocala, Florida.

THE late meeting of the American Pomological Society was held in Ocala in accordance with the invitation of the Florida Horticultural Society, and the northern visitors were impressed by the energy and intelligence shown by the members of this organization. It was natural that a large percentage of the papers should have been contributed by them and that they should have conducted most of the discussions. But the uniform excellence of the addresses was noteworthy. Nearly two hundred members of the local society were present, and their activity suggested the thought that the large percentage of the population engaged in fruit-culture helped to insure a more general familiarity with the methods which command success than can be found in regions where fruit-culture is subordinate to other branches of horticulture and agriculture. A large proportion of Florida Orange-growers came from a climate where this fruit does not flourish. The industry was new to them. There was no body of doctrine or experience to draw upon. The local society therefore, has been of signal advantage in furnishing a medium for the interchange of instruction and experience and the result is that, while there remains much to learn, the growing of semi-tropical fruits in Florida has already been placed on a foundation as secure as that of other branches of economical horticulture.

President Berckmans, in his opening address, said that the Pomological Society was founded fifty years ago, not only to unite the fruit-growers of the country in a brotherhood and furnish a means of social intercourse among them, but to be of practical utility in collecting and classifying the knowledge of different fruits gained in widely-separated localities. It had not been conducted in the interest of individuals, but was an impartial tribunal, setting its seal of approval on what had been proved good in practice and condemning what was unworthy; and since fruit-growing had become so important a factor in the production of national wealth the work of the Society could be truly characterized as patriotic. It had long been recognized in Europe as the most efficient organization of the kind in existence, and it was especially useful in this country where the fruit-grower owns the land he tills and where he can apply the mental force acquired in free schools to the conduct of a business which is under his own control and in which his planted orchards and other improvements will help to increase the value of property which he possesses in fee simple.

Mr. Berckmans then called attention to the Paris Exposition, and congratulated the Society that our government had established a Division of pomology in the Department of Agriculture, and that this Division was to be represented in the general exhibit made by the government at Paris. He invited attention to the progress made in utilizing surplus fruit, because this furnished a relief to the grower at times when over-production was threatened. He urged the importance of co-operating with the experiment stations with a view to making them more effective in general, and especially for the purpose of directing their efforts towards the testing of new varieties of fruit and devising means to make successful defence against plant diseases and destructive insects.

Mr. Berckmans concluded with a brief sketch of four members of the Society who had died during the year. These were Wm. Parry, of New Jersey, well known as an originator of small fruits, and more particularly identified with the introduction of the Kieffer pear; Richard Peters, of Atlanta, Georgia, a widely-known raiser of fine stock and fine fruit and the disseminator of many good varieties of native apples and peaches; A. J. Caywood, of Marlboro', New York, to whom we are indebted for several choice varieties of grapes and raspberries, and P. W. Reasoner, of Manatee, Florida, a young horticulturist of remarkable promise.

The attendance from the North was not so large as had been expected, but twenty-two states and the Dominion of Canada were represented, and among those who came and took an active part in the proceedings were such men as C. L. Watrous and G. B. Brackett, of Iowa; Geo. W. Campbell, of Iowa; Thomas Meehan, Jr., of Pennsylvania; F. L. Hexamer, of New York; E. Williams and J. R. Parry, of New Jersey; B. G. Smith, W. C. Strong and F. L. Temple, of Massachusetts.

The following are abstracts of some of the more important papers read at the meeting:

REPORT OF THE SUB-TROPICAL FRUIT COMMITTEE.

The committee on sub-tropical fruits which was created at the Boston meeting of the Society proved its value by presenting a report which gave a better account of the history and importance of this strictly southern industry than can be found elsewhere in the same compass. Unfortunately the report of the California member or the committee did not reach Ocala in time for the meeting, but the Gulf region, from Louisiana to Florida, was very thoroughly covered.

In Louisiana the Parish of Lower Plaquemines has the advantage of furnishing the earliest oranges. The entire crop is sold on the trees, and the oranges are often paid for while the trees are yet in bloom. The prospective crop of a hundred-acre Orange-grove was sold last winter for \$30,000 before a blossom or bud had appeared on the trees. In southern Alabama the hopes of Orange-growers were frozen out with the death of the trees in the cold January of 1886, but the Fig is here grown to perfection and yields enormously. No other strictly sub-tropical fruits are grown here, but, as in the northern region of Florida, fruits of Oriental origin like the Kelsey and Bhotan Blood Plums, the Peen-to and Honey peaches, the Le Conte and Keiffer pears, are receiving much attention. There is a reviving interest, too, in some old and almost extinct varieties of the Peach, while the cultivation of the Scuppernong Grape and of the Pecan is rapidly growing in commercial importance.

In the Florida Peninsula proper, and down to the 28th degree of latitude, the cultivation of the Citrus fruits is the absorbing industry. The trees here grow like weeds, attaining the largest size and most perfect development. Every known variety of Orange seems at home here, and many of the introduced kinds attain a sprightliness of flavor, combined with a juiciness and sweetness, which they never acquire in their original habitat. It is but reasonable to expect that in countries where these fruits have been cultivated for centuries, varieties of the finest texture and flavor may be looked for; and enterprising Floridians are collecting and experimenting with the best Oranges wherever they can be found. On the other hand, many persons hold that the best fruits can be had by selecting choice seedlings at home, which unite good quality with great productiveness. Many of the best-known groves in the Indian River region are from Florida seedlings, and even the famous Navel trees, on account of their unfruitfulness, have in some cases been budded with so-called native varieties.

The Lemon is more tender than the Orange, but the freezing weather, three years ago, did not cause irreparable loss in the southern counties, and largely increased areas are planted with this fruit every year.

Many persons consider it the most promising for cultivation of all the Orange family. Florida lemons were quite unsaleable a few years ago, but now, since more has been learnt of varieties and of proper methods of curing and harvesting, they lead the market in value.

The Pomelo, or Grape-fruit, has conquered a position for itself in the North, and must soon be as popular in the market as it always has been for home use. Its beauty and size and flavor must make it saleable, and its productiveness will make it profitable. It varies greatly, and new and improved varieties will certainly be produced.

The best varieties of the Lime have been so lately introduced that little is yet known of their commercial value. Besides these many minor fruits of this family have been introduced and are sparingly used in a domestic way, like the Citron, the Shaddock and the Kumquat, a diminutive Japan Orange of great value for preserving.

The Fig has already been mentioned, but it thrives best north of the Orange-belt. The Loquat, or Japan Medlar, is seen growing over all the State, and has proved profitable where planted for market. It is susceptible of great improvement, and the better varieties can be grafted on seedlings or on Quince roots, as is done in California. The Kaki, or Japan

Persimmon, is a comparatively recent introduction. Some of its varieties are so rich in color that they may be fairly termed gorgeous, and in flavor it bears as high a rank as it does in appearance. No doubt its introduction marks an era in the history of fruit-growing in the State, for its culture is no longer an experiment. Still, comparatively little is known as yet of its distinct varieties or their special uses. One of their most interesting fields of experiment now offered to horticulture is the hybridizing of the Kaki and the American Persimmon. In the Orange-belt the hardier varieties of the Guava, the Olive, the Date, the Carob, the Downy Myrtle, the Chinese Litchi and other fruits have been successfully grown, while south of this region the Custard-Apple, the Tamarind, the Tropical Almond (*Terminalia Catappa*), the Pineapple, the Hog Plum (*Spondia*), the Barbadoes Gooseberry (*Peireskea aculeata*), the Star Apple (*Chrysophyllum Cainito*), the Mango, together with the Banana and Coconut, are all in cultivation, and described with some detail in the report.

VARIETIES OF THE SWEET ORANGE.

Mr. E. H. Hart, whose Orange grove at Federal Point is famous for its extent as well as for the number of the tested varieties it contains, read a paper on the above subject. Mr. Hart, with much humor, explained how the original belief that there was but one kind of sweet Orange, all variations being accidental and temporary, had been swept away by the advent of new varieties and of the hundred seedlings, which were quite distinct to the educated eye and palate. The late P. W. Reasoner compiled a list of more than 150 varieties. All the worthy ones were not included in this catalogue, but it could have been reduced if some admitted as distinct varieties had been placed where they really belonged among the synonyms. It is not difficult to judge the quality of a variety, but it requires time to sift from the list those that prove shy bearers, those with fruit too delicate for transportation or those with other faults which detract from their profitability. Again, fashion is fickle, and the variety which sells well this year may not be in demand the next. Who would have thought a few years ago, when Mandarins and Tangerines were eagerly sought at fifteen dollars a box, that the time was not far away when they would melt down on the hands of the commission merchant for want of purchasers, or be left to hang on the trees to rot like sour oranges? The speaker went on to say that out of the infinite variety of apples known to pomologists, the standard market sorts could be counted on the ten fingers. Even on the amateur's list, no orange should be admitted without a rigorous examination. And the market varieties should be selected still more closely.

We have only space to add condensed descriptions of a few varieties of special merit. The Maltese Blood is a favorite variety of the Blood Orange. Its thin, tough, juice-preserving skin gives it a high rank as a shipping fruit, and its tendency to bear only on alternate seasons may be corrected by liberal cultivation and fertilizing. Several strains of this variety show slight differences, and one of the best for flavor, heavy-bearing and long-keeping is possibly a case of bud variation from the Jaffa, in which the red color has become fixed. The Jaffa, as well as the Long of Thomas River, gives evidence by peculiarities in the young foliage of remote connection with the Maltese Blood, and this explains, perhaps, the crimson pulp in the case above cited. Another type of Blood Oranges has the shape and characteristics of the ordinary round orange, with the addition of the tinted pulp. Some are sharply acid and others have an exquisite sprightliness, and many of the trees show a vigor and fruitfulness which, when elaborated by selection and judicious crossing, promise a race of which Florida may be proud. The Centennial, though ripe enough for use in October and November, possesses the exceptional advantage of preserving its juices unimpaired on the tree until May or June. Of very late varieties Hart's Tardiff takes the lead for quality and long-keeping, being in season from March till August, and growing sweeter all the while. To judge from market quotations the Navel family stands high in popular estimation, but a non-productive habit has caused growers to look upon it with suspicion. The unfruitfulness has been attributed to deficient pollen, but perhaps too profuse blooming, as in the Maltese Oval, may cause a shedding of the young fruit from temporary exhaustion. But when the vigor of a mature Navel tree has been sustained by liberal feeding or by budding on the stronger-growing Rough Lemon, there has been less cause for complaint. The Washington Navel now stands without a peer even in this royal family. It often surpasses the Pomelo in size, is finer-grained, solid to the very centre, and sweet and succulent as a Strawberry Pine. Of the Double Imperial Navel

lately procured from Mayor Rountree, of New Orleans, it is too early to speak. From the few specimens grown in Florida it seems of moderate size, very solid, fine grained and heavy, entirely seedless and of an exquisite vinous flavor. A thorny tree of vigorous growth and a somewhat different style of blooming from its relative, it seems like a new departure in the family, which may by its productiveness fulfill the promise of its abundant bloom. The apical mark is less prominent than in some other members of the family and often blind, but dissection always shows the orange within the orange. It is a true Navel, and only lacks the guarantee of fruitfulness to insure it a front rank among the choice oranges of Florida.

THE LEMON IN FLORIDA.

From an elaborate paper on this subject by H. S. Kedney, of Winter Park, we make space for a brief abstract only. Less is known of the Lemon and its cultivation than of the Orange, but although it demands more care and closer attention, the prevailing belief is that south of the region of danger from frost it will prove at last the more profitable fruit of the two. Fifteen years ago the finer varieties of lemon were introduced into Florida by General H. S. Sanford, to whom, and to Reverend Lyman Phelps, Lemon-growers owe a debt of gratitude for directing attention to the choicer kinds, and for setting the first example of a successful handling of this fruit. The Lemon should be budded on Orange stock, and as it needs more water than the Orange, high and dry locations should be shunned, and yet no water must be left standing about the roots. The trees should be planted much more closely than Oranges, since the dense shade preserves moisture and seems distasteful to the rust fungus. For obvious reasons heavy timber on the north and west of a grove will be found useful. Each Lemon-tree, if well cared for, should yield half a box of fruit the fifth year after setting, and in the tenth or twelfth year from six to eight boxes, which may be set down as a fair average yield. There are usually two crops a year, the first ripening in July and August, and the other in October and November. The Lemon-tree is much freer from diseases and insect pests than the Orange; it is rarely troubled with blight, "die-back," or scale. The rust-mite is its greatest enemy, and although a russet Lemon is quite as good as any other, it is unsalable—while a russet Orange is marketable.

Exhibitions.

The Recent Orchid Exhibition in this City.

THE Orchid Show recently organized at the Eden Musée by Messrs. Siebrecht & Wadley surpassed in interest either of its predecessors. As we remember them, neither was so rich in beautiful or curious plants, or so attractively arranged. The public appreciated its opportunity. Although the exhibition was open for a full week it was constantly crowded, and the number of catalogues sold proved that a genuine desire was felt to learn something about its contents. Of course at a show of this kind Orchids do not appear to the highest advantage. There are only two conditions under which they are seen at their best—either as isolated specimens or harmoniously massed, many individuals of similar kinds together. The very qualities which make Orchids attractive—their peculiar manners of growth and the vivid colors and eccentric forms of their flowers—give a confused, heterogeneous look to a general collection. The contrasts are so strong in such a collection that no one plant shows its true beauty, while the total effect is often unpleasing. Yet, anyone who made the effort to isolate one plant from another and study its peculiarities, had much to enjoy in this exhibition.

Messrs. Siebrecht & Wadley themselves contributed 176 Orchids, as well as numerous other rare or beautiful plants; Messrs. Pitcher & Manda sent seventy-nine varieties of Cypripediums and various other specimens; Mr. William S. Kimball, of Rochester—one of the chief amateur cultivators in the United States—contributed seventy-four specimens, and Mr. John Eyerman, of Easton, Pennsylvania, fifty-six, while from Mr. Man, of Weehawken, New Jersey, came fifty varieties of *Cattleya Trianae* alone. In this last collection was a white specimen that was labelled as "the largest in existence"—a splendid plant indeed, with seven flower-stalks and thirteen blossoms.

A large shelf filled with plants of *Primula obconica* may well have convinced all visitors that no "Chinese Primrose" is so beautiful as this. The fine specimens of *Strelitzia Reginae*—the "Bird of Paradise flower"—seemed, as is always the case when they are exhibited, to attract more attention than any of the Orchids. This is one of the showiest flowers in the world; and, whatever may be the case under other conditions, showiness

rather than beauty is what "takes" at a flower show. The thirteen varieties of Pitcher plants exhibited by Messrs. Siebrecht & Wadley, were likewise an attraction; but the most beautiful object in the room was a well-grown *Bougainvillea spectabilis*, trained on a large, fan-shaped screen, which it entirely covered with its masses of soft yet vivid crimson.

It is unfortunate that there is no good hall in New York for horticultural exhibitions. There is little choice except between the dark and gloomy hall of the Masonic Temple and the Eden Musée, which is well lighted but otherwise unfit for the purpose. It is not nearly large enough, and one is distressed to see beautiful plants crowded in among hideous mural decorations and equally hideous statues, and forming a mere adjunct to a collection of wax-works. The public has certainly shown that it takes a great interest in horticultural shows. Even the Metropolitan Museum has been crowded to suffocation when put to this service, and the smallest collection, well selected and attractively arranged, would be sure to be popular. Let us hope that a suitable horticultural hall will be provided when the Madison Square Gardens are reconstructed. But meanwhile the public owes a debt of gratitude to the enterprising firm of florists who have done so much, under difficulties, to show how the culture of Orchids has advanced in America.

Notes.

A novelty in the commercial world is the "Chamber of Commerce for Horticulture," which was recently established in Brussels. Its members will meet twice a month to transact business, after the manner of exchanges in other branches of industry.

The Tulip was introduced into Europe from Persia, passing by way of Constantinople. Johann Heinrich Hawart, of Augsburg, whose garden was famous in its day for the many rare exotics it contained, may first have brought it to Germany about the middle of the sixteenth century, and it appeared in England some fifty years later, during the reign of Queen Elizabeth.

An interesting plantation of fruit trees is about to be destroyed in the *Jardin des Plantes*, at Paris, in order that the space occupied by the menagerie may be extended. This is the collection of Pear trees which Decaisne studied when preparing his famous work, "*Le Jardin Fruitiier du Museum*." It contains about 550 varieties of Pears and forty-five varieties of Plums. Similar collections of Apple and Cherry trees formerly stood near by, but were destroyed in 1883.

In addition to the ordinary culinary uses of the Potato—which are much more numerous in France than in this country—there are many other services to which this esculent is put. In Germany spirits are made from it, and exported under the name of "Stettin brandy," while a large proportion even of the French cognac, which is fondly supposed to be the juice of the Grape, is in fact spirits of Potato. *Eau de Cologne* is likewise largely manufactured from Potatoes, while after the farina has been extracted from them, the pulp that remains is manufactured into picture-frames, boxes and toys, and the water expressed in the process is a valuable scouring fluid.

On the Castle Huntley estate, in England, a remarkable tree was destroyed by a severe gale which occurred on February 3d. This was an old Scotch Fir which, says the *Gardener's Chronicle*, was believed to be over 250 years of age and was "in some respects as remarkable a tree of the kind as could be found in the country. Its girth at the ground was twenty-four feet. At one foot up it girthed sixteen feet, and at five feet, fifteen feet. Above this the trunk swelled out until it had a girth of about thirty feet, and, although its limbs had been sadly broken and shattered by the storms of centuries, it had at the time of its fall a fairly good head. It was broken almost clean across about twelve inches from the ground, and the trunk internally was very much decayed to within an inch or two of the bark. The tree, had it been in sound condition, would, it was estimated, have yielded ten tons of timber.

The cottage at Fordham, which was once occupied by Edgar Allen Poe, has been offered by its owner, Mr. P. A. Karey, to the Park Department of this city with the request that it may be removed to some site in the Central Park or in one of the new parks above the Harlem River. The Central Park already contains as many buildings as it can well accommodate, and, even for the sake of historical associations, no other should be admitted within its precincts. But it is especially desirable to foster such associations in this country where commercial interests yearly destroy so many records of that

past which the lengthening perspective of time will make more interesting to our descendants than it seems to be to the average American of to-day. In one of the proposed new parks Poe's Cottage should certainly be placed on some site where the landscape-gardener can make it an agreeable and perhaps a useful feature in his design.

"A good deal of attention," says the *Gardener's Chronicle*, "has been given from time to time to the old Japanese lacquer-ware, some very fine examples of which are contained in the South Kensington Museum, and a very complete set, showing the whole process of its manufacture, is exhibited in the Kew Museum. At the time this collection was got together a full report was prepared to accompany it, in which the mode of extracting the lacquer from the *Rhus*-tree, and the entire process of lacquering, were described. Considering the very large quantity of lacquered goods that now come to this country from Japan in the shape of boxes, trays, flower-stands, vases, etc., it would seem to be of some importance that the trees which yield the varnish should be preserved, and we now learn from a report from Hakodate that, as it was considered that the Lacquer-tree (*Rhus vernicifera*) would not succeed in the North, the few trees first planted were not looked after; but last year 157 young trees, averaging from five to eleven inches in girth, were tapped, and the yield was fairly satisfactory. The amount of sap was less than the same number of trees of a similar size would have yielded further south; but the proportion of water and foreign matter was only one-fourth, while the sap of southern trees is said to be generally nearly half water. After refining, the lacquer was also found to give a high polish, and it is, therefore, intended to promote the growth of the tree as much as possible. The young trees planted last year amounted to 150,582.

Three fields of botanical investigation in northern Mexico still invite the zealous and hardy explorer, and promise abundant harvests of new species and of more detailed information than now exists, of the distribution of the plants of this important phyto-geographical region. These fields are: the high northern Cordilleras and their Sonoran slopes—a region some 200 miles south of Arizona, where a day's walk will take the traveler from lofty summits down into warm valleys, which open out towards the lowlands of Sonora, and in which grow the Palm and the Orange. The second region is that part of north-eastern Mexico occupied by the northern extension of the Sierra Madre, and extending southward from Monterey for nearly 150 miles. A few plants were gathered forty or fifty years ago in the extreme northern part of this region by Gregg, Berlandier, Thurber, Parry, and during the past few years by Palmer, Sargent and Pringle; but its flora is practically unknown, except along its margin, although since the opening of the railroad to Saltillo it lies at the very doors of the United States. A good trail, with numerous branches, now leads from Saltillo through the heart of the mountains southward to San Luis Potosi, along which numerous missionary stations have been established. It will not be difficult, therefore, to see a great deal of this region in a comparatively short time, and without danger. In these mountains will be found, probably, the southern limit of many North American trees, or new species of trees of North American forms. The third region is on the Pacific side of the continent—a hundred miles to the west and south of Guadalajara. Here in the wonderful "barrancas" through which the rivers of the high plateau rush down towards the sea, and along the entire western slope of the Cordilleras, from Calima to Sonora, will, perhaps, be found the best botanizing the North American continent can now offer to the searcher for novelties. It is to the examination of these three regions that Mr. C. G. Pringle, who has already done so much to increase the knowledge of the flora of north Mexico, expects to pass a large part of the present year. He will start again for Mexico as soon as he has completed the distribution of his plants collected last year in New Leon and Chihuahua.

Catalogues Received.

PAUL BUTZ & SON, Newcastle, Pa.;—Plants.—M. B. FAXON, 21 South Market Street, Boston, Mass.;—Vegetable and Flower Seeds.—H. W. HALES, Ridgewood, N. J.;—Chrysanthemums.—DAVID HILL, Dundee, Kane County, Ill.;—Evergreens.—G. D. HOWE, North Hadley, Mass.;—Potatoes.—MICHEL PLANT and SEED COMPANY, 718 Olive Street, St. Louis, Mo.;—Seeds, Bulbs, etc.—PARKER & WOOD, 49 North Market Street, Boston, Mass.;—Seeds, etc.—WILLIAM PARRY, Parry, N. J.;—Fruit and Ornamental Trees.—SIEBRECHT & WADLEY, 409 Fifth Avenue, New York;—Orchids (Third Annual Orchid Exhibition).—STORRS & HARRISON CO., Painesville, Ohio;—Seeds, Plants, etc.—E. & J. C. WILLIAMS, Montclair, N. J.;—Fruit and Ornamental Trees, Vines, etc.

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A Proposed Invasion of Central Park.

IT seems as though there would never be an end of the necessity to defend the Central Park against aggressions and mutilations of one sort or another. A bill has once more been introduced into the Legislature authorizing the city authorities to issue bonds to obtain \$300,000 for the erection of new buildings within the park for the menagerie which already exists there, and to extend its zoölogical collections. So often have similar bills been defeated, in deference to a genuine burst of popular sentiment expressed through newspapers and journals of every class, that we cannot feel serious fears that this time the result will be less fortunate. Nevertheless, it is incumbent upon us to say again that a scheme favoring the extension or even the permanent maintenance of a zoölogical collection anywhere within the borders of the Central Park is wholly pernicious and indefensible. It looks neither towards the best interests of the park nor towards those of the zoölogical collection itself. There is not a foot of the park which is not absolutely essential to its chief and only proper function as a breathing-space and pleasure-ground for the people, or a foot which can be sequestered without injuring that design which, as all critics, native and foreign, have agreed, is one of the very finest examples of landscape-gardening art that the world possesses. And, on the other hand, a good zoölogical garden ought itself to be a work of art—carefully planned for its special purpose and much more extensive in area than it could be within the Central Park. This, however, is not the only scheme which has recently been advocated for the invasion of the park. In the pages of the *Pharmaceutische Rundschau*—a respectable and usually well edited trade-journal published in German in this city—a long article has been published declaring that the proposed botanical garden, of which much has lately been heard, ought by all means to be laid out within the bounds of the Central Park. A botanical garden, rightly established and conducted, would injure the park quite as much as a zoölogical garden. As much even as a zoölogical garden it needs to be controlled by scientific men, free from the interference of politicians. It appeals, more dis-

tinctly than a zoölogical garden, not to idle curiosity, but to intelligent curiosity and the definite desire for knowledge, and therefore is even less appropriate in a great popular pleasure-ground. And, finally, the soil of the Central Park is unfit for the establishment of a great botanical collection. Every old New Yorker knows what this tract of land was before Messrs. Olmsted and Vaux took it in hand. One great reason why it is so exceptionally interesting among works of landscape-gardening lies in the fact that Nature had seemed to say, Here, whatever you do, you cannot make a beautiful park. And the same fact partially explains that necessity for cutting out its plantations which from time to time excites well-meaning, but mistaken, popular protests. All other considerations apart, then, would it not be the height of folly to establish a botanical garden in a place which has been made a beautiful park only under the greatest difficulties?

In the proposed new parks in the northern section of the city there is room and to spare for both a fine zoölogical and for a fine botanical garden. Let the legislature there set apart the necessary space for them. Let money be collected from private givers in such amounts as will show a genuine popular interest, and then let the legislature, if needful, assist from the public treasury; and, as we have already advised, let governing associations, free from political control, be incorporated similar to those which control the Metropolitan and the Natural History Museums. Thus, indeed, there would be a chance that we should have collections worthy of the name. Nor need it be objected that the new parks would be too far from the centres of population to be really useful. We must think of the future as well as of the present; and even to-day, as has been pointed out by those in charge of the scheme for a botanical garden, the borders of the Bronx are as accessible as was Fifty-ninth Street when the Central Park was planned. By the elevated railways they can be reached from the City Hall in less than an hour, while these railways and the Bridge bring Brooklyn and Jersey City much nearer than they were to the Central Park twenty years ago.

We shall hardly be accused of a lack of interest in the establishment of a botanical garden at least, or of a failure to appreciate the fact that if rightly established and maintained it will be a boon and benefit not only to this city, but to the American people at large. Nevertheless, we frankly say that we would rather never to see it established than see the Central Park—that great monument to American art and priceless pleasure-ground of the poor—curtailed and ruined for its sake or for the sake of any other scientific or political or money-making scheme. It is certain, too, that the whole public shares our feeling, and that there would be no surer way for a legislator to ruin himself in the eyes of the people than to make himself an instrument in the defacement of the Central Park.

We begin this week a series of articles on the art of gardening which will both interest and instruct our readers. Born in the earliest times, this art has been practiced wherever men have lived in settled communities. It has gone through many phases, each of which reflected the spirit and the tendencies of the passing age, and has differed in different countries in harmony with the character of national civilization. Its developments in Europe, like those of all the other arts, may be grouped under two main types, one of which, as Alexander Humboldt pointed out, illustrates the temperament and expresses the æsthetic ideals of the South, while the other stands in the same relation to the North; and perhaps the most interesting portion of the history to be laid before our readers will explain that intermingling of these two types in modern days which finds a parallel in the present condition of architecture, painting and sculpture.

A number of histories of the art of gardening have been published in other languages, and German literature, especially, offers several of considerable size, compiled with much industry, and covering the whole field. But so far

as we have been able to discover, no such work exists in our language. Innumerable theoretical and practical treatises on the art of gardening have been written in English, and in some of them a certain amount of historical information is given. But we believe there is no English work that deals historically with the whole subject, or looks at it from the most instructive point of view—as an individual and independent manifestation of the artistic instinct, yet one which has a vital kinship with all the others, and a vital relation to the general course of human development. Indeed, even the most learned and voluminous German historians have either neglected to emphasize the close tie which binds gardening to architecture, or, while professing to do so, have not followed the best historians of architecture with regard to the points in question. We believe that this fault has been avoided in the present series of articles. Of necessity the articles will be brief, but they will give all essential historical facts and conclusions, with sufficient description of individual works to make their significance clear.

It may be granted that the history of gardening is less rich and varied than those of some of the other arts. Nevertheless, it is far more varied and significant than most persons realize. It is only when attention is concentrated upon any subject that its full interest appears, and but little attention has in our country been given to this one. What does Emerson say? "Each work of genius is the tyrant of the hour and concentrates attention on itself. For the time, it is the only thing worth naming to do that—be it a sonnet, an opera, a landscape, a statue, an oration, the plan of a temple, of a campaign, or of a voyage of discovery. Presently we pass to some other object, which rounds itself into a whole as did the first; for example, a well-laid garden; and nothing seems worth doing but the laying-out of gardens."

Nor was there ever a time or place when the laying-out of gardens was of more vital concern than it is with us to-day. Here in America we are confronted with problems more numerous, more varied and more important than those which any other age or country has seen. There is no reason why the art of gardening should not be carried in America to a higher development than any of which European history tells. And the surest way to foster such a development is for artist and public to acquaint themselves with the creations of the past. In this art, as in architecture, the time for ignorant experiment has gone by. Only catholic knowledge and cultivated taste can serve as the starting points for progress.

Longleat.

LONGLEAT HOUSE, of which an illustration is given on page 139, is one of the most famous among the great Elizabethan homes of England. It stands some five miles from the town of Warminster, in Wiltshire, and its founder was Sir J. Thynne, who caused its erection between the years 1567 and 1579. It is now the seat of the Marquis of Bath, and is in perfect preservation. The architect is supposed to have been John of Padua, which is probably the fact, for the touch of an Italian hand would explain the greater simplicity in outline and massing that we note when Longleat is compared with other houses of its time and class, while classic feeling also speaks from many of the details of its treatment. But in building this English country-home the artist by no means imported his scheme ready-made from Italy. He wisely accommodated himself to local tastes and adopted many local architectural devices. For example, the windows are without conspicuous pediments, and are divided by the transoms and mullions which so long survived in England after that Gothic art had perished to which they owed their origin. Moreover, instead of the straight façades which we find in Italian Renaissance palaces, here each of the four great fronts is provided with bays, having those side windows so beloved in England because so essential to the full reve-

lation of the surrounding landscape. The front, most prominently shown in our picture, has three such bays, while the main or entrance front towards the left has four, with a stately doorway and flight of steps in the centre. The four great wings thus formed encircle a large interior court, in the centre of which, just back of the entrance, is a superb great staircase. The main wings are 220 feet in length, and the side wings 164. A second entrance leads into the gardens on the side-front opposite to that shown in the illustration.

The grounds around Longleat are of vast extent and great beauty. One of the entrance-gates is two and a half miles from the house, and from another a straight drive of a mile in length leads through one of the most stately avenues in England to the main doorway. The flower-gardens are divided from the deer-park by a charming sheet of water, and the park itself, some thirty miles in circumference, feeds more than a thousand deer. Gilpin, in his "Forest Scenery" (1791), speaks thus of the beautiful situation of Longleat: "A great house stands most nobly on an elevated knoll, from whence it may overlook the distant country, while the woods of the park screen the regularity of the intervening cultivation. Or it stands well on the side of a valley which winds along its front, and is adorned with woods, or a natural stream hiding and discovering itself among the trees at the bottom. Or it stands with dignity, as Longleat does, in the centre of demesnes which shelve gently down to it on every side."

The Art of Gardening.—An Historical Sketch.—I.

THE art of gardening means the art of arranging surfaces of land and water, with all the forms of vegetation they support and all such works of architecture or sculpture as may be thought desirable, according to some settled design or scheme. Its productions may vary in character between the most formal and the most natural-looking effects; and in size between the smallest bit of verdurous ground in a city street and the widest rural park. But they may always be distinguished by the fact that organized beauty has been sought in their creation. Horticulture aims at the development of beautiful individual plants. Economic gardening, like its sister craft of agriculture, so disposes the surface of the ground and the individual plants that cultivation can be most easily pursued. But when we speak of the art of gardening we imply a result in which, though individual plants are valued and usefulness is largely served, a beautiful general effect has been the main concern. Of course not all the results we see as the outcome of effort in this art are beautiful, but as much may be affirmed of any other art, and the aim, the intention, is the thing with which we must reckon in defining the field that an historical sketch should cover.

Gardening is thus a very complex art, serving (as I have said), not beauty alone but utility also, and demanding the assistance of architecture, of horticulture, botany and engineering. Yet it is a distinct and individual art, and its history shows many periods and phases, and is always expressive, to a most interesting degree, of the spiritual temper and the intellectual development of the peoples who have practiced it. But in tracing all the earlier stages of its story we must rely, to a far greater degree than with any other art, upon mere written and pictured testimony. Not only the huge monuments of the ancient architect, but the most fragile products of the potter, the glass-blower and the weaver, have come down to us from gray antiquity. But the gardens of the old world have wholly perished, and even those which were created only a few centuries ago have almost all been altered into something very unlike their first estate. A garden carries within itself the seeds of decay, and scarcely the most careful attention could preserve it forever. We can fancy, some old Roman garden, tended from age to age by skillful cultivators, renewing itself time after time, and reaching us in a flourishing condition. But even so, it would not be the same garden that the Roman artist had created. The main outlines of its scheme might be the same, but all its vegetation would have been often replaced, and could hardly have been replaced in entire accord with the first arrangement. And, of course, no approach to such care as this has ever been bestowed upon a garden. Being half the work of nature, gardens were even less likely to be cherished under difficulties than other works of art; and none decayed so quickly and entirely when once

the barbarian or mere neglect had laid a hand upon them.

The origin of art has been found by some in that desire to portray natural forms which led the cave-dweller to scratch the outline of a reindeer or a mammoth on a piece of bone; by others in that appreciation of the beauty of abstract lines and spots which the South Sea islander shows when he adorns his paddles and hatchets with incised patterns; and by at least one writer—Schiller—in the act of the savage woman who first bound a handful of wild-flowers into a garland or nosegay. But to find the origin of the art of gardening we cannot look back to savage times. Nor can we wisely conceive of it as practiced in the very earliest, most rudimentary periods of civilization. It must have followed and at first strictly depended upon the art of architecture. Not until men had built themselves solid dwellings and places of worship of some pretensions can gardens for the delighting of the eye have been designed. The fact may seem a strange one at first sight if we have been taught by the "romantic" school of thinkers, with Rousseau at their head, to picture a primitive civilization as one in which man lived "close to the bosom of nature" and loved her beauties far more than those which were due to his own efforts. Nevertheless, it is a fact in entire accord with all that we really know, and all that we can sensibly imagine, of a primitive society. In such a society nature must always have been regarded not as the friend, comforter and restorer of man, but as his enemy to be thwarted and subdued; and a different conception could not arise until man felt himself her master. What he first wanted was to get protection from the rigor of her elements, the attacks of her wild beasts, and the menaces of other men; and his first artistic efforts must have been to adorn his walls and roofs and to beautify his own person and the utensils and weapons he employed. The artistic impulse means the wish to make something individual—to put a fragment of the artist's self into the result; and it can have found an outlet in gardening only after men had grown well accustomed to living in settled habitations, and had lost their first intimate familiarity with nature in her wild estate.

Some authors have found the origin of gardens in the tree-worship of primitive ages. When fetishes were the gods, trees were even more universally adored than serpents, although, indeed—as the story of Eden is enough to prove—the two cults often went hand in hand; and when this stage had passed and abstract deities were worshipped, the earlier phase of development was perpetuated in the "sacred grove" which surrounded every temple in every ancient land. Other writers have imagined that the first gardens were merely homes for useful plants—edible vegetables, medicinal and incense-producing herbs. These the Nomad tribes carried about with them, and were forced to grow in protecting enclosures. Undoubtedly much in the development of gardening art was due to both these sources. But it is only when a desire for beauty of general effect makes itself clearly felt that art is born. And gardening, we may feel sure, had not reached this point until after architecture had made considerable strides.

Of course many early poets, and among them the poets of Judea, have described beautiful gardens as existing before structures of any kind. But, however early they may have lived, the mere fact that their words have come down to us implies a long-developed civilization; and the conditions and tastes they express are, I need hardly explain, those of their own period, not of the mythical period they profess to portray. When men were able to record themselves in perfected forms of speech they had long left the bosom of wild nature, had lost their first fear of natural forces and first familiarity with natural beauties, and were therefore in a position to appreciate the charms of the outer world and to long for spots in which they could enjoy them. We cannot believe that the "first man" lived in a garden, but it is entirely natural that when poets began to record their conception of primeval happiness they should have thus imagined. Bacon says that "when ages grow to civility and elegance, men come to build stately sooner than to garden finely, as if gardening were the greater perfection." And I may add that when men first came to work in art they must have begun to build before they began to garden, because a more rudimentary need was thus gratified, and a better outlet for the artistic impulse was thus afforded.

New York.

M. G. van Rensselaer.

The middle-grounds and distances are the first subject of study for the artist in landscape. The beauties and deformities, the pleasing and unpleasing objects, which the more distant parts of the site and the surrounding country exhibit, or are capable of exhibiting, to the house or other principal place of view—these are his unalterable data.

Planting and Rural Ornament, 1796.

Foreign Correspondence.

London Letter.

I HAVE lately been asked by a friend in America to inform him what species of Palms would probably thrive in the open air in the Southern States; and as this is a subject likely to interest many readers of GARDEN AND FOREST, I will reply through the medium of its pages.

At the outset I must state that, except at Kew, very few of the hardier kinds of Palms are cultivated in England, although recently some notice of the most ornamental of these has been taken by our horticultural journals. So far as I can ascertain, the same statement applies to such favored localities as the south of France, Italy, etc., where the conditions which favor the out-door cultivation of many extra-tropical, and even tropical, species of Palms are almost perfect. There are a few exceptions to this as in the garden of Mr. Hanbury, at Mentone, and in that of the late M. Dognin, at the Villa-Valetta, Cannes.

We are too apt to consider that all plants which are found in tropical countries must require stove-treatment. It took many years in the earlier stages of Orchid cultivation in England to convince gardeners that Orchids might come from the tropics of the old or new world and yet be what are termed "cool" subjects. I remember in my apprenticeship days a fairly large collection of these plants, which included *Odontoglossums*, *Cattleyas*, *Masdevallias* and *Dendrobiums*, every one of which were grown in a hot, moist stove; and it is not very many years since we were not allowed to carry an Orchid from one house to another without first enfolded it in cotton-wool. Ignorance of the conditions under which new introductions are found wild often cause one to make gross blunders in their cultivation. It is only three years since we received, for the first time, at Kew some handsome stems of one of the noblest of all tree Ferns, namely, *Alsophila crinita* of Ceylon—and not knowing more than that this species is a native of that island, we treated them as stove-plants. They grew rapidly, but the fronds died almost before maturing. Dr. Trimen, the Director of the Botanic Gardens at Ceylon, happened to visit Kew in time to save these plants for us. They grow only in the mountains, so that on removing the stems to our large temperate-house they soon recovered. Now they are magnificent specimens. Palms are not so delicate as tree Ferns, and many of them thrive in temperatures of considerable range. *Chamærops humilis* and *C. excelsa* (*Fortunei*) are examples of this, for they are perfectly healthy in a stove, quite as healthy in a green-house, and the latter species does very well out-of-doors in the neighborhood of London. The varying power of plants from warm climates to resist cold is often very remarkable. The *Kniphofias* and *Phygelius Capensis* occur to me just now as instances. Both are natives of the Cape, where they rarely, if ever, are frozen, yet in England they bear 20° of frost with impunity, whilst many plants which are their companions in a wild state succumb to the first frost here.

And now to the subject of Palms for temperate climates. In the Kew collection the following are perfectly happy in a house where the temperature is approximately the same as that in the open air all through the year, except that in severe weather it is never allowed to fall below 40°:

Jubæa spectabilis, the Chilean Wine Palm, a noble plant, with an enormous bottle-shaped stem and a massive head of large, dark green, pinnate foliage; *Chamærops humilis*, *C. excelsa* and *C. Martiana*, the two first well-known Fan Palms, with constitutions like nails, the last similar in leaf to *C. excelsa*; *Livistona* (*Corypha*) *australis*, a splendid Palm for a temperate climate, and also a first-rate tropical plant; *L. Chinensis* (*Latania Borbonica*); *Areca* (*Kentia*) *Baueri* and *A. sapida*, the former a truly noble Palm, with very strong, large, curved, pinnate leaves; *A. monostachya*, now called *Bacularia*, or the walking-stick Palm, a small Australian species, with stems one inch in diameter, five feet high, and a graceful head of irregularly pinnate foliage, and here rarely out of flower; *Washingtonia filifera* and *W. robusta*, both natives of southern California, and probably better known in America than here. These last grow rapidly in our coolest houses, preferring the border to pots, and their handsome leaves are greatly admired. *W. robusta* I have seen, in the famous collection formed by Herr Wendland at Hanover, with leaves six feet across, as stout as iron, with large brown teeth on the petiole, and the long, white filaments hanging from the blade-like silken threads. There is no Palm to surpass this for a temperate climate. In England it is scarcely known. All the *Braheas* are best here when grown in the cool-houses.

Two other Palms, generally known as *Braheas*, namely, *Erythea armata* and *E. edulis*, both natives of Mexico and both

grand plants. *E. armata* is cultivated in Belgium and other continental countries under the names of *Brahea Roezlii* and *B. calcarata*. It is not unlike a *Thrinax parviflora*, but the petioles are shorter and bear small marginal teeth, whilst the whole plant is of the most beautiful glaucous green—almost silvery. Here we call it the Silver Palm. It is scarcely, if at all, represented by large plants in English gardens. If any of your readers would kindly supply some definite information in regard to the climatic conditions and the character of mature specimens of this Palm, I, for one, would be greatly obliged. It is quite at home under cool treatment here. *Serenoa serrulata* is also a useful Palm for temperate climates. *Juania australis*, the Chonta Palm of Juan Fernandez, is developing nicely in a cold-house. We have only lately secured plants of this graceful and very interesting species, which had never before been in cultivation. It is very similar to *Glaziovya insignis*, or, to take a better known plant for comparison, *Cocos Weddelliana*. But the foliage is more robust and the stem stouter. We have not yet tried the *Glaziovya* under cool treatment, but I have been told it is quite healthy under such. We have a beautiful example of it in a warm-house at Kew. It is certainly one of the most graceful of all dwarf Palms. Its proper botanical position is in the genus *Cocos*. *Sabal Palmetto* is healthier in a temperate-house than in a stove, its erect-stalked, handsome foliage being most effective amongst other plants.

Phoenix dactylifera, *P. spinosa*, *P. reclinata* and *P. Canariensis*, the last named a very elegant Palm, almost as graceful as *P. rupicola*, which is the prince of the genus, flourish in a cool temperature. No Palm would be more likely to prove "as happy as a native" in your Southern States than *P. reclinata*, the dwarf of the two African Date Palms. It is a bright green, elegant-leaved plant, rarely exceeding ten feet in height of stem, and always tufted. In the south-east of Africa it is one of the most attractive plants to be met with; at Kew it is in perfect health in the cool-house. *P. Hanceana*, a sturdy, compact species, native of Hong Kong, grows freely in the temperate-house.

The newest and probably one of the hardiest of Fan Palms is *Nannorhops Ritchiana*, from Afghanistan, of which large quantities of seeds were distributed from Kew a year or two ago. Like many Palms, it grows very slowly in the infant stage, but we have already found that it does not like artificial heat, preferring the temperature of an unheated green-house. In habit and the character of its foliage it resembles the *Chamærops*, but when large it is almost invariably tufted. In California and other of your warmer states it is certain to prove quite at home. (Thus far the Palms grown under cool treatment at Kew.)

From a descriptive account recently published of the famous garden formed by the late M. Dognin at Cannes, I have obtained some valuable information in relation to the hardness of many plants which we usually keep in tropical houses. Thus, in addition to some of the Palms above mentioned, I find the following species were a perfect success in the open-air garden of M. Dognin, namely: *Cocos (Syagrus) campestris*, *C. australis*, *C. botryophora*, *C. flexuosa*, *C. Romanzoffiana* and *C. Yutai*. These are some of the very best of the genus: *Sabal Havanensis*, *S. umbraculifera*, *Thrinax Chuco*, *Ceroxylon niveum* and *Copernicia cerifera*.

The Villa-Valetta is one of the noblest gardens of sub-tropical plants in the Riviera; possibly in Europe. It is situated on the *Chemin de la Californie*, near the town of Cannes. The collection of plants, mostly exotics, is of the richest; succulent plants of all kinds, *Araucarias*, *Dammars* and similar *Conifers*; many species of *Bamboo*, *Tree-ferns*, *Cycads*, etc., are represented mostly by exceptionally fine examples, all arranged and grouped in an artistic manner, and all in capital health. There must be many situations in the south of your country where the conditions, as regards climate, are about the same as those of the Riviera. The possibilities in horticultural art in such places must be very great. With so many noble-leaved Palms and *Cycads*, elegant *Bamboos*, *Tree-ferns* and the hosts of other plants available, the making of magnificent gardens, of a kind totally different from what we are accustomed to in the north, ought not to be difficult.

Probably your nurserymen know as well as we do here, that in raising a stock of Palms, even of those which are hardiest, tropical treatment for seeds and young plants is much quicker and often safer than cool treatment. The only exception known to me is that of the *Nannorhops* already referred to. The same treatment answers for young *Bamboos*.

Orchids.—Following close on the heels of *Vanda Amesiana*, we have a second new introduction of Messrs. Low & Co.,

which is described as being related to the former, the flowers quite as large, and pure white, with a rosy-purple lip. It has subulate leaves, erect peduncles, a foot long, bearing from fifteen to twenty flowers. It has been named *V. Kimballiana* by Professor Reichenbach. A quantity of plants of it were sold by auction in London last week. Since the introduction of the gigantic-flowered *V. Sanderiana* no new additions have been made to this genus except these two recent arrivals. *Cypripedium politum* is the best of the hybrids now in flower. It is distinct in form, and the colors, though dark, are clear and attractive, the dorsal sepal being very prettily penciled. *Pleione humilis* is about two months later than the *Wallichiana* group. Several pans, a foot across, and crowded with large lilac and purple-brown flowers, have been an attraction at Kew nearly a fortnight, and they are still fresh. The strongest pseudo-bulbs bear two-flowered scapes. *Dendrobium Findleyanum* is one of the handsomest of the early-flowering kinds, its large flowers, three inches across, the rose-tipped white segments, and large, spreading, yellow-throated labellum, being exceptional at this time of year. It blossoms freely, too, and the shining, curiously-knotted pseudo-bulbs are interesting at all times. *Dendrobium nobile*, var. *nobilius*, is in bloom, and its glowing, purple, medium-sized flowers are delightful. Indeed, an average form of the type of this species has very few superiors. The best of the East Indian Orchids now flowering is *Phalænopsis Stuartiana*. It is as good as, if not better than, *P. Schilleriana* as a garden plant. W. Watson.

London.

New or Little Known Plants.

Helianthus mollis, var. *cordatus*.*

MR. FAXON has here figured a well marked and very showy variety of a species which in its ordinary state is by no means striking. As usually found, the stem of *Helianthus mollis* terminates in a short and stiff racemose-like inflorescence, the few coarse and rather short-rayed heads being almost sessile in the axils of the small upper leaves. Here we have what may be called, for a sunflower, a graceful inflorescence, the large heads borne upon long bracted peduncles, and the numerous orange-yellow rays forming a broad expanse of color which is shown to the best advantage. There is a marked difference, also, in the leaves, which are here broadly ovate, with a very short acumination, instead of ovate-lanceolate, and the heads are often closely surrounded by three or four broad bracts resembling the leaves. Otherwise, the forms are the same, and the variety is connected with the typical form by intermediate states.

The whole plant is some three to five feet high, very leafy and hoary, especially toward the top, with a villous or somewhat rough pubescence. It is perennial and hardy. The common form is found in dry, barren localities through the Western and Southern States, from Ohio to Iowa, and southward to western Georgia and Texas. This variety has been in cultivation at the Arnold Arboretum for three or four years, from seeds that were sent by Mr. N. T. Kidder, and were probably from New Mexico or Arizona.

S. W.

Cultural Department.

Vineyard Notes and Studies.

THE many letters of inquiry which I receive about trellising and pruning Grape-vines lead me to fancy that something may be published yet on these topics which will be of interest, and may be of use to novices in grape culture. If grapes are to be grown for profit, it is evident that methods of culture should be planned as cheaply as possible. Two cents a pound for grapes does not leave much margin for extra cost in their production, and the prospect is now that grape-growers must reduce expenses to the lowest terms, or give up planting vines.

I prefer a trellis made of stakes, say four inches thick and four feet long, driven into the ground one foot and six inches. A single wire (No. 12) is stretched along on the top of the stakes, and is two and one-half feet from the surface of the ground.

* *HELIANTHUS MOLLIS*, LAM.; Gray, Syn. Flora, i. 276.—Var. *CORDATUS*, new var. Leaves broadly cordate, acute or short-acuminate; heads terminate on leafy branches or peduncles, often subtended by two to four leaf-like bracts.



Fig. 100.—*Helianthus mollis*, var. *cordatus*.—See page 136.

I would, usually, set the vines in rows, ten feet apart, eight feet distant from each other along the rows. The trellis need not be made until the third spring after the vines are planted. Before this time it is about as well to let them run on the ground. Thus three years' use of vine-stakes is dispensed with.

The stakes should be seasoned. I use White Cedar poles, sawed in lengths to suit. If, a few days before setting, they are given a foot bath of coal-oil their durability will be increased. Two feet of the bottom ends of the stakes may be dipped, and then set in a tub to drain for a few minutes. There

will then be but little waste of the liquid, and this preparation of the stakes will pay. It is of no use to dip them unless they are dry enough to absorb the oil. An impervious coat of paint would keep the sap in the wood, and thus hasten decay.

It is needless to set a stake to each vine. A stake every twelve feet is enough. Tie the vines to the wire. The canes will fasten of themselves. On this single wire may be carried as much fruit as the vines can mature. Twenty pounds is enough. I have had forty pounds, but then the fruit may fail to ripen.

The merits of this style of trellis are, first, cheapness; next, convenience. The vines are easily pruned and easily sprayed, which last operation will be necessary. The fruit is readily gathered, and the trellis is low enough to permit one to cross the vineyard in any direction. One need not creep under the rows or walk to the end of one to get on the other side of it. The grapes are near the ground, where they ripen better, and the vines trained low are less exposed to damage from winds.

Wire trellis is essential to the prosperity of the Grape-vine. It wants something which it can cling to and climb or run along, and it will treble its length of growth of cane if this congenial support be provided for it. The tendrils of the vine indicate that nature intends it to climb, just as plainly as the fins of a fish show that it is made to swim. We may notice how a Grape-vine will run when it gets into a tree-top, and can catch on to twigs and branches.

Another merit of the style of trellis described is that on it the vine may be preliminarily trained to stand alone by itself, if need be. I have many vines which, trained thus for years, can now stand like little trees. I keep them on the trellis for the sake of the advantage of the wire, but they are able to do without it.

Vineland, N. J.

A. W. Pearson.

Some Useful Decorative Plants.

ASPIDISTRAS.—Foremost among those plants to which special attention is invited are the most useful *Aspidistra elatior* and its variegated form. Admitting that they are old-fashioned and comparatively common, still they possess much beauty. The long, graceful, dark-green foliage of the type, or the leaves of the variegated variety, striped with creamy white, both present most pleasing effects, and for endurance under adverse circumstances, as in the dry heat of a dwelling-house or in a dark hall, they are unequalled. They may also be used to advantage in sub-tropical bedding during the summer. As to cultivation, it is most simple, as when potted in good loam, given an abundance of water, and a temperature of from fifty to sixty degrees, with a partial shade during the summer, no further attention is necessary. Propagation is effected by division of the rhizomes, which operation may be performed at any time of the year, but preferably in the spring, the divided portions making a new growth in a short time at that season.

COPROSMA BAURIANA VARIEGATA.—This charming garden form of *Coprosma Bauriana* originated in New Zealand, and makes a very ornamental shrub either for cool-house culture or for outdoor work in the summer, its glossy green leaves, with their broad marginal bands of yellow presenting so bright an appearance as to be specially noticeable. This is also an easy plant to grow after the young plants are once established, and with judicious pinching of the tips of the shoots will soon make a shapely shrub. The chief difficulty with some growers, however, has been found in rooting the cuttings, by which method the propagation of this variety is effected—the cuttings having a great tendency to damp off, unless carefully watered and ventilated. The best cuttings are small side shoots, such as those usually produced by an old plant that has been brought into a warm-house for a few weeks, and these shoots should be taken off with a small portion of the hard wood attached so as to form a heel for the cutting. Much care should also be taken to avoid any exposure of the cuttings to the full sunlight, as when wilted, even very slightly, they seldom recover sufficiently to produce roots.

EURYA LATIFOLIA VARIEGATA.—This charming plant is undoubtedly one of the best variegated plants for green-house cultivation, and it deserves to be more widely distributed than it has been. It grows freely in a Camellia-house, or in cool green-house temperature, and being naturally somewhat inclined to a pyramidal form, it soon becomes a highly ornamental specimen. Its foliage, somewhat similar in general outline to that of a Camellia, is beautifully marked with creamy-white, and in the young growth is frequently tinted with pink, and this, combined with a graceful habit, makes it a most attractive object. A moderately light, well-drained soil, containing a liberal

quantity of peat, is preferable for it, and in its growing season it enjoys plenty of water both overhead and at the root. It is propagated by cuttings, which should be made of about half-ripened wood, and placed on a slight bottom heat, in a close frame, with only air enough to prevent damping. At best the cuttings take a considerable time to root, but with proper care a fair percentage of plants can be secured. In all probability this plant would prove hardy in some of the Southern States—at least in those localities where Camellias are found to do well out-of-doors—and if so, it would prove a decided addition to the shrubs for open-air planting.

Holmesburg, Pa.

W. H. Taplin.

Notes from a Northern Fruit Garden.

FROM the fact that I not unfrequently see grapes growing and ripening in orchards and gardens where the vines are more or less in the shade, I am inclined to question the belief that grapes need all the sun they can get. If they need it anywhere, they do in northern Vermont and in Canada; yet I cannot discover that a moderate amount of shade retards ripening at all, except in the case of the Brighton, which, although a very early grape, does not even color here in dry, hot seasons when Delaware, Salem, Moore's Early and Eumelan ripen.

The practice of laying down Grape-vines and covering them for winter, is not universal; yet, with most varieties, in nearly all of New England this treatment pays. Growers find that even when the buds of uncovered vines all start well, the covered vines give a better crop, and ripen it earlier. If vines are planted against the south side of a light fence, laying them on the ground will be all the protection needed in a snowy country, as a deep drift will form in such a spot. Such a drift will not waste away for a long time where there is snow enough for pretty steady sleighing.

At the recent winter meeting of the Fruit Growers' Association at Montreal, which I had the pleasure of attending, it was the general testimony that the Wealthy apple, as grown about Montreal, or anywhere near the level of the St. Lawrence river, keeps no better than the Fameuse—that is, only up to the holidays. My Wealthys are sound and good now (February 15th), though Fameuse apples were gone soon after New Year, and this has been my experience in the dozen years that I have had the Wealthy in bearing. It keeps well until the vernal equinox; and the same is true of McIntosh Red, which, also, is complained of at Montreal as a poor keeper. My place is sixty or seventy miles south of Montreal, but it is nearly 1,000 feet higher. Still, I do not ascribe the better keeping of my apples entirely to the altitude of my land. The Wealthy matures with me, so far as I can see, as early as it does about Montreal—say about the middle of September. As soon as it is well colored it begins to drop, but growers do not seem to take the hint and gather it at once. If this is done, and the early part of the day if sunny chosen, the fruit if removed at once to a cool, dark cellar, will keep better than if it had been allowed to feel the many warm and even hot days of late September and early October. These are what hurry it on to over-ripeness and bring on early decay. It seems to me that this principle is applicable to all apples, as much so as to pears. As soon as the fruit will part readily from the tree it is ready to be gathered, and delay in this particular is at the expense, not only of keeping, but of quality. Wide alternations of temperature every day—at noon a burning sun, at night coolness even to frost—can have no other effect than to deteriorate quality and hasten decay.

Newport, Vt.

T. H. Hoskins.

Orchid Notes.

Cymbidium Lowianum is a very handsome variety of the well-known *C. giganteum*, which produces stout, arching racemes nearly four feet long and bears about a score of large greenish-yellow flowers. The lip is particularly attractive. It is of pale yellow, the front lobe being of a uniform deep maroon, with streaks of the same color in the throat. This variety, like the type, when well grown is a fine ornamental plant even though out of bloom, and it can be grown with the general collection of green-house plants. It is a very vigorous and strong-rooting kind. It should be grown in rich loam, with leaf-mould and sand. It requires abundance of water, and it should at no time be allowed to get very dry, as it is nearly always in active growth. The flowers will last in perfection nearly four months if kept in a cool-house, and when cut they will last longer than any other Orchid I know. It is a native of Burmah.

Calogyne flaccida.—This is a very attractive species, growing and producing its flowers very freely. It has oblong fur-

rowed bulbs, with two dark-green coriaceous leaves. The pendulous racemes spring from the base of the bulbs, bearing about a dozen creamy-white flowers, the lip being prettily blotched and streaked with yellow and crimson. This is an admirable plant for basket culture. It grows best in the cool-house, with abundance of water. It should never be dry.

Another species in flower now is *C. ocellata*, which somewhat resembles *C. flaccida* in general appearance. This species produces half-drooping racemes from the top of the matured bulbs, bearing nine to ten comparatively large pure white flowers, relieved by irregular blotches of yellow margined with reddish brown on the lip. This is a superior species, and will be found extremely useful for cutting and for window decoration, as it lasts a long time. It needs the same treatment as *C. flaccida*, and, I think, grows even more freely than that species. The variety *Maxima* differs from the type in

spreads very rapidly, and will cover the ground with a good permanent sod. It is very beautiful when in bloom, bearing spikes of small blue flowers about two to three inches long at the axils of the leaves.

I found this plant about fifteen years ago, growing wild in great abundance in the vicinity of Boston. Never having seen it in this section before, I called Dr. Gray's attention to it, and he stated that he had not before known of its growing on this side of the mountains of Vermont and New Hampshire. A few plants were then planted in the shade of some Pines, where they have flourished ever since.

This plant can be propagated very rapidly by making cuttings about three inches long and planting them in boxes of prepared soil two parts sand, and one of soil. They should then be placed in some cool spot where they will get a little light until spring, when a lot of nice plants will be ready to be set out.



Longleat.—See page 134.

having larger and more numerous flowers on a raceme. Both kinds emit a delightful Coconut fragrance. This Orchid was introduced more than sixty years since from northern India, and should be met with more commonly than it is.

Phajus grandifolius.—This is one of the oldest and best known of all tropical Orchids, having been introduced more than 100 years since under the name of *Bletia Tankervillei*. It may be found in almost every green-house, and, consequently, is more rationally treated than many of its rarer congeners. We grow a quantity for cutting. It is unsurpassed where very heavy work is required. It lasts a long time, and will open its buds in water. The stout spikes are about three feet high, rising above the dark-green foliage and bearing a score or so of large white and brown flowers. It is a luxuriant grower, delighting in a compost of rich loam manure, and plenty of sand. Care should be taken to retain the old foliage until the new growths are well advanced.

F. Goldring.

Kenwood, N. Y.

Veronica officinalis is one of our most valuable wild plants for planting in shady places where grass will not grow. It

One of the best features about this plant is the foliage, which is evergreen, keeping its color well all winter in the most exposed situation.

H. M. Pratt.

Somerville, Mass.

Plant Notes.

The Soap-tree of the Chinese.*

IN GARDEN AND FOREST for February 13th it was stated in the very interesting article on the Kentucky Coffee-tree that its Chinese congener, *Gymnocladus Chinensis*, "has not been introduced into the United States or Europe." This would, I believe, have been absolutely correct had it been written rather more than a year ago; at the present moment we have at Kew a number of plants about a foot high raised from seeds forwarded from Ichang by the indefatigable botanist and traveler, Dr. A. Henry. None of the plants have as yet developed characteristic leaves, but only simply pinnate ones with

* *GYMNOCLADUS CHINENSIS*, Baillon in Compt. Rend. Assoc. Franç. pour l'Avanc. Sc. 1874. p. 418, t. 4.

narrower, smaller leaflets, much more rounded at the tips than those of its American relative. Judging from the aspect of the young plants the species seems likely to prove a quicker grower than the Kentucky Coffee-tree. In the Kew Herbarium there is a good series of dried specimens of *G. Chinensis*. These exhibit a marked character in the pod, which is only half the size of that of *G. dioicus*, and the foliage, as is already stated, is very different from that of the American plant.

On one of the tickets attached to part of Dr. Henry's material is the following information: "The soft substance inside the pod is used for washing the face by Chinese women. The seeds themselves are strung together and made into a sort of 'chain-armor' undershirt for wearing next the skin in summer by coolies." To a sample of pods in the Museum No. 1 is affixed the following: "They are beaten with a mallet and used as soap. Sold at about sixteen to twenty a penny."

It seems desirable to put on record the exact date of the introduction to cultivation in Europe of a most interesting and, what may also prove, a valuable tree. I have, with this object, penned the foregoing lines. So far as I know they form the first record of the tree from the standpoint of the cultivator.

Royal Gardens, Kew, February, 1889.

George Nicholson.

BORONIA HETEROPHYLLA, figured and described in a recent issue of the *Révue Horticole*, is a newly cultivated species of a genus long known in gardens. It is a tall, glabrous shrub, with numerous slender branches; narrow, linear and sometimes pinnate leaves, and handsome and very fragrant red flowers, which are produced in the greatest profusion along the whole length of the stems. The *Boronias* are all natives of Australia, and excellent cool green-house plants. The present subject will probably prove a more vigorous grower than *B. megastigma*, the most commonly cultivated species, the flowers of which are not surpassed in delicacy and intensity of perfume, and it is pretty sure to become a popular addition to our winter-blooming green-house plants. *B. heterophylla* is said to have been introduced into European gardens by Miss Marion North, the celebrated traveler and flower-painter, whose collection of paintings, made from nature in nearly every part of the world, and presented by her to the English nation, is one of the most interesting features of Kew Gardens.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XII.—THE GROWTH OF ORGANS.

BY the multiplication of cells in the manner described in the last paper, all the different organs of the plant are built up and the several parts are joined together. The laying down of the partition walls in these microscopic cells is never a haphazard matter. Every plane and curve falls into its place in obedience to the law of inheritance, and thus the sum of shapes of the cells gives us the inheritance as a whole. Hence, for example, the cell-growth of the Maple gives us the Maple tree, differing in some essential particulars from every other Maple tree, even of the same variety, having slight differences, perhaps, in the distribution of roots and buds and branches, but still resembling its kin in all essential features, so closely, indeed, that its relationships are easily recognized. The laws of growth which underlie this remarkable uniformity of shape in plants which are descended from a common stock are not at all understood, though many of the facts bearing on the subject have been recorded. Some of these may be noted in connection with this portion of our subject; other facts relating to growth must be deferred to a later stage of our examination.

The order of study which will be found most convenient is, first, the mode of growth of the organs in their order of succession; second, the conditions of growth, and lastly, some of the physical phenomena which accompany growth.

GROWTH OF THE ROOT.—In the seeds of our common forest trees the root exists as a single conical cluster of cells at the end of a rudimentary stem. In the grasses and allied plants the origin is multiple and somewhat different, but this need not concern the present treatment of the subject.

GROWTH OF ROOTS IN LENGTH.—When the germ breaks through the seed-coats the root is generally the first thing to be seen, appearing at that period as a firm cone, which is seen to consist of two essentially unlike parts, an outer cap of flattened cells and a small group of minute cells in the hollow point of this cap. The root extends in length by the multiplication of the cells in this group. The renewal of the cap keeps pace with the extension of the growing point, and thus

the slender, thread-like form, protected at its extremity, insinuates itself through the crevices of the soil in which it could not be forcibly thrust. Practically only a very short portion of the root is at all capable of growth in length; in fact, it is generally said that only the protected tip can thus grow. As a matter of fact, however, some of the extension is due to the enlargement of the cells just behind the point of true cell-multiplication.

GROWTH OF ROOTS IN THICKNESS.—The roots of our common forest trees and shrubs thicken by the addition of new cells substantially in the same manner as that which is characteristic of stems, to be described presently.

GROWTH OF ROOTS BY BRANCHING.—The arrangement of roots is so much disguised by the distortions arising from the pressure of the soil that there seems to be no sort of regularity in their branching. But if roots are grown in water, especially water containing a sufficient supply of nutrient material, their arrangement is seen to be one of a good degree of symmetry. Each new root-branch starts naturally from a group of cells lying very near what one may call the shaft of the root. If, as happens when roots are closely pruned, the new root-branches are very numerous, there is no regularity at all in their distribution. Every root-branch, whether it arises from a pruned or an unpruned root, is provided at its slender tip with a root-cap precisely like that which belongs to the earliest roots, and the growth is after the same fashion. But there are a few differences in the directions taken by the main and the lateral roots, some passing downwards in a far more oblique course than the others.

Under favorable circumstances roots can start from any part of a stem, but they are more abundant at the joints than at any other places. All these roots striking out from the stem and branches obey nearly the same laws of growth which we have already noticed in those which appear underground. Thus, in striking cuttings, the roots which appear at the cut end of a shoot are in all substantial features like those which form in the natural way, as lateral branches in normal roots.

THE GROWTH OF STEMS IN LENGTH.—The promise of the main stem of an ordinary forest tree is contained in the rudimentary bud in the seed. This is, like all buds, a shortened stem, in miniature, with most of its parts only dimly foreshadowed. When a bud unfolds, the future joints of the stem or branch are barely outlined, but as the development proceeds, these joints become well defined and the distance between them increases. In definite growth the end of the developing stem is terminated by a newly-formed bud, and at the close of the annual period of growth this new bud stands ready to unfold when occasion offers. Under ordinary conditions in our climate, the buds do not expand until the beginning of the spring period of growth, but if the leaves of a tree are swept off in summer by insects, it sometimes happens that there will be two growths from buds in a single year. In the case of plants which have what is called indefinite growth, there is no true terminal bud, but the stem or branch continues growing until it is stopped by frost; the growth in the following year begins in the uninjured parts.

It is difficult to realize that all the upward and lateral growth of our trees is from buds, and that when a given bud has ceased growing for the season, it has stopped its growth in length once for all, and all further extension of the stem and branches must be from the development of the newly-formed buds.

In case of injury to a terminal bud, some of the lateral buds appear as if stimulated to accelerated growth, and one or more of the off-shoots assumes the place of leader, and continues the upward development.

The branching is, of course, dependent on the arrangement and the development of the lateral buds. Each bud is normally in the upper angle formed by a leaf with the stem, but there are certain exceptions to this. The normal buds govern the shape of the plant.

Seldom do all the buds of a plant develop. Those which remain inactive are soon covered up by the growth of the tree as it thickens, but under certain circumstances some of the buried buds may start into activity.

GROWTH OF STEMS IN THICKNESS.—Confining our examination, as before, to our common forest trees and shrubs, it is to be noted that the stem, even in a very young state, can be easily distinguished into bark, wood and pith, together with thin plates of cellular tissue which fill the spaces between the wedges of wood. Just outside of the wood and under the bark is found a layer of cells (or more than a single layer), which possess the power of growth to form an inner part of the bark and an outer layer of wood, while at the same time it can keep itself in repair. This development of

the film of growth is usually continuous in a given season, but it may be interrupted, in which case it is possible to have two rings added to the wood in a single year, whereas, as everyone knows, there is usually only one new ring for each year's growth.

This film of growing tissue under the bark is often termed the cambium layer. At the earliest period of its growth it is charged with sweet nutritive matters fitted to serve as building material. If this cambium layer is injured locally, irregularities in development result.

Branches and roots thicken in much the same way as the main stem.

In closing this short statement of the manner in which a stem grows, it is well to note the manner in which a twig can be grafted or a bud can be implanted on a foreign stock. The success of the transfer depends upon the fitness of the cambium layer of the one to grow conjointly with the cambium layer of the other. If the union is not perfect, or if the two parts, scion and stock, are not the same structurally, complete union cannot take place.

Cambridge, Mass.

George Lincoln Goodale.

Correspondence.

Squirrels and Conifers.

To the Editor of GARDEN AND FOREST:

Sir.—It is a sign of good common sense to say "I don't know" when it is not easy to know, but it is far from creditable to say "I don't know" when the means of knowing cannot be far away. I am never asked why the branchlets have fallen so thickly under Norway Spruce trees in winter without a sense of shame as I say, "I don't know." Whoever can tell me shall have my best thanks. I was about to draw a check for these thanks to a large amount in favor of Mr. Jack (see GARDEN AND FOREST, March 6th), but after reading I feel still compelled to answer, "I don't know." When he claims to have positive proof that squirrels do "all the mischief," he may speak from his own experience. No doubt he has gathered up branches cut off by squirrels. But he must be content with saying that they did cut his trees. They don't cut my trees. There are no squirrels where the seven trees twenty-four years old are now standing in my sight. The many hundreds of branchlets there could not be cut by an enemy not present. But if it be suggested that squirrels may be there at an odd time without my knowing it, I reply that the branches themselves show that they have not been cut at all. I enclose you a few gathered at random. You see the cut "done quickly and neatly with their sharp incisors" is a myth, so far as these branches are concerned. The cut is as ragged as the most fashionably edged piece of note paper could be. And as for their doing the work in order "to get at the buds," they could not reach down to the ends of the slender branches at the points where they are broken if they tried. And, more than this, not a bud, as you see, has been disturbed. In the many hundreds of branchlets that lie under my trees, not one bud has been disturbed, so far as I can find. I know that squirrels do cut branches to get at the seeds more freely. No one can tell an old seed collector, especially a collector of Pine seeds, anything new about this. Quite familiar with the gnawing of a pine branch by a squirrel, I can bravely say, the squirrel is not in this trouble at all. I am speaking of my trees, not Mr. Jack's.

I feel so mortified over this ridiculous puzzle that I examined the shoots again under a good glass to-day. It was evident there was no bending of the branch to break it. It could have been broken only by a force operating in the direction of the branch, a longitudinal power, it might be termed. Going to the tree and breaking a branch by pulling the twig in contrary directions, I found the fracture of precisely the same character, and so I deduce this truth that it must have been something pulling the twigs downwards that broke them. What can that force have been?

I have my own thoughts, but as yet they are but thoughts. To-day I confine myself to actual facts. I would ask you to say whether the twigs I send you do not confirm all that I say so far.

Germantown Nurseries, Philadelphia.

Thomas Meehan.

[The specimens sent by Mr. Meehan evidently have not been cut off by squirrels. It is to be hoped that he will investigate this matter further.—ED.]

To the Editor of GARDEN AND FOREST:

Sir.—To supplement the interesting paper of Mr. J. G. Jack in your first March number on the disarticulation of Spruce twigs, allow me to say that while, no doubt, squirrels are to be

blamed for much of the damage done in this manner, other causes are at work to which the damage is sometimes traceable, and this is especially true of deciduous trees.

It is well known, for instance, that Oaks and Poplars and some other species (*Taxodium*) are subject to a spontaneous disarticulation of their short shoots, very similar to the process by which the leaves are severed from their insertion at the base.

Another cause for the dropping of twigs in the Pine tribe is the work of a beetle larva (*Hylesinus*), which, hollowing the marrow of the twig, weakens it and promotes its breakage at the first severe wind.

I have also some notes of observations which credit hailstorms with part of this damage. Thus Forest-master Alers reports his observation made on June 19th, 1886, in a forty-year-old growth of Spruce: The tender shoots of the year, which had then a length of from one to four inches, were cut off by the hail always at the articulation. This happened before the eyes of the observer, and the freshly-broken twigs were lying on the white hail so thickly that he could not make a step without treading on them, while there had been none before.

In connection with this subject it will be of interest to note the observation of foresters, that after a large loss of the young twigs a rich seed year follows, which may be explained on the principle which induces fruit-growers to remove the young twigs for the purpose of stimulating fruit production.

I would offer two other possible causes for the damage. The one has suggested itself to me by observing that in the grounds of the Department of Agriculture, where squirrels do not abound, after severe cold, with high wind from the northwest, a large quantity of broken Spruce twigs without leaves was found, mostly on the north-west side. This may be explained by the rubbing of the tender, partly-frozen twigs against each other and against the stronger twigs, which latter also show loss of foliage due to the rubbing. This winter, which was free from icy blasts, no such broken twigs are observed, although the rubbing off of needles is quite frequently observable. The other cause may be referred to the neighborhood of a tree like the Birch, which in a high wind is apt to whip off the tender twigs.

Washington, March 9th.

B. E. Fernow.

New Hampshire Forests.

To the Editor of GARDEN AND FOREST:

Sir.—In an article copied, in your issue of February 20th, from a Manchester, New Hampshire, paper, referring to the sale of state lands in 1867, injustice, doubtless unintentional, is done the late Gen. Walter Harriman in this sentence: "Most of the timber lands in Pittsburg, etc., were sold for twenty cents an acre during Gov. Harriman's administration." This sale of the public lands was authorized by a joint resolution of the Legislature, the proceeds being set apart by the next Legislature as a perpetual school fund.

Gen. Harriman's love of trees and of all plant-life was intense; his protests against, not only unnecessary tree-trimming, but also against the ruthless clearing of shrub growth on our road-sides, were constant and characteristically vigorous. He favored forest preservation and the protection of our rural hedge-rows and lanes from the unsympathetic treatment of the modern road surveyor; and none deplored more than he that destruction of the forests of his native state, which, as Mr. J. B. Harrison well remarks, is producing a "blight and a curse upon this sanctuary of beauty and peace."

Boston, Mass.

J. R. Leeson.

The American Pomological Society.—III.

The Meeting at Ocala.

FURTHER abstracts of papers read at this meeting by members of the Florida Horticultural Society are presented below, and we may add in some future number articles on the Pineapple, the Fig and the Peaches and Grapes which have proved valuable on the Florida Peninsula. Many important papers by northern members were not read owing to the absence of the writers, but they will appear in the published proceedings.

The most important action of the Society in reference to semi-tropical fruits was the appointment of a committee to frame a "scale of points" for judging oranges—so that fruit from all portions of the country can be tested by a uniform standard. Of new varieties of fruits, very few

were added to the approved lists. The Lucretia Dewberry and the Early Harvest Blackberry were recommended for the southern states.

The Wilder medals were all awarded to Florida exhibitors at the Exposition in Ocala. The Lake County Shippers' Union, Marion County, Sumpter County, Lee County, Rev. Lyman Phelps, E. C. Hart and D. W. Adams each received a silver medal, while Citrus County, Polk County, Volusia County, O. P. Rooks and E. S. Hubbard each received a bronze medal. The county exhibits thus honored were collections of fruits and other products growing in each. The taste displayed in the arrangement of these exhibits, as well as the variety and value of material showed, plainly justified the unusual course of bestowing a prize upon a county instead of upon an individual exhibitor.

METHODS OF ORANGE CULTURE.

An essay on this subject, by the Honorable C. F. A. Bielby, gave complete instructions for growing oranges, beginning with the clearing of the land. This is an important matter, for vast tracts capable of yielding the best of oranges are still covered with forest growth, and Mr. Bielby described the approved methods for clearing each variety of land, namely: (1) The gray hummock, so-called, with its heavy timber of Live Oak, Hickory and Bay; (2) the black hummock or low level of dark mould covered with an almost impenetrable growth of hardwood and undershrubs; (3) the high Pine-land, a rolling country often from thirty to sixty feet above water, covered with stately Pines; (4) the medium Pine-land, level and from four to six feet above water, with trees as large but hardly as tall; (5) the flatwoods or low Pine-lands. On all these soils, which can again be divided according to the various subsoils, whether of sand, limestone, clay or coquina, the Orange will thrive, and as the grove-owner on each variety of soil is suited with his own, this proves that the advantages and disadvantages of each are quite evenly divided. To chop, pile and burn the growth on gray hummock, to grub the roots and burn again would cost from \$75 to \$100 per acre, while the burning would work a ruin to the soil from which it would not recover. To clear away the underbrush, pile it in windrows twenty-five feet apart together with the trees less than three inches in diameter; to cut the standing timber and lay it along the wind-rows; to grub a strip eight feet wide between the rows; to work this with the plow, and set the trees in well-dug holes, four feet in diameter and fifteen feet apart will cost \$35 an acre. If the timber is left standing between the windrows and deadened, and if four-foot holes are dug fifteen feet apart, as before, the cost of clearing and planting will be \$20 an acre, and although the dying branches will begin to fall the second year, and some of the Oaks themselves will soon follow, little damage will be done in this way, and the shade will be a help to the young Orange-trees.

The black hummock is usually wet, and needs surface drainage. All the undergrowth, with the smaller trees and some of the large timber, should be cut, and all can be burned with little injury to the soil. Much of the timber should be left standing to be thinned out as the Orange-trees occupy the ground. The trees should be set on mounds, or better on ridges twenty-five feet apart and running parallel with the drainage. To clear this land costs \$165 an acre, and although the water is at the very surface, the Orange-tree flourishes on this deep soil producing bright, thin-skinned and heavy fruit. In the Pine-lands the cheapest way is to deaden the timber by girdling. The flatlands have been considered of little value, and even now in fairly accessible localities they can be bought for from one to five dollars an acre and the clearing will cost but five dollars more. On these low, wet Pine-lands Mr. Bielby once found a tree of enormous size from which 8,000 oranges had been taken in a single crop. None of the soil in these Pine-lands can be called good, but since moisture is the most important factor in orange-growing, an open sub-soil under little hills and valleys is the worst, while level Pine-lands with a clay subsoil is the most promising. Upon these Pine-lands, as knowledge of fertilizers and of methods of cultivation has grown, the greatest advance in Orange-culture has been made within the past few years.

In the northern part of the state varieties which ripen in October and November are to be preferred, so that the danger of freezing may be avoided. From Lake George down to latitude 28° 30' December is a safe market month, while south of this, as in the Indian River country, where fruit hangs on the tree sound and sweet till March and April, the latest and finest

fruit can be grown with safety and profit. Orange-trees should be set high, with their crown-roots showing well above the ground. The supply of moisture determines the method of cultivation. Where soil is light and dry the harrow should be used every ten days from February to November to keep the weeds from using the water which the trees need, and to conserve the supply of moisture in the ground by checking evaporation at the surface. For soils of darker color and finer texture, with underlying clay or yellow sand, the better method is to keep the soil stirred about the roots as far as the trees throw partial shade, and allow some growth of Crab-grass or the like on the remainder of the grove, not to be turned under while green, but to die down in autumn on the surface. In the black hummock and flatwoods the hoe should be used alone, but the flatwoods may be harrowed in dry years. The effort should be to preserve the moisture where there is just enough, and to use up the surplus where there is too much. With abundant moisture, the question of fertilizers is not so difficult, but it is always a serious one. On the alluvial hummock over marl, groves that have been bearing fifteen years without any fertilizers show no deterioration in brightness, sweetness, fineness of texture or weight of the crop, and for such soils the evil days seem yet far in the future. The gray hummock soil over clay and limestone will make trees five or six years old, but to trespass further upon the native fertility of the soil is to invite catastrophe. After this period groves on the gray hummock, and on the Pine-lands from the outset, fertilizers should be used. Caution in the use of nitrogenous material should always be exercised, but potash in the form of pure sulphate is invariably good, while phosphoric acid in ground bone, and lime in gypsum, are usually profitable applications. The above is but the skeleton of a part of Mr. Bielby's admirable paper, which included a discussion of the diseases and insect pests to which the Orange is subject. It was written in so clear a style and out of such fullness of experience and knowledge that all who heard it will watch with interest for the appearance of that Manual of Orange-culture which Mr. Bielby ought to prepare.

THE KAKI, OR JAPAN PERSIMMON.

After many unsuccessful attempts to introduce this fruit in the higher latitudes of the United States, Mr. P. J. Beckmans and the late A. J. Bidwell succeeded in establishing it in Georgia and Florida. Mr. B. F. Livingston, whose paper treated of this fruit, stated that no fruit tree in Florida grows as thriftily and vigorously and with so little manure and cultivation as the Kaki, especially when grafted or budded on the wild native Persimmon. This stock, however, is best grown from seed, as the old-field root-sprouts are barren and predisposed to attacks from a beetle, whose larvæ cut into the heart of the tree, and down through the pith into the large roots. Mr. Livingston's trees, grafted in February, 1888, on one-year-old seedlings, now average six feet high, exceptional specimens being eight feet high and two inches in diameter above the stalk. Trees should not be allowed to bear when too young, for they are very precocious, and February grafts sometimes set fruit in nursery rows the next summer. With no other fertilizer than swamp muck, specimens of the fruit weighing more than a pound have been produced, and the trees do well on all the kinds of Florida soil, from wet bottom land to high and dry soils. The fruit differs remarkably in size, color, flavor, texture and adaptability to varied uses. There is much confusion of nomenclature, but they can be grouped into families, each one having certain common characteristics, which were described by Mr. Livingston. His concluding advice was to select only well-established and identified varieties, as promiscuous planting would be sure to include many indifferent and almost worthless kinds.

Periodical Literature.

From a recent issue of the *Scientific American* we reproduce the following interesting information in regard to the manufacture of "Wood Cloth":

Mitscherlich has applied the bisulphite process for reducing wood to the production of a fibre from wood which can be spun.

Thin boards or laths free from knots, but of any desired width, are cut into strips in the direction parallel with the grain, and are then boiled in a boiler containing a solution of sulphurous acid or bisulphite. This boiling effects disintegration without requiring that the strips of boards shall be reduced to very small pieces. After boiling the wood, it is dried in the open air or in specially constructed drying rooms. By thus drying the product, the fibre, which is originally very

weak, and tends to break at the slightest strain, becomes comparatively strong, and does not resume its very breakable condition on the addition of water. The operations are carried out as follows:

The damp masses on the frame are transferred to a traveling endless cloth, which leads them to a pair of rollers, which may be plain or provided with corrugations in the direction of their length, the ribs of the one roller being made to gear into the recesses of the other one, whereby they effect a simultaneous strong bending and squeezing of the masses. The cutting of the material in passing through the corrugated rollers is avoided by causing the endless cloth to pass over the lower roller and by placing a canvas covering around the upper roller. The pressed masses fall from these rollers on to a second endless cloth, which conveys them to a second pair of rollers, from which they are conveyed to a third pair, and so on, they being preferably pressed in this way six times. By continued treatment of the wood the fibres become at length so pliable and isolated from each other that they can be employed directly for coarse filaments. For obtaining a perfect isolation of the fibres, however, without material deterioration, these operations alone are not suitable, and their special purpose is to loosen the fibres in the transverse direction, so that in the following operation a thin, long fibre may be obtained. For this purpose the boiled and pressed masses are completely dried. After drying they are combed in the direction parallel with the fibres by means of devices provided with pins or teeth, in a manner similar to the operations for combing flax, cotton, etc., but with the difference that the pins or teeth of the apparatus must be made very strong. The separation of the extractable matter from the fibre produced by boiling the gums and soluble organic matter can be effected at any time. It is, however, preferably effected after the fibre has been spun into threads, etc.

Recent Publications.

Field and Hedgerow, by Richard Jefferies. Longmans, Green & Co., 1889.

Under this attractive title Mrs. Jefferies has collected, since her husband's death, twenty-nine of his latest essays, originally published in a number of different periodicals. The longest is the "English Deer-Park," about which a word was said in this journal when it was printed in the *Century Magazine* last autumn. Many of the others are bits of description, commentary or analysis, only three or four pages in length. But all have the distinctive stamp of Jefferies' mind and style strongly set upon them, and all were worth republication. The variety in ostensible subject-matter is also great. These are some of the titles: "Nature and Books," "The July Grass," "The Country Sunday," "Swallow-Time," "Buckhurst Park," "Some April Insects," "The Makers of Summer," "My Old Village," "My Chaffinch," and "Locality and Nature." Nevertheless, they may all be divided into two classes—those which chiefly exhibit the writer's keen love for the minutest facts of Nature, and those which chiefly reveal his equally keen interest in the minutest traits of rural man. Perhaps in future times the greatest value of the book may seem to lie in its record of the odd superstitions and methods of expression of the English rustic in this our time, and in the picture which, taken as a whole, it presents of his material and spiritual condition. But to us, interesting though it is in this respect, those pages which deal with birds and flowers and the countless aspects of the wide out-door world are the most attractive. Minuteness of observation and delicacy of analysis could no further go, and color facts, especially, are dwelt upon in a way which one would expect only from a landscape-painter with the most sensitive retina and the most extended experience. Jefferies himself would certainly have resented such a comparison, for his feeling about artists seems to be that they are men spoiled by the "conventionalities" of their craft for the clear observation and intelligent appreciation of the beauty which the world presents. Nevertheless, such powers of observation and appreciation as his are characteristically those which go to make up the artistic temperament; and despite the success he gained as a writer, one who knows what the study and practise of art really mean, must believe that he would have compassed a still higher success had he taken to painting instead of writing. What he wished most of all—he tells us himself over and over again—was to open the unseeing eyes of the average man to the loveliness of Nature, to define with the nicest exactitude her ever-varying charms of color and form, and especially to bring forth the spirit which underlies her colors and forms, and speaks through them to the human soul. And, as he likewise tells us in this volume, in the chap-

ter called "Nature and Books," he finds language wholly unequal to the task, and decides that though millions of books have been written about Nature, the books which will really interpret her are still all to be indited. The truth is that such books cannot be indited. Language can never do the work that Jefferies wished to do. And though art cannot do all that he felt desirable in the way of the definite presentment of tiny, intangible details, it can interpret the spirit of nature to the spirit of man far more effectually than syllables of prose or verse. What is even Wordsworth's work in this direction to Corot's? With the sounds of Nature poetry, of course, can deal more or less successfully, while painting cannot deal at all.

"The moan of doves in immemorial elms,
The murmur of innumerable bees."

Such emotions as these words excite lines and colors cannot excite. But sight finds still more and richer food in Nature than sound; and had Jefferies been a painter he would surely have been better satisfied with his own lot as well as a more important factor in the delighting of the world. Then he would not have cried in despair, "The flower has not given us its message yet. . . . I want the inner meaning and the understanding of the wild-flowers. . . . Why are they? What end? What purpose?" Approaching such questions, as Jefferies did, from the intellectual point of view, no answer is possible; but approaching them from the artistic point of view the answer reveals itself to the painter as he paints, and the observer as he gazes. The end of Nature's beauty is the delighting of man, and it delights man fully only when he has read something of himself into her forms and colors. Unconsciously Jefferies felt this, trying, as he did, to read man into Nature with the help of words; but words were not the proper tools for his purpose.

Nevertheless, all that they could do, without the magic of rhyme and rhythm, he accomplished; and there is no eye but will see more beauty in Nature, and see it more clearly, and appreciate it more intensely, after reading such passages as the one which attempts to analyze the color of the May Dandelion, or comments on the "Winds of Heaven," or in "Locality and Nature" describes a river-bank on Exmoor. The way, too, in which human and natural factors are constantly mixed together, no matter what may be the title of the page, is in refreshing contrast to the writing of many lovers of Nature, who seem to believe that because they love Nature they must either ignore or protest against the presence and the works of man.

Recent Plant Portraits.

Botanical Magazine, February.

STRELITZIA NICOLAI, *t.* 7038; a splendid arborescent species, long cultivated in European gardens, and, until 1858, when it flowered at St. Petersburg, confounded with another south African species, *S. Augusta*. The geographical range of the latter, and the exact locality where the former species grows spontaneously are still unknown.

STYRAX OBASSIA, *t.* 7039; "one of the most attractive of the many hardy shrubs introduced within late years from Japan, where it is a native of the southern mountains of Kiusiu and Sikok. Siebold, who discovered it in Japan, attributes to it no other property but its scent of Hyacinth." The hardiness of this very ornamental shrub, or small tree, in our northern states has not been entirely established yet.

IRIS MEDA, *t.* 7040; "this is a well-marked new Iris, which was discovered in Persia, in the year 1882, by the Austrian traveler, Polac, and introduced by him to Vienna. Its nearest alliance is with the south European *Iris Chamæiris*, of which the flower in the type is yellow, and of which there are two fine violet varieties." The perianth-tube of the flower of this new plant which has been produced in England in the gardens of Professor Michael Foster, whose collection and knowledge of Irises are unrivaled, is greenish yellow, copiously varied from top to bottom with brown; the outer segments are brown in the centre, with a dense yellow band. The flower is curious, rather than handsome in its markings; and its interest would seem to be rather botanical than horticultural.

OPUNTIA RAFINESQUII, *t.* 7041; a well-known and widely-distributed North American plant.

DENDROBIUM GRACILICAULE, *t.* 7042; an inconspicuous species of no horticultural value; a native of Queensland, of New South Wales, and of Lord Howe's Island.

ODONTOGLOSSUM CARISPUM, var. *RUCKERIANUM SUPERBUM*; *Revue Horticole*, February 1; M. André suggests that this fine plant, which is a native of the mountains to the north of Bogota, may be a natural hybrid between *O. crispum* and *O. Andersonianum*.

Notes.

Our associate, Professor A. S. Packard, sails for Europe this week, and will pass the summer in Germany and Italy.

The eighty-sixth annual exhibition of the Imperial and Royal Horticultural Society of Vienna will be held this year from the 25th to the 29th of April, inclusive.

One hundred and twenty different varieties of Willows are successfully grown, it is said, by Mr. S. J. A. Salter, F.R.S., in his private grounds near Basingstoke, England.

Professor Oscar Drude, Director of the Royal Botanical Garden in Dresden, Germany, has just published an atlas showing the geographical distribution of plants. The maps measure sixteen by fourteen inches, and the work can be bought for about \$4.

It is reported from Berne, Switzerland, that recent snow-storms of exceptional severity have done much damage in that neighborhood, not only ruining many picturesque old bridges and houses but destroying thousands of the splendid Fir trees which clothe the mountain sides.

A year ago the Dutch horticultural journal *Sempervirens* asked for reports upon *Stachys tubifera* for European cultivation as an article of food. Twenty-one reports were submitted, among which seventeen were favorable, recommending the plant as a valuable addition to the list of table vegetables. Good sandy soil, not too dry, is said to be the best for it, as the tubers then become beautifully white, while in heavier soil they assume a brownish color.

Chrysanthemums are largely cultivated in Dalmatia to supply chemists with the substance from which the well-known "Dalmatian insect powder" is made. The island of Lesina is the chief seat of cultivation, and the flower most generally grown is *C. cinerariaefolium* Trev. It is said that no other local crop pays so well, the product of a single acre of ground bringing a gross receipt of \$500 to \$1,500; and the government yearly distributes plants at very low rates in order that the industry may be still further developed.

Mr. Abbot Kinney's retirement from the California Forestry Commission is to be deeply regretted. He has devoted much time and study to the question of forest preservation in California, and his services to the state in this way have been great. His term of office has expired, and the Governor has appointed in his place Mr. F. J. Moffitt, a member of the State Senate. The other members of the Board, as it is now constituted, are John D. Spreckels and W. S. Moore. Mr. Kinney was Chairman of the Board, and its success in the past has been due to his energy and zeal.

Professor Rothrock contributes to the last issue of our valuable contemporary, *Forest Leaves*, an interesting article upon "Tree Growth as Determined by Location," which is graphically illustrated by the portraits of two White Oaks—the first grown in a forest and closely surrounded by other trees and the second developed in the full enjoyment of abundant light and space. The second tree is one of the most magnificent specimens of its kind which can be seen. It stands on the banks of Mantua Creek, in central New Jersey. This tree is not tall, but it has a spread of branches of one hundred and three feet, and a trunk diameter of six feet three inches.

Eastern Roumelia is the real source of the world's supply of Attar-of-Roses, many provinces sharing in its production, but the richest regions being those which lie around the famous Shipka Pass and the district of Maglis further east. The name Shipka itself means "Wild Rose." Here a famous White Rose is grown which has always been considered a peculiar species. But specimens collected on the spot by a person sent for the purpose by Dr. Dieck, Director of the National Arboretum near Merseburg, Germany, were recently submitted to Monsieur Crépin, the well-known authority on Roses, and he pronounced them "simply the typical form of the familiar *R. alba* of our gardens."

According to a writer in the *Gardeners' Chronicle*, singular survivals may still be found in England of ancient methods of "allotment gardening." In Somersetshire, for example, he says, "there are two large pieces of common land called East and West Dolemoors, which are divided into single acres, each bearing a peculiar and different mark cut in the turf; one of these is a horn; others are, four oxen and a mare, two oxen and a mare, a poleaxe, a cross, a dung-fork, an oven, a duck's nest, a hand-reel, and a hare's tail. About midsummer of every year these lots are 'raffled,' and each particular portion is taken over by one individual for the ensuing year. Archaeological research affords several examples of this singular phase of allotment gardening."

Monsieur André dedicates, in a recent issue of the *Revue Horticole*, a new genus of *Bromeliaceæ* to Mr. J. G. Baker, the English botanist, who has long studied this difficult family. *Bakeria tillandsioides* flowered this year in the garden of M. Devansaye, who cultivates one of the largest collections of these plants in Europe, and who had received it from Brazil without a name. In habit it resembles a *Tillandsia*, but it produced a long, slender, flexible scape, with branches covered with numerous, small, violet-colored flowers. Judged by the colored plate published in the *Revue*, *Bakeria*, with its graceful inflorescence, springing from a rosette of narrow, silvery leaves, will make a charming addition to the number of ornamental plants of its family, which are more appreciated in Europe than in this country.

Dr. R. A. Philippi, writing from Chili to the *Gartenflora*, speaks of a singular sight which met his eye on the way from Traiguen to Angol. "One sees great fields several acres in extent thickly covered with Oats, among which no other plant of any other kind appears, except, perhaps, some species of *Oenothera*. But the crop has not been sown by men, but is a spontaneous growth of *Avena hirsuta* from southern Europe, called 'Tiatina' by the Chilians. . . . In certain parts of Valdivia *Hypochaeris radicata* has become a public pest; it stands so thickly that the rosettes formed by its leaves entirely cover the ground and permit no other plant to grow. Where it appears, however, it kills out two other pests—*Rumex Acetosella* and *Brunella vulgaris*—and in its turn is suppressed by *Trifolium repens* which is spreading more and more widely year by year. As European man drives out the native American man, so European plants drive out those indigenous to the soil."

Dr. Masters, in the issue of the *Gardeners' Chronicle* for February 9th, shows that *Abies subalpina* of Engelm., a Fir of the interior Rocky Mountain region, is really the same as the tree of which a fragment gathered forty years ago in Oregon, is preserved in the herbarium at Kew, and to which Sir William Hooker applied the name *A. lasiocarpa*. If this view is correct, and the specimen, judged by the illustrations which accompany Dr. Masters' article seem to substantiate it, one of the most troublesome cases of synonymy among American trees is cleared up. Less clear is Dr. Masters' reference of Murray's *A. bifolia* to *A. subalpina*. We have never examined Murray's specimen, which is here figured by Dr. Masters. It is hardly worth while, therefore, to express any opinion in regard to it, and we only suggest that the size and shape of the cone, and the shape of the scale in Murray's specimen bear a strong resemblance to some of the intermediate forms which seem to connect *Abies grandis* and *A. concolor*, and which abound in southern Oregon.

A correspondent of the *Revue Horticole*, M. Desbois, of Orleans, sends to that journal the following interesting note on the effect of sulphate of iron upon the rigidity of the stems of plants. "The La France Rose, although beautiful, is often produced on the summit of a stem too feeble to support it. The way to obviate this is to water the plant when the bud is partly grown with a solution of sulphate of iron. The stems become, when treated in this way, sufficiently rigid to support the expanded flowers, which gain depth and beauty of color. I have used sulphate of iron in a large number of similar cases, and always with excellent results; and I have never known a plant injured by it, or found that too large a dose could be administered. The solution should be made stronger for plants growing in heavy soil than when the soil is light. During the last season a dozen Fuchsias treated with sulphate of iron flowered freely in spite of the unfavorable weather; the flowers were exceptionally brilliant in color, and the shoots were unusually vigorous. I saved by the same means a Marechal Niel Rose-bush which had been seriously injured by cold, but which entirely recovered, and is now more vigorous than ever." It is to be regretted that M. Desbois does not give the strength of the solution which he uses with such excellent results.

Catalogues Received.

P. J. BERCKMANS, Augusta, Ga.;—Green-house, Bedding and New Plants.—ROBERT BUIST, JR., 922-924 Market Street, Philadelphia, Pa.;—Seeds.—Z. DE FOREST ELY & Co., 1303 Market Street, Philadelphia, Pa.;—Seeds.—I. V. FAUST, 64-66 North Front Street, Philadelphia, Pa.;—Garden, Field and Flower Seeds; also, Garden Implements.—JOSEPH HARRIS SEED CO., Rochester, N. Y.;—Seeds.—JOHNSON & STOKES, 217-219 Market Street, Philadelphia, Pa.;—Seeds.—WM. HENRY MAULE, 1711 Filbert Street, Philadelphia, Pa.;—Seeds.—ROBERT SCOTT & SON, North-east corner Nineteenth and Catherine Streets, Philadelphia, Pa.—T. H. SPAULDING, Orange, N. J.;—Chrysanthemums.

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The Improvement of Villages.

A LADY interested in the development and improvement of her town, and recently appointed one of the managers of a newly organized Village Improvement Society, writes to ask in what way she can best exert her influence to further the aims which the founders of the Society had in mind when it was created; or, in other words, what she and her associate Directors can do to improve the sanitary condition and the appearance of the town. It is situated in New England not far from one of the smaller cities, and it has long been famous for its rural beauty. The township is large, and contains a number of villages. A part of the population, living at one extremity of the town, is almost exclusively devoted to manufacturing, while other parts are occupied by the expensive villas of many summer residents. The population is unusually heterogeneous. The increase of the manufacturing population and the influx of persons seeking summer homes have had the inevitable result; and the improvements of recent years, to use a familiar, but not always a very appropriate, expression, have destroyed a great deal of the rural and sylvan charm which once made this town beautiful, and desirable as a place of residence. The inhabitants, naturally, are now anxious to do something to restore the lost beauty, or, at least, to preserve that which remains, and to adopt some general scheme of improvement suited to the changed conditions of the town and to the changed requirements of its inhabitants. It is not, of course, practicable, or within our sphere, to give a specific plan of improvement for any particular town or property; and all that is expected of us in this particular case is some general statement calculated to provoke discussion and the consideration of the general principles which seem to underlie the whole question of rural town-improvement.

The object of the founders of Village Improvement Societies is clearly to improve the sanitary condition of towns and their general appearance, and in this way to improve the well-being of the inhabitants, and then to elevate their intelligence, stimulate their love of Nature and develop

their artistic feelings. The first requisite for the accomplishment of this purpose is to secure for the people of the town an abundant supply of pure water and a good system of sewerage-removal for the villages and for the isolated dwellings. These are the principal requisites for insuring the health of a community. This being accomplished, the preservation of natural scenery and rural beauty, the improvement of roads, the planting of shade trees, the decoration of public squares, the beautifying of school-grounds and the surroundings of railway-stations, the removal of obnoxious and unauthorized advertisements, the practice of thrift and neatness, should all in turn occupy the attention of the officers of the Improvement Society.

No one will deny that these things are necessary and important, or that a town in which such matters are carefully looked after is a much better place to live in than the ordinary American village. But how can these improvements be brought about? How is an independent body of industrious, public-spirited and intelligent individuals to make themselves felt in the administration of the affairs of a large town? It is evident that they must rely upon some method of more general application than those adopted by societies of this character in small country towns, in which a few men and women are permitted to plant trees at their own expense, and to see that no injury comes to them after they are planted. For this is what the Village Improvement Societies meant in their early days in many small New England villages.

The executive committee of a society, however large its membership, could hardly operate with any prospect of success in a thickly populated town covering many square miles of territory by any direct personal process; and it seems to us that its only chance of success lies in its ability to impress its ideas upon the community through the education of public sentiment. A society working independently—that is, undertaking to improve a town, or any part of it, at their own expense—would find themselves at once in conflict with the local town officials, and this conflict of authority would necessarily injure their efficiency and usefulness. The sphere of such a society to be really useful must be educational, and must depend on the increased intelligence of the community for obtaining from the town officers and from the citizens themselves the improvements good taste and the highest interests of the town demand. The directors of a society will find more than enough to occupy their time if they approach the subject from this direction, and they will find, too, that progress based on popular intelligence will be more permanent and more satisfactory than if it is the result of isolated individual effort.

The first duty of the officers of the society to which we have referred is to raise from their public-spirited fellow-citizens a good round sum of money, for education and reform cost money; having secured this, let them begin an educational crusade against popular ignorance and indifference to everything connected with public health, convenience and taste. Let them combat this ignorance and this indifference in every way in their power—by the diffusion of sound advice through the press and by special publications, through the lips of clergymen and school-teachers, by popular lectures, and by all the other methods which, once set in motion, have never yet failed to quicken the pulse and stimulate the intelligence of the American people.

This is the way, and the only way, in which an individual or an association of individuals in one of our communities can make its influence felt in a lasting manner. And this is the advice we offer to our correspondent. Make yourself and your co-workers educators in the first place, and then censors; and when anything is done in your town which is calculated to injure it or the welfare of its inhabitants, let the fact be known in such a way that there can be no mistake about it. Your influence will increase and spread, and gradually but surely you will ac-

comply what you desire, and make your town a credit to its inhabitants and a delight to the stranger within your gates.

Pruning Shrubs.

OUR climate is so favorable to the growth of hardy deciduous shrubs that these should play an important part in every American garden, especially in the Northern and Eastern States. A small garden can be made very attractive with a proper selection of shrubs alone from opening spring, when the earliest of them are in bloom, until they glow with the rich colors of their autumn foliage, and even later still, for many of them are covered with bright fruit far into the winter. When properly planted in deep, rich soil they demand comparatively little care, although a mulching with coarse litter is a help to many varieties, and an occasional light dressing of decomposed manure, or of bone-dust and ashes will often prove beneficial.

But how shall they be pruned? As a rule, the knife should be used with caution—not to “trim them into shape,” as the phrase goes, but to encourage their development into the best typical form. Severe pruning tends to enfeeble either shrub or tree, and the removal of large branches usually interferes with the natural and, therefore, most graceful outlines of either. So far as any general rule can be laid down, it may be said that shrubs will be the most vigorous and in their best form the year through, when no pruning is attempted beyond the thinning out of the weaker and overshadowed branches in order to afford the stronger ones a better opportunity for growth. Shrubs have a beauty in winter as well as when they are in full foliage or flower. In the leafless season a mass of shrubbery is enveloped with a haze of delicate color which comes from the melting together of the different tints of the bark of the small branches; and this color, together with grace of form, that in shrubs which is quite as distinct in winter as in summer, can be destroyed by careless cutting. The shearing of shrubs into formal shapes, such as cones and spheres, or cutting off all the tops at the same level, means, of course, the destruction both of the health and beauty of the plant.

But when shrubs are used for special purposes they require special treatment. If abundant bloom is the object chiefly aimed at, the time and manner of pruning should be chosen with this end in view. Shrubs which bloom early in the spring, like Thunberg's *Spiræa*, for example, form their flower-buds on the growth of the previous year. If this growth is cut back in autumn or in early spring, the flower-buds, too, are cut away and the bloom of the year is destroyed. With such shrubs the proper course is to wait till the flowering season is over and then prune away a considerable portion of last year's wood. This will encourage new shoots, which will start at once and begin to make flowering branches for next spring. On the other hand, shrubs which flower late in the season, like the Rose of Sharon, some of the *Tamasisks* and the Great Panicked *Hydrangea*, make their flower-buds on the wood that forms during the growing season of the same year. These late-flowering shrubs should be pruned now, before the new growth starts. If the *Hydrangea* just mentioned is cut back so as to leave but one or two eyes on each branch of last year's growth, these will put out vigorous shoots, each of which will bear at the extremity a large panicle of flowers next fall.

These directions may be summarized as follows:

For general purposes, shrubs should never be cut back so far as to impair their vigor, nor be pruned so as to destroy their natural outlines.

Shrubs which bloom early, on wood of the previous year, should not be pruned in autumn or in early spring when it is desired to secure abundant flowers, but immediately after the blooming season.

Shrubs which bloom late, on wood of the current year, should be pruned after the leaves fall in autumn, or in early spring before they start.

THERE is no insurmountable difficulty in protecting the forests upon the national domain or those in the Adirondack region of this state, if the Congress of the United States and the Legislature of New York will give to this subject the serious consideration which its importance requires. But popular legislative bodies only reflect popular demands, and if we are to have forest-preservation in this country it will be because the people of the United States, instructed in the material requirements of their country, insist upon it. The Executive Committee of the Horticultural Society, of Newton, Massachusetts; in recently passing a resolution, which we gladly publish, expressive of intelligent concern for the preservation of the forests and of sympathy with all efforts directed to that end, set an example which might well be followed by other bodies of men, whether they are tillers of the soil or not, who are interested in the future of the United States. If every organized society in the country will pass resolutions upon this subject, if every newspaper will publish and endorse them, and if every man and woman will use his or her influence in bringing the subject of forest-preservation to members of Congress, personally and by petition, sooner or later the country will be saved from those special and particular evils which the extermination of the western forests will bring upon it:

Resolved: That the Newton Horticultural Society desire to express, through the medium of the public press, their entire satisfaction in the efforts that are now being made to awaken the people to the great importance of preserving the forests throughout our country. In New England, and especially in northern New Hampshire, as well as in other regions, the forests are fast disappearing before the axe of the logger.

Not only are certain districts thus robbed of their chief attraction to lovers of natural scenery, but the value of the streams, which take their rise among them, for manufacturing purposes, is seriously impaired, not only by the droughts but by the inundations thereby produced. Our countrymen, generally, must be educated up to a knowledge of the important truths which so vitally concern them, and we therefore cordially welcome every effort, however humble, to bring about so desirable an end.

Especially do we recognize the value of the weekly diffusion of knowledge on forestry in all its relations to the interest of the people, made by GARDEN AND FOREST. Could its articles on this subject be more widely diffused and brought to the notice of the capitalist, the farmer, the contractor, the builder, in fact, every one, the result would be most satisfactory.

It would be unwise to sit down and close our eyes against matters which so intimately concern ourselves as well as coming generations; we, therefore, as members of a society designed to foster and promote a love for the beautiful and useful in Nature, would entreat our fellow citizens and countrymen to give new and persistent attention to all that concerns the preservation of the forests.

The Garden (London) recently republished in full the admirable “Hints About Lawns” which Mr. J. C. Olmsted wrote for GARDEN AND FOREST; and an accompanying editorial note read as follows: “If landscape-gardening were as true and clear as the above sketch, that art would not now be the horror it is to sensitive men.” In justice to Mr. Olmsted, to his famous father and to other American landscape-gardeners, it should be explained to our English contemporaries that their art, as practiced here, is by no means a horror even to the most sensitive eyes. Horror is excited only when the land-owner himself tries to do an artist's work, or when he mistakes for an artist some one who has no better title to the name than lies in the fact that he can grow plants successfully.

Some idea of the wonderful growth of trees in the fertile soil of California—a growth which seems almost fabulous to persons living in less favored regions—will be gathered from the following statement printed in a recent issue of the *Pacific Rural Press*. The trees are in Antelope Valley, in Colusa County, and have not been irrigated. A Fig-tree, planted in 1874, has a top thirty feet high by thirty feet

through, with a trunk five feet seven inches in circumference at the smallest part, which is two feet from the ground. A California Walnut (*Juglans Californica*), planted in 1882, is twenty-five feet high, with a head twenty-five feet through, and a trunk diameter of twelve inches. An English Walnut, planted in 1884, is sixteen feet high, with a trunk six and one-half inches in diameter.

The Art of Gardening.—An Historical Sketch. II. —Egypt.

IF we wish distinct proof in support of the belief that man's love for art developed before his love for nature and that he practiced architecture in advance of gardening, we may find it in the fact that all the early gardens of which we have any accurate knowledge were formally, architecturally arranged. Egyptian gardens are portrayed in many paintings and bas-reliefs, succinct and conventional, of course, in treatment, but easily deciphered and clear in the witness they give to the rigid formality of the Egyptian style. Although the civilization portrayed in these pictures is the earliest of which history, as distinguished from mere legend, speaks, it was already highly developed and must have existed for many ages. And when we remember the physical character of the land, with its burning sun and level plains, devoid of all that picturesqueness of surface and that richness in large vegetable forms which other countries exhibit, we can easily believe that gardening art was widely practiced on the banks of the Nile. Temples were surrounded with gardens; the rich Egyptian lived in country houses encircled by larger ornamental demesnes, and gardens existed in which the architectural factors were of accessory, not primary, importance. But whatever the size of the enclosure, it must have been formally disposed. Such was the case in all ancient lands, but there were especial reasons why it should have been the case in Egypt.

Local taste, as every relic we possess declares, ran emphatically in the direction of symmetry in all forms of art. And we can understand why if we glance at the physical aspect of the land. It is, so to say, Nature's most formal, symmetrical creation, with its single wide river, its vast level plains, and those bordering mountains which are but perpendicular walls of rock. Picturesqueness is nowhere suggested—Nature did not teach the Egyptian what its charms might be, nor reveal to him the beauty of variety. Although a multitude of minor plants grew, of course, in his fertile soil, trees were present in but few varieties, and everywhere order, balance, sobriety, and a persistent, if splendid, monotony of outline met his eye. Even to-day, with all our preference for landscape-gardening properly so-called, we feel that a large measure of formality would be prescribed in Egypt by the dictates of Nature herself. Here one does not desire an outlook into the distance so much as to seclude one's self from its sameness behind barriers which allow the imagination to believe that variety may lie beyond them. Here the chief essentials are coolness and shade. But no brooks exist; to simulate natural ponds would be too gross and palpable a deception—the formal basin is really the most natural expedient. As all vegetation must be irrigated, and as in its larger forms it is supplied in no great variety, both convenience and beauty are best served by a symmetrical disposition of the plants. And, in general, only a garden with a distinct element of architectural stability and grandeur would seem in harmony with the outer world. If we feel this to-day, how much more must the Egyptian have felt it to whom experience had revealed no other kind of beauty? As he naturally evolved the most solid and most symmetrical kind of architecture that the world has seen, so, too, he naturally created only formal, architectural gardens.

The common type of temple-garden is, of course, the one most frequently shown in Egyptian picture-records. It was not so much a place into which men could escape from the imprisonment of walls and roofs as an adjunct to the beauty of the building—a stately court-yard surrounded by high barriers and planted with rows of trees which seem often to have grown in pots. Avenues of trees must likewise have formed the approach to the temples, obelisks, sphinxes and other sculptured monuments mingling with their more pliant forms. Thus, for example, we may picture the great sphinx-avenue which leads for more than a mile between the temples of Luxor and Karnak, now a waste sandy stretch lined by headless figures, but once verduous under foot and shaded by tall Palms or Sycamores.

Other pictures show us gardens of more importance lying around palace or temple, with wide parterres, long rows of

umbrageous trees, groups of Palms and great basins and canals flowing with water; and one picture at least on the wall of a Theban tomb, shows a villa-garden in which architectural elements by no means preponderate. It is a great square walled enclosure, lying close to a river—the Nile, of course, as there was no other—from the banks of which steps lead up to the only entrance, a noble gate. On the opposite side of the garden, near what we may call its back wall, stands the villa. To right and left of the entrance are great longitudinal basins of water, while two others, of a square shape, lie further back. The side walls are lined with trees, between each pair of which a vine is trained against the wall, and outside the front wall, close to the river, runs a row of trees evidently of exceptional size. The centre of the garden is occupied by a vineyard, divided by paths into seven sections, which is encircled by its own wall and fills perhaps a third of the whole area. And all the remaining portions are sub-divided into regular sections, amid which kiosks and shelters are arranged, filled with various kinds of plants in masses. Several different species of trees are indicated, and among them we may divine the Sycamore and the Date Palm, while in other spots we see great groups of rush-like foliage, and the basins hold aquatic plants. This, indeed, must have been a spot where man could refresh himself in seclusion and peace; yet nothing could well be more formal, more architectural in design.

A picture which was discovered by Champollion and is now in the Louvre, shows a garden surrounded by a wooden wall, and again lying by the river between which and the wall stands a row of trees cut into spherical forms. In the centre of the enclosure is a great arbor of vines, encircled by a double row of Palm-trees, while in other parts square pools and symmetrical parterres of flowers are indicated, and an open kiosk of four rooms covered with vines. In other pictures we see trees clipped into columnar shapes, and in all we realize the natural desire of everyone who built a garden to place it close to Father Nile.

The chief shade-tree of the Egyptians was the Sycamore—of course the true Sycamore, *Ficus sycamorus*, and not one of the very different trees which in modern Europe and in America are called by this name. The Date Palm must have been equally conspicuous, valued for its fruit as well as for its beauty, and harmonizing well in its graceful yet stately lines with the architectural forms about it. The Doum Palm (*Hyphane Thebaica*), the Acacia, the Carob-tree (*Cratonia siliqua*) the Almond, the Pomegranate, the Myrtle and the Laurel were also familiar trees; the Vine was everywhere present; and a wall-picture of the eighteenth dynasty shows us an apartment in which ornamental foliage-plants are growing in pots.

It is probable that lawns and parterres of grass were unknown in Egyptian gardens—in no hot southern land can they ever have been perfected. But their place was supplied by flat parterres of flowering plants, which, it is in harmony with all we know of Egyptian taste to believe, formed carpet-like patterns of vivid colors. Of course such patterns were entirely appropriate when the design of a garden was formal; the Egyptian feeling for color was so well developed that we must fancy them peculiarly beautiful in the grouping of their tints; and never can they have had so admirable an effect as here, where the architectural forms they encircled were painted in conspicuous designs with bright blue and red and green.

New York.

M. G. van Rensselaer.

The Cedar of Lebanon.

THE Cedars of Mount Lebanon are, perhaps, the most renowned and the best known natural monuments in the world. Religion, poetry and history have all united to make them famous. Distinguished travelers and men of science have visited them, and their story has been told over and over again. There are, however, grave doubts, at least, whether the Cedar so often mentioned in the Bible was the tree now called the Cedar of Lebanon; and the forests which Solomon cut to rebuild the Temple were, perhaps, composed of Junipers or of some other tree with more durable wood than that of the Cedar. There is no doubt, however, that the Cedars of Lebanon in more modern times have been objects of veneration. Belon, the author of the first work upon Conifers ever written, visited Syria in 1550, ascended Mount Lebanon, and visited the Monastery of the Virgin Mary, situated in a valley below the grove of these trees where the festival of the Transfiguration was held. For this solemnity the Marmites—a Christian sect inhabiting Mount Lebanon—with many pilgrims, repaired to the grove. The night before was celebrated in dancing and feasting by the light of fires built with branches cut from the

Cedars. The following day the Patriarch celebrated high mass upon an altar erected under one of the largest of the trees, which, we are told, were planted by the hand of King Solomon himself, at least this is the story related to the faithful; and "that the Patriarch officiated pontifically on this solemn occasion; that his followers were particularly mindful of the Blessed Virgin on this day, because the Scriptures compare her to the Cedars of Lebanon; and that the same Holy Father threatens with ecclesiastical censure those who presume to hurt or diminish the Cedars now remaining,"—an injunction which does not seem to have been very strictly obeyed, for the number of very old trees in this famous grove has been steadily diminishing ever since. Belon found twenty-eight of them standing at the time of his visit. Thévenat a century later found twenty-three. Only sixteen large trees were seen by Maundrell in his journey from Aleppo to Jerusalem, made in 1696, although he found many small trees growing near them. The number of the large trees continued to gradually diminish, if the reports of travelers are to be believed, from this time, although the grove being protected more or less successfully from fire and from sheep and goats, the young trees increased. In the middle of the last century there were twelve of the old trees remaining, and between four and five hundred smaller ones of all sizes. Dr. Pariset, who visited Mount Lebanon in 1829, found the grove in substantially the same condition as when Dr. Pococke had seen it eighty years earlier.

But the most experienced observer who has ever seen the Cedars on Mount Lebanon is Sir Joseph Hooker, who visited Syria in the autumn of 1860, for the purpose of examining the grove, in regard to which little was known scientifically up to that time. A very interesting account of this visit was published in the *Natural History Review* in January, 1862, with the author's views upon the specific rank and the origin of the different species or forms of the genus. The elevation of Mount Lebanon was found to be 10,200 feet, and that of the valley, where the trees are growing, 6,200 feet. "The number of trees," to quote from this article, "is about 400, and they are disposed in nine groups, corresponding with as many hummocks of the range of moraines; they are of various sizes, from about eighteen inches to upwards of forty feet in girth; but the most remarkable and significant fact connected with their size, and consequently with the age of the grove, is that there is no tree of less than eighteen inches girth, and that we found no young trees, bushes or even seedlings, of a second year's growth. . . . The position of the oldest trees (of the 400) afforded some interesting data, relative to the ages of the different parts of the grove, and the direction in which it had lately spread. There were only fifteen trees above fifteen feet in girth, and these all occurred in two of the nine clumps, which contained 180 trees. Only ten others exceeded twelve feet in girth, and these were found in immediately adjoining clumps, one on one side and one on the other of the above mentioned. There were five clumps containing 156 trees, none of which was above twelve feet in girth, and these were all to the westward (or down-valley) side of the others. On this side, therefore, the latest addition to the grove has taken place."

One of the old Cedars of Mount Lebanon appears upon page 149. The illustration is made from a photograph taken upon the spot and communicated to us by Mr. Francis Skinner, of Boston. It was supposed, until comparatively recent times, that all the Cedars left upon the earth were in this famous grove, but now they are known to occur upon different chains of the Taurus, where, with *Abies Cilicica* and *Juniperus foetidissima*, they form extensive forests; while as late as 1865 Mr. Jesup, an American missionary, discovered five large groves in the Lebanon itself, three east of 'Ain Zahaltah, in the southern Lebanon, one of which was said to contain 10,000 trees. Other groves were also discovered at this time, so that upon the Lebanon alone the Cedar is known in ten distinct localities. The same tree, or one hardly to be distinguished from it by any of the characters which botanists consider valuable, *Cedrus Atlantica* occupies the mountain ranges of Constantine, the western province of Algeria, bordering upon Tunis, and abounds on the eastern Atlas ranges. They characterize the upper mountain zone between 5,200 and 7,200 feet, and approach to within twenty miles of the sea. Cedars, too, were found upon the mountains of Cyprus after the recent English occupation of the island, which only differ from those of the Lebanon in the shortness of their leaves, and which serve to form an important link between those of Asia Minor and of the Atlas. West of the Lebanon, at a distance of 1,400 miles, or nearly the same distance as that which separates the Atlas from the Lebanon, occur the great Afghanistan forests of

Cedrus Deodara, which extend eastward along the Himalaya almost continuously to Nepal, occupying various elevations between 4,000 and 12,000 feet, and in Afghanistan outnumbering all other Conifers in the number of individuals. The Deodar, or "Tree of God" of the Hindoos, is one of the most valuable timber-trees of the Himalaya.

Sir Joseph Hooker states in the paper from which we have already quoted that "the African Cedar differs from that of Lebanon in having a perfectly erect, rigid leader, and straight, stiff ends to the branches, all of which in the Lebanon plant droop more or less. In the African the cone is generally smaller, the leaves shorter and more glaucous, and the scales and seeds triangular in form (instead of quadrangular). There are two forms of Cedar in Algeria as in Taurus, and characterized by the same differences in each country—viz., a greener long-leaved, and a more silvery short-leaved variety. The *C. Deodara* has a much more pendulous leader and ends to its branches, and longer leaves of a more glaucous hue than *C. Libani*, though not such silvery leaves as the *C. Atlantica*. The cones are as large as those of *C. Libani*, but the scales and seeds are the same form as those of *C. Atlantica*, and hence markedly different from those of *C. Libani*. . . . It should be added that there are no other distinctions whatever between them—of bark, wood, leaves, male-cones, anthers or the structure of them—nor in their mode of germination or duration, the girth they attain, or their hardness."

The conclusion reached by Sir Joseph is that the three Cedars are well marked forms, generally distinct, but occasionally approaching or passing into one another, and all derived from one common parent.

The Cedars are related botanically to the Larches and to the Firs. Their stiff, awl-shaped leaves are produced like those of the Larch, from very short lateral branches, but unlike those of the Larch, they are persistent. The cones are upright, with deciduous scales like those of the Firs, but they are much larger, and are composed of broad and rounded, closely imbricated scales, and do not mature until the end of the second or sometimes the third season.

The Cedar of Lebanon was planted early in British gardens. The exact date of its introduction seems uncertain, although it is probable that it was about 1680, and that the famous trees of the Chelsea Botanic Garden were really the first. A good deal of conflicting testimony, however, has been produced at different times upon this subject.

Bernard de Jussieu carried from London in 1734 the first specimen planted in France; unless, as has been suggested lately, Belon really brought the Cedar to France from Syria at the time of his visit in the middle of the sixteenth century. Jussieu's tree is growing where he planted it in the *Jardin des Plantes*, and is still healthy and vigorous.

No foreign tree perhaps has ever been more generally planted in England during the last two centuries, and thousands of noble, wide-branching old specimens, scattered from one end of the kingdom to the other, are among the most impressive objects in many stately parks and pleasure grounds.

Our illustration upon page 151 will serve to show the Cedar of Lebanon as it appears in England. It is a view of one of the most famous country places, Wilton House, near Salisbury, long the home of the Pembrokes, where lived the lady whom all the world knows through old Ben Jonson's epitaph as "Sidney's sister, Pembroke's mother." Here it was that this lady's brother, Sir Philip Sidney, wrote the "Arcadia," and although he died a century before the first Cedar was planted in England, Wilton House in those days must have possessed many of the features which has since made it famous. "The shading woods, . . . the rocks, woods, hills, caves, dells, meads and brooks" which answered the poet's sigh for his absent "Stella."

Here in the United States the Cedar of Lebanon is not often seen. It is not hardy in New England, where, perhaps, more attention has been paid to the cultivation of exotic trees than in other parts of the country; and although a few good specimens may be seen in the neighborhood of this city and of Philadelphia, where the tree seems to be hardy enough when once established, the number is not large, and it does not seem to have been a favorite with planters. It is not known who first planted the Cedar in the United States. Mr. Downing, in his "Landscape Gardening," published in 1849, speaks of a specimen in the grounds of Mr. T. Ash, at Throggs Neck, in Westchester County, in this State, as the finest in the Union, being at that time fifty feet high. It would be interesting to know if this plant still survives. The specimen planted at Woodlawn, near Princeton, New Jersey, by the late Judge Field in 1842, and now the property of Professor Marquand, was thirty-six feet high in 1859, and is now fifty-four feet high,



Fig. 101.—A Cedar of Mount Lebanon.—See page 147.

with a trunk girth, one foot above the ground, of seven feet two inches, and a spread of branches of thirty-three feet—certainly not a very remarkable growth in forty-six years. There is a fine Cedar on the grounds of the old Prince Nursery, in Flushing, now some sixty-five feet high, with a trunk which measures, five feet from the ground, eight feet and two and a

half inches, but the fact that this tree is so rarely seen in the Middle States still needs explanation.

The best accounts of the Cedar of Lebanon are found in the paper by Sir Joseph Hooker already referred to, and in the historical and cultural essay published by Monsieur Loiseleur-Deslongchamps in 1837, entitled "*Histoire du Cèdre du Liban*."

Foreign Correspondence.

London Letter.

WE are getting tired of double flowers, not long since the acme of perfection with horticulturists. The first tendency to doubleness in a flower was hailed with delight, and the monstrosity was coddled and encouraged till a perfect double flower was obtained. Thus came the double Dahlias, the Hollyhocks, and hosts of other things besides. The double Dahlias were discarded for the single-flowered kinds not very long ago, and most people asked how it came to pass that such monsters as the big Dahlia were tolerated. The revolution now is against the double Camellias, which very few people admire. No lady will wear them; they are worthless for bouquets. In fact, they have had their day. But the single-flowered Camellias are in favor, and are likely to become very popular. The blossoms of *C. reticulata* are too large to be worn by any one save a calman at a wedding, but they are grand flowers, nevertheless. The bicolored flowers of *C. Doncklaari* are also handsome. These are, however, large-flowered species. But we have now a race of Camellias, recently introduced from Japan, and being rapidly propagated by the nurserymen here, which are remarkable for their compact habit, small leaves, and small single or semi-double flowers of the most elegant form, and varying in color from white to deep crimson. Probably they are the result of crossing the small-flowered *C. Sasanqua* with the larger-flowered race, but, whatever their origin, they are certain to become popular garden-plants. I do not pretend to any knowledge of the horticultural methods of the Japanese save what I have seen in a few plants imported direct from Japan, but these show a lamentable want of neatness and true horticultural skill. These grafted Camellias are a case in point; nothing could be more primitive, nothing uglier than the manner in which they are grafted. No English horticulturist would tolerate such work. The Japanese distort, starve and mutilate their plants to get them into some ridiculous and unnatural shape; they cannot allow their plants to grow their own way. This may be art, but it is an abomination all the same. Judging of Japanese art in the garden from the papers lately published in GARDEN AND FOREST, I will say that we want none of that kind of garden-makers in England at any rate.

None save a Philistine would venture to find fault with double Roses; at the same time the single-flowered kinds are creeping into favor in many gardens in England. The Rose Conference and Exhibition to be held at Chiswick in July next is expected to bring to the front a great many Roses which at present are known only to a few specialists. This, of course, applies chiefly to species, for which a special appeal is made in the schedule. Many of these are of great beauty and as easy to manage as the Dog Rose, but they are rare in English gardens. Your Cherokee Rose flowered here for the first time, I believe, last year; and now many growers are wanting it. The handsome, large-flowered *R. involucrata*, said to be the most tropical of all Roses, was not in cultivation until it was introduced from India to Kew last year, where it flowered out-of-doors in autumn. The flowers are white, and very fragrant. Probably this species will prove hardy in the south of England. Seeds of the new *R. gigantea* have also been received at Kew, and the pretty little *R. minutifolia*, figured in GARDEN AND FOREST last year, is represented by young plants raised from seeds supplied by an Italian nurseryman. The seeds distributed by Vilmorin & Co. at a franc each all failed. The remarkable Afghan species, *R. simplicifolia*, is in vigorous health here, but it does not flower; on the other hand, the hybrid, *R. Hardyi*, raised from the last-named and *R. laxa*, flowers frequently. It is one of the most beautiful of all single Roses; it has large yellow petals, cup-like in arrangement, with a blotch of crimson in the base, suggestive of the Gum Cistus flowers. *R. simplicifolia* would probably do better with you than in England, as it does not like our damp, dull winters. Does any one know of the existence of the single *R. anemonifolia*? We have the double red and double white, as introduced by Fortune, but the single-flowered form is not known here. As it is Japanese, some of your readers who introduce plants direct from Japan may know something about it. The single-flowered Banksian is almost as rare. The white and the yellow double-flowered varieties of this grand Rose are plentiful enough, but we did not know of the existence in gardens of the single-flowered form until it was found last year in the garden of Mr. Hanbury at Mentone. Our knowledge of Roses will no doubt be greatly improved by this forthcoming conference.

The death of Mr. J. T. Peacock, of Hammersmith, has robbed English horticulture of one of the most remarkable

of its patrons. Many years ago Mr. Peacock was famed for his rich collection of succulent plants, a collection which in point of number of species was surpassed only by that at Kew. He paid very high prices for large specimens of *Echinocactus*, *Cereus*, etc., and whenever any of these arrived or flowered he threw his garden open to visitors. These large plants always perished in a short time after their arrival in England. Mr. Peacock's collection of succulents grew so large that he could afford to loan great numbers of them to the Crystal Palace, the Royal Horticultural Society and other large public gardens. Latterly he turned his attention to Orchids, and before his death he possessed one of the richest collections in the neighborhood of London. The whole collection of Orchids and succulents is to be sold by auction. It is remarkable that so many large private collections of Orchids are distributed by the auctioneer annually. Last year, within about three months, no less than six large collections of Orchids were sold by auction in London. This year already five large collections have been placed in the auctioneers' hands. Orchids are costly playthings, no doubt, and although some amateurs have occasion to regret ever having had anything to do with them, others are lucky and get most of their outlay back. There must be an enormous number of new growers to make a demand for all these plants; besides these, the importations which are ever on the increase. The last big arrival was three thousand fine plants of the new *Cypripedium Rothschildianum*, which were sold here on Thursday last. Those who bought and paid dearly for the few sold last year will have occasion to regret their purchases now. There is a good deal of lottery in the Orchid trade; much more than in any other branch of horticulture. There is a marked increase in the number of growers in France, Germany and Belgium, and I am told that in America Orchids are almost as popular as in England.

The directions given in GARDEN AND FOREST, on February 13th, for the management of green-house plants makes us here envious of the weather which enables you to syringe green-house plants twice a day in winter, and makes it necessary for you to use shading. Here we do not get sun enough for Ferns, even, and no one would think of using shading in February, or even in March, for any plant save filmy Ferns. The losses caused by the bad light, fogs and changeable weather here are often heart-breaking. English horticulturists would be glad to get some of that sunlight in February which is over-abundant with you. For early forcing your bright sunlight in winter must give you an immense advantage. For the last fortnight the weather here has been dull and snowy, with a cold north-east wind blowing, and scarcely any sunshine. Plants outside have been nipped by frost, or they have crept back into their winter shells. In-door plants are suffering from fire-heat and want of light. In the country matters are not quite so bad, and I speak only of what is experienced by horticulturists in the neighborhood of London.

Kew.

W. Watson.

Cultural Department.

Asparagus for the Home Garden.

IN boyhood I was accustomed every spring to wander along "high-water mark" on the shore of the Chesapeake and gather the brittle stems of the wild Asparagus, which grows there in the greatest abundance. No knife was needed, for the stems snapped off at the lowest point where they were tender. All that was gathered was therefore eatable. This wild Asparagus was never as large as the highly-fed stems from the market gardens, but one who has become accustomed to its use will always take it in preference to the cultivated sorts. My early experience with this savory plant intensified my distaste of the first market asparagus I ate, which was white, and worthless as an article of food. Argenteuil Asparagus is celebrated as unsurpassed, and some authorities assert that Asparagus, to be good, must be bleached, but if the canned French Asparagus is a fair sample of the bleached product, it is only sophisticated palates which prefer the stringy white stalks to the tender green stems which have developed above ground.

To make an asparagus bed for home use there is no need to buy roots, which in many cases will come to you in a mouldy and worthless condition. Asparagus is a wonderfully hardy plant and will stand any amount of rough treatment, but nothing so quickly moulds in damp packing as the roots do, and many nurserymen will pack them with wet moss and in this way insure their destruction. In making an asparagus bed, remember that it is to last many years. It will therefore pay to prepare the soil very thoroughly. If your garden is of heavy clay it will pay you to use an abundant dressing of sand. If the

spot is wet thorough drainage is essential. Trenching twenty inches deep, with a thick coat of manure worked in, will pay. Get as good a strain of seed as you can, although I have grown as fine Asparagus from seed gathered from the wild plants as I have from any of the colossal sorts, and any "variety" you may get will be full of other varieties. Asparagus, being a diceous plant, is hard to keep in strict strains. On one corner of the plot selected for your bed, or near by, prepare a small bed and sow the seed as early in spring as possible. As soon as the young plants are large enough to handle, say two or three inches high, and about the size of very fine knitting-needles, lay off your plot in rows two feet apart and dibble the plants in six inches apart. Keep them well cultivated all summer, and in the fall give a coat of rough manure all over. The next

Primroses.

The true Primrose is very rare in this country. The flowers generally grown and offered for sale in the flower-stores as Primroses are hybrids probably between the common Primrose (*Primula vulgaris*) and the Cowslip (*P. officinalis*), and possibly (*P. elatior*) the Oxlip; but the varieties and hybrids are so intercrossed that it is hard to trace their real origin. The flowers are borne on short pedicels springing from a common peduncle, and the whole may be termed an umbellate scape. In the true Primrose the scapes are uniflorous, all springing from the root-stock or crown, the individual flowers being much larger and of better form than in the hybrids.

The hybrid Primroses, as well as Polyanthus, are easily



The Cedars at Wilton House.—See page 147

spring you can cut a little asparagus, and the roots being near the surface it will be very early. The next fall and spring thin out the plants in the row, leaving only every fourth one to grow. The second spring give the bed a dressing of Kainit (German potash salts) before growth begins, at about the rate of a ton an acre. Then, when the young growth appears, cut your tender green asparagus off at the surface of the ground, and pity the deluded people who consider the white woody underground portion of the stem eatable.

The subsequent culture will be a heavy fall dressing of manure and a dressing of Kainit once in three or four years. A one-year-old Asparagus plant raised in this way is larger by far than the two-year roots sold by nurserymen. I once planted a large bed in this way, and the following spring marketed good Asparagus from it, which could not have been done from two-year-old roots buried several inches under ground.

Crozet, Va.

W. F. Massey.

raised from seed sown in a cool green-house in March or in frames in April. When large enough to be handled they are transplanted into boxes and kept in a shady place until they are large enough to plant into nursery-beds. We plant them in beds surrounded by stout boarding or planking, which are known as "cradles," over which we can lay lattice-work, or other light shading, during the hottest weather. In color the flowers vary from almost white, through yellow to nearly crimson. In some of the varieties a short, common peduncle, with long pedicels, gives the plant the appearance of the common Primrose. These hybrids are largely grown for spring bedding, especially in England. Owing to the practice of transplanting in spring for immediate effect they are not so satisfactory here as we could wish. Root-action is disturbed, and vitality consequently reduced, so that the first few bright days in May causes them to wilt so much that they begin to look "seedy" before they really arrive at their best. Much

better results are obtained by letting them bloom where planted from seedling-boxes, especially if they are so arranged as to have the protection of a few sashes from the middle of March onwards.

The true Primrose does not mature seed very freely, but it is easily increased by division. It is not easy to keep it, however, during the hottest months. A cool soil and shade during the brightest part of the day are necessary to success.

When fall comes we plant our Primroses along with the Violets, and get abundance of bloom during the winter. Primroses make up very nicely in bouquets of twenty-five to thirty flowers, with a few of their own leaves.

Alpine Ariculas can be grown from seed and treated in the same way as recommended for the hybrids. They can be used for bedding in the same way. They do not ripen seed, but continue blooming, though sparingly, throughout the summer.

Wellesley, Mass.

T. D. Hatfield.

Orchid Notes.

Dendrobium Farmerii is a lovely Orchid, especially adapted for basket-culture, belonging to the evergreen section of the genus, with quadrangular stems, about a foot high, producing near the top pendulous racemes or bunches of straw-colored flowers, delicately tinged with pink, and having a rich golden lip. It is a native of the Khasya Hills, and is easily grown, requiring a warm house during active growth, after which it may be placed in a cool-house and kept fairly dry. There are two rare and choice varieties of this species—one with golden-yellow flowers, while in the other they are pure white.

Dendrobium splendidissimum is the best of a series of hybrids resulting from the crossing of *D. nobile* and *D. aureum*. It is a grand Orchid, combining the best qualities of both parents, and retaining the Primrose fragrance of *D. aureum*. The flowers are nearly four inches across, white, suffused with rosy-purple, the lip having a large blotch of deep purple, surrounded with a zone of creamy-white. This plant should have a long rest in a cool-house in order to flower properly.

Dendrobium primulinum is a fragrant Orchid, deciduous, producing pendulous bulbs about one foot long, from the sides of which come solitary, pale mauve flowers, with large spreading lips, which are white, tipped with rose. The variety *Giganteum* has much longer and very slender stems. The flowers are much larger, with a very much developed lip, often two inches across, pure white, and veined with purple. It was introduced in 1857 from Nepal. It requires the same treatment as *D. primulinum*, and should be grown in a basket or on a block.

Phalanopsis Veitchii.—This rare species, now in flower with us, is presumed to be a natural hybrid between *P. rosea* and *P. Schilleriana*. The habit of the plant is like that of *P. Schilleriana*, but is not nearly so robust. The scape is that of *P. rosea*, and bears about a dozen pretty pinkish flowers, which in shape and markings strongly indicate the parentage. The two plants we have are, I believe, the only ones that have yet been found. The pale variety, *Brachyodon*, is much more attractive than the type. In it the flowers are somewhat larger, and the plant more robust. This variety is represented by a unique specimen.

P. Stuartiana is a somewhat recent addition to this lovely genus, and proves to be a great acquisition. It is now pretty plentiful, very easily grown and an abundant bloomer. It may best be described by calling it a white *P. Schilleriana*, though in many respects it is abundantly distinct from it. There is a great variation in the foliage. In some plants the leaves are deep green, with only the faintest marbling, while others can scarcely be distinguished from *P. Schilleriana*. The flowers are usually cream-colored or pure white, the inferior halves of the lateral sepals yellowish, copiously spotted with dark cinnamon. Sometimes the whole flower is speckled with purple, as in *P. punctatissima*. The flowers are very closely set on the raceme, which is usually much branched, even on small plants. This species is interesting for its propensity to form root-buds, which quickly develop into flowering plants. It requires the usual *Phalanopsis* treatment, and now is a good time to overhaul the plants and remove the old decayed moss and roots, replacing them with new compost of fibrous peat and clean sphagnum. Baskets or cylinders of wood or clay will be found most suitable for this class of plants.

Odontoglossum niveum is a slender, low-growing Orchid, with ovoid, compressed bulbs, and linear, lanceolate leaves about one foot long. The slender racemes bear about a dozen very pretty flowers, about three inches across, white, waxy, copiously spotted with reddish-purple. The narrow segments are reflexed at the points, and the lip is beautifully

ornamented with a golden crest. This species was introduced nearly half a century since from Pamplona, where it was found at an elevation of 6,000 to 8,000 feet, and until recently was very rare. A fine plant is in bloom with us, and grows freely with the other *Odontoglossums*.
F. Goldring.

Kenwood, N. Y.

Galanthus Elwesii.—Last fall we planted several hundred bulbs of this pretty Snowdrop in a cold-frame. As the result, probably, of the abnormal mildness of the winter season, the first week in February found all of them in full bloom, and they are still in good condition, although the soil is frozen solid. The sashes serve to keep off snow and rain, enabling them to maintain their snow-white purity. *G. Elwesii* is quite distinct from *G. nivalis* and its varieties, the petals being distended and narrowed at the base, the inner perianth-segments smaller, and constricted above their middle. Planted with *Chionodoxa Luciliae*, this Snowdrop makes a pleasing sight in the early spring months. Both are perfectly hardy.

Ornamental Grasses.—The *Eulalias*, especially *E. Japonica* and its varieties, *Zebrina* and *Variegata*, are well known as ornamental plants, and deservedly so. The *Eulalia gracillima univittata*, however, is not as widely known as it should be. It is dwarfer than those named above, and is of a graceful habit, its distinctive feature being a pure white mid-rib running through each leaf. Last year this plant fully established its value and reliability as a decorative plant.

Scirpus Tabermontani zebrina, or Porcupine-grass, as it is sometimes called, is well worth growing, too. Being of doubtful hardiness, for assured safety it should be wintered in a cool green-house. When first introduced into cultivation it was grown as a warm green-house plant, but has since proved nearly hardy. Any little trouble taken with it will be amply rewarded by its tufts of leaves, two to three feet long, resembling bunches of porcupine-quills, except in color, which in the grass is green and white in alternate bands. The younger leaves are suffused with rose. Another species, equally pretty, is *S. Holoschanus variegatus*, a grass with leaves banded in the same way. This is quite hardy, and grows a foot high. These grasses do best in soils that are moist and rich.

Astilbe Japonica aureo reticulata.—This is a more valuable plant, if possible, than the species, being quite as useful for flowers, while the leaves are veined with rich yellow. The leaf-stalks, too, are noticeable for their crimson hue, giving the plant a distinct and attractive appearance when grown as a pot-plant. This variety is of strong constitution, and promises to become popular.

Passaic, N. J.

E. O. Orpet.

Plant Notes.

Berberis Lycium.*

WHEN this Barberry comes to be better known—and a figure which has been prepared for the *Botanical Magazine* will do much, when published, to further a knowledge of and create an interest in the plant—it will surely become a favorite. Hitherto, I believe, there has been no figure of *B. Lycium* published, and I do not find any record of the plant being cultivated. It has been growing at Kew for several years under the name of *B. elegans*, and this name occurs in the lists of several continental botanical gardens. No one hitherto appears, however, to have identified the species under its garden name with the wild type, which occurs in sunny places and elevations from 3,000 to 9,000 feet above sea-level in the western Himalaya, from Garwhal to Hazara. In the Kew collection are individuals which are undoubtedly referable to *B. Lycium*, and, indeed, identical with it, *i. e.*, they cannot be separated even as varieties from a nurseryman's standpoint—*B. glaucescens*, *B. arihuacensis*, *B. aristata* (under the latter name widely different plants—belonging, perhaps, to three distinct species—are cultivated in English gardens).

B. Lycium, as far as Kew experience allows me to judge, seems as hardy as our native *B. vulgaris* or the North American *B. Canadensis*, and produces its wealth of golden racemes after all the allies of *B. vulgaris* and the very numerous forms of that species have passed out of flower. On the other hand, however, it appears not to blossom in a young state, but cedes to none in beauty and floriferousness when once the bush has reached the flowering stage.

It forms an erect bush about a couple of yards in height, with whitish bark and subsessile, subpersistent, lanceolate or narrow, obovate leaves, of a light greyish-green above and very glaucous beneath. As a rule the leaves are entire, but

* *BERBERIS LYCIUM*, Royle, *Botany of the Himalayan Mountains*, 64; *Transactions of the Linnean Society of London*, xvii., 94.

on strong, vigorous shoots they are not infrequently furnished with two or three spiny teeth. The drooping raceme is longer than the leaves, is either simple or compound, and is often corymbose; the berries are elongated in form, violet in color, and are furnished with a conspicuous style and capitate stigma.

In the districts where it is found wild, Royle says *B. Lycium* is largely used in the manufacture of *rusot*. The following lines respecting *rusot* are copied from Royle: "The wood and bark of the Himalayan species of Barberry are not only used simply in India, but an extract is prepared from them which is to be found in every bazaar, and described in all the works on materia medica. This is prepared by digesting in water sliced pieces of the root, stem and branches of any of the species of Barberry in an iron vessel, boiling for some time, straining and then evaporating to a proper consistence. This extract is much employed in Indian medicine, and everywhere known by the name of *rusot*." *George Nicholson.*
Royal Gardens, Kew.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XIII.—SOME OF THE CONDITIONS WHICH FAVOR RAPID GROWTH—CERTAIN PHYSICAL PHENOMENA OF GROWTH.

THE MEASUREMENT OF GROWTH is by no means so easy a matter as would appear at first to a casual observer. In the case of strong shoots, which increase in length very rapidly, it is, of course, sufficient merely to make measurements with any accurate scale, at proper intervals. For instance, shoots of Bamboo can grow at the rate of six inches to one foot in twenty-four hours, and such rapid growth can be very readily measured. But when we are dealing with plants which grow slowly, or when we desire to note the amount of growth during short periods of time, it is necessary to make use of apparatus by which all growth can be registered, and the exact times of growth known. In general, such pieces of apparatus consist of a drum made to revolve regularly, by means of clock-work, and bearing smoked paper, which can be marked by an index connected with the growing part of the plant under observation. When such an apparatus is properly adjusted it can run along for many days, making an accurate record of all the varying rates of growth, and the times of these variations can, of course, be easily compared with the rates. It has been urged that, in the case of such experiments, the plants are withdrawn from their natural conditions and subjected to special conditions in the laboratory which may disturb in many ways their natural activities; and hence, it is said, it is not right to conclude from these experiments that the growth registered by the apparatus is the same which the plant would have made in the open air or in its natural home. Such objections are not well founded. Nevertheless, they must, in some instances, be taken into account, and, further, it must be remembered, in examining the general conclusions drawn from the results of experiments of this character, that different plants, under precisely the same conditions, may behave very differently. In fact, there are a good many peculiarities or idiosyncrasies of plants which are as yet wholly unaccounted for. But the general statements which now follow are based on an examination of a large number of plants, and doubtless apply, with very few exceptions, to all of the common plants which fall within the province of the horticulturist and the forester.

RELATIONS OF GROWTH TO TEMPERATURE.—There appears to be a certain degree of temperature which is suited to the most rapid growth of every plant. Growth can take place at temperatures far above this, and can continue at temperatures far below it, but at the optimum the multiplication and the enlargement of cells proceeds most rapidly and uninterruptedly. The degrees which have been made out for some of our common plants are given in the following table:

	Minimum.	Maximum.	Optimum.
Wheat,	41° F.	108° F.	84° F.
Cress,	34° F.	98° F.	80° F.
Red Clover, . .	42° F.	82° F.	70° F.
Indian Corn, . .	48° F.	115° F.	90° F.

These figures are fair averages of those given by observers. RELATIONS OF GROWTH TO LIGHT.—In general it must be admitted that cell-growth is retarded by light. At first this seems very strange when we reflect that it is through the agency of light that the green parts of plants construct all their building materials. The putting of these materials in place is, however, quite a different matter. It can go on in the light, but it proceeds, as a rule, faster in the dark. A moment's consideration will show that all growth of ordinary roots takes place in the dark, and the thickening layers of stems are com-

pletely shielded from the light; moreover, the unfolding of buds at the covered growing points of stems and branches is another case in point. To the cultivator of plants the fact is familiar that in a dim light the seedlings are apt to be "drawn," whereas in bright light they are more "stocky," and are better able to resist attacks of disease. The growth is less rapid in the latter than in the former case. Hence we must bear in mind the fact that rapid growth is not by any means necessarily that rate which is best for the plant under cultivation.

RELATIONS OF GROWTH TO THE MINERAL MATTERS IN THE SOIL.—This subject is one of surpassing importance, since it underlies all success in cultivation. The experiments in this field of observation have been conducted not only in special soils prepared for the purpose, but also by a method capable of yielding even more satisfactory and exact results—namely, by what is known as "water-culture." When seedlings have thrust out one or two strong roots, and a few leaves, they are placed above the surface of the solution which is to be employed in the experiment, and the roots are permitted to dip into the liquid. For instance, one plant will be grown with pure water, another with water containing one of the salts of potash, another with another salt of the same base, and so on. It is plain that such observations can be indefinitely extended to all classes of substances.

From the myriads of results which have been obtained by this mode of experimenting, the following general conclusions appear at the present time to be justified:

Growth and the preparation of materials for growth are checked when the substances mentioned below are absent, or are present in too small amount—combinations of potassium, magnesium, calcium, nitrogen, iron, phosphorus. These, together with sulphur in very small amount, and for some plants, sodium and chlorine, may be regarded as absolutely indispensable. Acting on the hints afforded by water-culture, it is possible to provide for a certain species of plant the precise amount of the substances best adapted to the needs of its growth. In practice, however, there are several serious difficulties which stand in the way of transferring these results from the laboratory to the garden or the forest. The most perplexing hindrance is that as soon as a solution of these mineral matters comes in contact with the soil it is liable to undergo changes in composition. Some kinds of soil, notably clayey soils, have the extraordinary power of withdrawing from solutions certain of the matters held in solution, and in this mechanical adhesion, as it is called, the abstracted substances are liable to be acted on by the air which is entangled in the soil. Although the plants may get at these matters after a time, and perhaps in the very best form in which they can use them, we are not sure that what we place on the soil is what the plants are going to get. For exact information in regard to this most important matter the reader may consult some authoritative work like that which is mentioned at the end of this paper.*

PHYSICAL PHENOMENA OF GROWTH.—The pressure which is exerted by a growing part is in some cases, capable of measurement. The results of such measurements are surprising. Only a few examples can be cited here; other cases may be found in the treatises referred to in earlier papers of this series.

Darwin found that the tiny underground stemlet of a germinating bean was able to move a weight of rather more than three pounds, and in another instance about eight pounds.

In the case of the fruit of a squash placed in a frame-work connected with a lever, a force of more than two tons was exerted by the multiplying and enlarging cells.

When trees grow on ledges the increase in the thickness of the large roots at their very base will frequently raise the whole trunk for a distance of an inch or more, the firm ledge under it affording an unyielding support, against which the pressure of the cells of the thickening roots comes. This fact should be borne in mind in the examination of those cases of supposed growth in height of old thick stems which may have served as gate-posts. By the raising of the end of the gate above its former level the old stem, which we know is incapable of growth in length, may appear to have grown, whereas it was simply being lifted by the roots underneath.†

Cases in which growing roots have torn asunder stone foundations, into the crevices of which they have insinuated themselves, are doubtless familiar to all the readers of this paper. The force exerted in all these instances has been exercised solely by the innumerable delicate, thin-walled cells, which increase in number and in size in the orderly manner we have attempted to describe.

Cambridge, Mass. *George Lincoln Goodale.*

*Storer's AGRICULTURE.
†See also GARDEN AND FOREST, March 6, page 109.

Correspondence.

To the Editor of GARDEN AND FOREST :

I have about two acres which I want to put into a grove of Nut-trees, such as Chesnut, Hickory, etc., and would like to know the best size to get the trees and the right distance apart to plant them. Of course, I shall thin them out to some extent as they grow up, but do not want to do this until those taken out will be of some service.

New York.

C. D. Miller.

[It is more economical to plant the nuts of Hickories, Walnuts and Chestnuts where the trees are to grow than to transplant seedlings. The nuts should be procured in the autumn and kept over winter in moist sand, as if they are allowed to become dry they lose their power of germination. They should be planted as soon as the frost is out of the ground in the spring. If the ground is hilly or filled with rocks the nuts must be planted, two to six feet apart, wherever sufficient soil can be found for them, by making a hole with a stick from a half to one inch deep, dropping in the seed, and then closing the hole by pressing the foot upon it. This, too, is the best method for planting where the ground is so impoverished that it will not produce a heavy crop of grass or weeds. But when the ground is rich and level it should be ploughed and marked out as though it were intended for a crop of corn; the nuts should be planted four feet apart, and the soil should be cultivated to destroy the weeds until the seedlings are large enough to shade the surface, after which no further cultivation will be needed.]

Seedling Chestnut plants, one to two feet high, can easily be transplanted and can be procured from nurseries. So can seedling Black Walnuts, although little is gained by planting seedlings rather than seeds of trees which, like the Black Walnut, the Hickories and the Oaks, make strong tap-roots. Seedling Hickories are not kept in any large quantity in American nurseries.—Ed.]

To the Editor of GARDEN AND FOREST :

Sir.—In the notice of the Double-flowered Horse-chestnut, by George Nicholson, of Kew, published in No. 51 of GARDEN AND FOREST, I find it stated that the flowers became double by the changing of the stamens into petals.

In a double-flowered Horse-chestnut which I examined last summer, the discoid base of the flower was converted into a pillar, from which arose four distinct flowers in succession, each furnished with its complement of stamens and petals. There was, at the same time, a spiral movement which had disposed the petals of the different flowers in such a manner as to produce a many-petaled rosette, but each flower of the series retained its own stamens unchanged.

I intend, hereafter, to endeavor to observe whether plants belonging to the *Discifloræ* differ in their method of doubling from plants belonging to the *Calycifloræ*.

Media, Penn.

G. A. Lewis.

To the Editor of GARDEN AND FOREST :

Sir.—Your remarks upon the vandalism of cutting down and peddling out the remains of the old historic Oak at Woodbridge, Connecticut, remind me of an incident of my own experience which has never been recorded, but is worthy of mention as an illustration of a degree of barbarism which it seems incredible can still exist.

During the late civil war there was, at one time, a great demand for "Pasture Oaks"—as the White Oaks growing singly in open fields were called—the timber of which commanded a high price at the Navy Yards.

Near where I then lived in Massachusetts was a farm which had been in the family of the man who then occupied it, for more than 200 years, the house in which he lived being more than 150 years old. It stood, perhaps, ten rods back from the high-way, and on each side of the entrance to the lane which led up to the house was a magnificent White Oak, which must have witnessed the course of life from infancy to the grave of many generations of the ancestry of the man who then owned and tilled the farm. I passed them almost daily, and they were to me a constant source of admiration, both on account of their intrinsic grandeur, and the reflections excited by the thought of the stories they could tell.

You can better imagine than I can describe my sensations when, on approaching the place one day, I saw one of them prostrate, and the owner with his assistant busy in cutting down the other, and the only reply he made to the exclamation that rose involuntarily to my lips was that he "guessed there would never be much more timber in 'em, and he never again could get so good a price for it."

Minneapolis, February 20th.

H. W. S. C.

To the Editor of GARDEN AND FOREST :

Sir.—It having come to my knowledge that a florist of this place, David Cliffe, was suffering from poison supposed to have been caused by some plant, I was led by what has appeared in GARDEN AND FOREST to suspect that perhaps *Primula obconica* might be that plant. I wrote him of my suspicion and this is what he replies :

"I am positive that *Primula obconica* is poisonous to some persons. As you know, I was under treatment for poison which I received from Poinsettia, through cuts in my hand. Feeling much better, I busied myself potting my Primulas. In the evening I was completely blind from my face being swollen. It remained in this condition for a day. Since this my foreman, after packing up some of the plants, had his hands and arms poisoned. Last week a customer who had taken some of the plants refused to take any more, saying some who had handled them were poisoned by them."

It is hard to believe this of any *Primula*; and probably the cases in which it poisons are very few, as there is no doubt that hundreds handle it with no ill effects, just as is the case with many other plants. Personally, I am compelled to avoid any contact with the common Poison Ivy; and even the seeds of the Oregon Maple (*Acer macrophyllum*) and of the *Ostrya Virginica*, both of which are covered with minute hairs, and excite an itching and inflammation of my hands, while many others who have handled them are not at all affected. The *Primula obconica* is such a beautiful and useful plant that it will be much regretted if it should be proved to be really poisonous to many persons.

Germantown, Phila.

Joseph Meehan.

To the Editor of GARDEN AND FOREST :

Sir.—Permit me to express my satisfaction with your editorial article on the "Soil and National Development," in your issue of February 13th. It is true, as you say, that all wealth is drawn from the earth itself, and it is equally true that the rocks and minerals, and especially the soil which is produced from them, are useful to man just in proportion to his knowledge of them and their properties. It will be fortunate for our people if you can arrest their attention, and show them in what ways the soil is being ruined in large regions of our country, and by what methods its fertility may be preserved as an inheritance for future generations.

The richness of the virgin soil is made up of the savings of past generations of plants, very much as the riches of a nation are made up of the small savings of past generations of men. If we continue to return to the soil a fair equivalent, in energy and mineral, for that which we remove in the crop, the soil will grow richer; but if we continue to remove the crop without such equivalent, if we steadily plunder and rob the soil, it will finally be reduced to the state of barrenness and savagery from which it has been raised by the vegetation of past ages.

Mahoning, Ohio.

J. W. Pike.

Recent Publications.

Die Landschaftsgaertnerei; ein Handbuch fuer Gaerter, Architekten und Freunde der Gaertner-kunst. Von E. Petzold, Leipzig, Haessel.

The first edition of this work on landscape-gardening was published in 1862, and won high praise in Germany despite the fact that the author was said to have followed the English artist Repton with too confiding a faith. After twenty-five years of study and experience, during many of which Herr Petzold has held the position of Park and Garden Director to Prince Frederick of the Netherlands, he now reissues his book in an augmented and much-improved form. The subject is discussed in the thorough German way, and among the most interesting chapters may be named those which treat of "The Colors of Trees and Shrubs with reference to Foliage, Flowers and Fruit," "The Characteristics of Tree-forms as affecting the Lines of Landscapes," and "The Arrangement and Care of Cemeteries." Form, color and linear and atmospheric perspective, are discussed with reference to the landscape-gardener's problems; all the elements which enter into

his work are separately examined; the characteristics of the old and new styles in gardening are explained; and, in short, nothing theoretical or practical is omitted which could serve to make a useful hand-book for artists and amateurs. Some of the illustrations are from designs by Friedrich Pr  ller, a landscape painter and professor at the Art Academy of Dresden.

The Rose Garden. By William Paul, F.L.S., etc., London: Kent & Co. Ninth edition.

The fact that this book has within a comparatively few years passed through nine editions establishes its value among the many manuals of its kind which have appeared in England. Of course its second division, which gives careful directions for the cultivation of many kinds of Roses, is less useful in this country than in England. But in the first division is contained an essay on the history and poetry of the Rose, which is delightful reading; the origin of many favorable varieties is explained in an interesting way; and an appendix contains two valuable articles on the botany and the entomology of the Rose. A full bibliography of works on the Rose published during the past ninety years adds to the merits of a very attractive work.

Periodical Literature.

Now that a project is on foot, under the auspices of the Torrey Botanical Club, to establish a botanical garden in this city, it is interesting to recall the fact that such a garden long ago existed here.

An article recently published in the *American Druggist* quotes as follows from the *American Medical and Philosophical Register* of July, 1811:

"This institution, the first of the kind established in the United States, is situated about three and a half miles from this city, on the middle road between Bloomingdale and Kingsbridge. The ground, consisting of about twenty acres, was originally purchased of the corporation in this city, in 1801, by Dr. David Hosack, the founder of the establishment. The view from the most elevated part is variegated and extensive, and the soil itself of that diversified nature as to be particularly adapted to the cultivation of a great variety of vegetable productions.

"Immediately after the purchase, the proprietor, at a very considerable expense, had the grounds cleared and put in a state of cultivation, arranged in a manner the best adapted to the different kinds of vegetables, and planted agreeably to the most approved style of ornamental gardening. A conservatory for the preservation of the more hardy green-house plants was also built.

"As the primary object of attention in this establishment was to collect and cultivate the native plants of this country, especially such as possess medicinal properties, or are otherwise useful, among others, such gardeners as were practically acquainted with our indigenous productions were employed to procure them, and by the distinguished liberality of several scientific gentlemen in this country there were in cultivation at the commencement of 1805 nearly 1,500 species of American plants, besides a considerable number of rare and valuable exotics.

"In the year 1806 very important additions were made to the collection of plants, from various parts of Europe, as well as from the East and West Indies. A second building for their preservation was also erected, and the foundation of a third laid, which was completed in the following year. In the autumn of the same year, 1806, a catalogue of the plants, both native and exotic, which had been already collected, and which amounted to nearly 2,000, was published. Since that time the botanic garden has been greatly improved. The buildings, which are erected on the most recent plan adopted in institutions of this kind, consist of three large and well-constructed houses, exhibiting a front of 180 feet. The greater part of the ground is brought in a state of the highest cultivation, and divided into various compartments, calculated for the instruction of the student of botany and medicine, and made subservient to agriculture and the arts. The whole establishment is surrounded by a belt of forest trees and shrubs, and these are again inclosed by a stone wall two and a half feet in thickness and seven feet high."

In the year 1810 the legislature purchased the garden from its owner and put it in the care of the Regents of the University, who in their turn confided it to the College of Physicians and Surgeons of New York. It was not many years, however, before the ground it occupied became so valuable that the garden was "rooted up." Many of the plants were sent to the Bloomingdale Insane Asylum. In 1835 the twenty acres were

valued at \$100,000. Their value to-day it would be almost impossible to compute. In 1876, adds the *American Druggist*, a scheme for a botanical garden was started in this city, certain persons asking the legislature for a charter which would permit them to establish it in the neighborhood of the Natural History Museum. But as their action was prompted simply by a desire to prevent the Park menagerie from being removed to this locality, no more was heard of the garden when it was decided that the menagerie should remain at the Arsenal. The project of to-day has been born under very different conditions, and we may hope it will have a very different outcome.

The February number of the *English Illustrated Magazine* contains an interesting article, by Mr. H. Barton Baker, on "Cognac," the town and castle, not far from Angoul  me, which, from a medi  val stronghold, were transformed years ago into a manufactory of brandy. The castle still stands almost intact, but is used as a warehouse for brandy-casks, and the quaint streets of the city everywhere reveal the presence of the dominant industry. Even the house-fronts, formerly of pure white stone, have assumed a piebald look in consequence of the fumes from the warehouses. The account of the processes of making and keeping the spirit which the author gives are most entertaining. "But," he says, "brandy is rapidly becoming a thing of the past, thanks to the ravages of the phylloxera. Only eleven years ago the Cognac district had about 60,000 acres planted with vines; of these nearly 8,000 have been utterly destroyed, and over 20,000 seriously injured; since then three-fourths of the area have been desolated and the remainder much affected, and the opinion of the leading merchants is that the chances are that in another generation the true *eau-de-vie* will be a liquor *introuvable*. Some attempt is being made at replanting the vineyards, though, in most cases, the pest reappears upon the young shoots, and here and there experiments are being made with American vines, which are said to be phylloxera proof, but the prospects of Cognac can scarcely be said to be improving to any great extent."

This state of things has brought about a painful decrease in the activity of the town, especially as regards the immense establishment organized in an ancient convent which is owned by the Messrs. Hennessy. "But while an utter stagnation of business prevails among the large houses, some of the smaller ones are driving a brisk trade—not, however, with the production of the grape. From Holland and Germany large consignments of spirit obtained from grain, potatoes, beet, or any refuse from which alcohol can be distilled, are sent into Cognac. This new fiery liquor is doctored, watered, flavored, colored, put into bottles or casks, branded 'cognac,' and is received as such all over the world. This is the stuff the English publican vends, sometimes pouring it out of old bottles bearing a well-known label to deceive his customers. In fine, it is this decoction that is generally drunk in this country and Germany and in all parts of France as well, especially in the Parisian caf  s, under the name of cognac. Those who drink pure brandy nowadays have to pay very dearly for the article."

The best brandy now costs at least twenty-five English shillings a bottle, and is said to be almost all consumed in the United States.

According to the *Pharmaceutical Record*, the source of the opium supply of the United States is central Asia Minor. Here the Opium Poppy (*Papaver somniferum*) is "easily cultivated on the plains or lower ranges of hills, a good rich soil being necessary, and considerable labor expended in caring for the plant during the season of growth. Seed is planted during the months of November to March, inclusive, in order to protect against possible accidents by storm, and also to secure a succession of ripening plants. When the plant has flowered the leaves that fall are collected (used as wrapping and packing in part), and when the capsule has attained its growth, the collectors begin their work in the afternoons by incising the capsules with an instrument formed like three knife-blades, which are separated from each other by a film of cotton twine and all bound as one; the operator takes the capsule in the left hand and with the right rapidly passes the blades around it in a spiral upward. In the morning the exuded milky juice, which, by exposure to light and air, has become of a brownish-red color, is scraped off, and the collected juice placed on a poppy leaf to partially dry in the sun. The opium as it dries is made into suitable balls and wrapped with poppy leaves, and packed in dried leaves to prevent the adhesion of the lumps into a mass. Beyond this simple process there appears to be no further manipulation of the drug, except where dishonesty is practiced, as the addition of various adulterants.

Notes.

Two new parts of Baillon's indispensable "*Dictionnaire de Botanique*," being Fascicles xxii. and xxiii., have reached us. The work is now brought down to "Leth."

Miss Emily L. Gregory's studies upon the "Development of Cork Wings on Certain Trees" is now reprinted in pamphlet form from the pages of the *Botanical Gazette*.

Last winter a Philadelphia gardener placed a frame over a spring in which Water-cress grew. The warmth of the water prevented freezing, and he had Water-cress all the winter.

Mr. Frederick Janson Hanbury, F.L.S., proposes to publish, by subscription, an illustrated monograph of British Hieracia. It will be issued in quarterly parts at six shillings for the colored, and at four shillings for the uncolored edition; and five years, it is estimated, will be required to complete the publication. Mr. Hanbury's address is 69, The Common, Upper Clapton, London.

Sixteen plans were recently presented in competition for the commission to lay out a new public park in Utrecht, Holland; but although two were rewarded with second prizes none was thought worthy of the first prize. Had as many plans been prepared for a work of this description in America it is certain that the most careful and exacting judges in the world would have been amply satisfied with some of them.

The Philadelphia Select Council, on March 7th, passed an ordinance appropriating Bartram's Garden and two other pieces of ground for park purposes, and providing for their purchase. Some other small parks have been given to the city, and additional ground will probably be bought by the city to increase the number and area of its open spaces. The movement for this object is most judicious and important.

The National Horticultural Society of France offers a prize of 2,500 francs, to be paid at the end of the present year, for the best practical work upon vegetable and fruit gardening and floriculture published since April 6th, 1886. It is offered in the name of the late Dr. Joubert de l'Hiberderie, who left the sum of 60,000 francs to the Society for the purpose of establishing this prize. Presumably the work must be written in French.

The Monograph of North American *Umbelliferae*, upon which Messrs. Coulter & Rose have been constantly engaged for a number of years and which has appeared in the *Botanical Gazette*, is now issued separately in a handsome pamphlet of 144 pages with ten plates of 159 figures of cross-sections of the seed of the different genera, of which there are fifty-two indigenous to the continent north of Mexico with 217 indigenous species.

The annual banquet of the Philadelphia Florists' Club, was held last Thursday evening, and the guests from Boston, New York and other cities had renewed occasion to observe that the florists of Philadelphia excel in hospitality and good-fellowship, as they do in intelligence, taste and skill. A unique feature of the occasion was the toasting of several of the newer Roses, and the responses by the growers who had been specially interested in the dissemination of these varieties were instructive as well as entertaining.

Dr. C. C. Parry has recently printed in the proceedings of the Davenport Academy of Natural Sciences an account of the genus *Ceanothus*, with an enumerated list, and notes and descriptions of several Pacific coast species, based upon his forty years' observation of these plants in their native habitats. Dr. Parry distinguishes for the first time the following: *C. intricatus*, known only on the summit of Mt. Tamalpais, near San Francisco; *C. Andersoni*, from the Santa Cruz Mountains, *C. Californicus* and *C. divergens* from Napa Valley. With the two species of eastern America, thirty-three species are included in this, the latest revision of this difficult genus.

Professor Eaton, who lectured recently on Oaks at New Haven, said that the largest and most famous Oak that had been known in the State of Connecticut was the Charter-oak, on the Stewart estate in Hartford. "Two hundred and one years ago it was a large and ancient tree. The historical connections which have made it famous are well known. On August 20th, 1856, a great storm swept over this part of New England, and the aged tree was blown down. It was then 700 or 800 years old. The event caused much excitement. A dirge was played by the army band, and the bells were tolled at sunset. It was thirty-three feet in circumference and thirty-seven men could stand in its cavity at one time." This Oak was a White Oak (*Quercus alba*), while the tree recently cut down by vandal hands at Woodbridge, Connecticut, was a Black Oak (*Q. tinctoria*).

The *Cercle Floral*, of Antwerp, proposes to hold next year an exhibition illustrative of "Botany in its Geographical, Commer-

cial and Industrial Aspects"—that is to say, not only the floras of different countries will be illustrated, but also, as fully as possible, the various products derived from them. Of course, collections with a similar aim have already been formed in various places, notably at Kew. But in this temporary exhibition it is proposed to bring the living and the manufactured products more closely together than is possible in permanent museums. The results of the skill of the hybridizer will also be systematically shown. Great botanical collectors will be honored by having as many as possible of the plants which they severally introduced grouped together and appropriately labeled. Those plants will also be gathered together which are most useful from an artistic point of view, as furnishing decorators and artisans with graceful suggestions. A congress will be held for the discussion of the various questions which such an exhibition will naturally bring up, and if the wide-reaching programme is carried out with any degree of success, Antwerp ought to be very attractive to students and lovers of plants during the summer of 1890.

It is usual, says the *Illustrirte Garten Zeitung*, of Vienna, to believe that the prices paid for Tulips in Holland during the celebrated "Tulip mania" have never since been equaled. The fact that they have been rivaled in recent times has not excited much attention because no single class of plants has been so conspicuously preferred as was the Tulip in its day. For example, a sum equaling \$2,250 was paid by a nurseryman in Erfurt, Germany, for the original plant of *Magnolia Lenné*; in 1876, Mr. Francis Parkman, the historian, sold a hybrid Lily (*Lilium Parkmanni*) which had been produced on his estate near Boston to an English nurseryman for \$1,200; and about a year ago Monsieur Lemoine, of Nancy, France, gave \$200 for a bulb with two or three bulblets of the first semi-double *Gadiolus*. The prices given in this country for the Bennett and the Puritan Roses at the time of their introduction, and more recently for the Mrs. Alpheus Hardy Chrysanthemum, are familiar to all, but in these instances, of course, a large amount of stock was sold, while the sums paid by old Dutch amateurs were for single bulbs. Orchids bring higher prices to-day than any other plants. The Messrs. Veitch paid \$1,800 for a *Cypripedium Stonei platytanum*, a plant more curious than beautiful, which consisted of but a single flower-stalk, at the base of which were three young shoots about one and a half inches in length; the same firm, on another occasion, gave \$1,400 for two plants of *Cattleya Trianae* var. *Leeana*, and a list of similar prices might be greatly extended.

A correspondent of an English journal, replying to a query whether there is such a thing as a plant that moves spontaneously, replies that *Desmodium gyrans* must be the plant referred to. It belongs to the Pea family and is a native of the East Indies, "where it rejoices in the name of Burram Chandali. It is a somewhat slender plant, seldom exceeding two feet in height; the leaves are not large, but trifoliate, the two leaflets at the base being much the smallest, and these comprise that portion of the plant which appears to be continually on the move, but the movement is very irregular, although rapid. The texture of the plant is somewhat thin, the color of the leaves being a bluish green, and the constitution appears somewhat delicate. I believe it to be a biennial, but have found it difficult to keep the plant alive during the winter months. Seeds can be obtained from the principal seedsmen. . . . The plants become characteristic as soon as the first leaves next the seed-leaves are formed, and the eccentric moving powers are developed. It does not like cutting, and the best plan to produce a bushy plant is from time to time to pinch out the extreme point of the shoot. It enjoys strong heat and a moist atmosphere. It is one of the most extraordinary plants in the vegetable world, but it does not possess any beauty." In Nicholson's *Dictionary of Gardening* 'Moving-plant' and 'Telegraph-plant' are given as the popular names of this *Desmodium*, and it is said that the leaflets move up and down "either steadily or by jerks, the movements being most marked during bright sunshine."

Catalogues Received.

J. J. JARMAN, Yokohama, Japan;—Bulbs.—JOHN LAING & SONS, Forest Hill, London, England;—Chrysanthemums.—THOMAS MEEHAN & SON, Germantown, Pa.;—Trees, Vines, Shrubs, Fruits.—W. H. MOON, Morrisville, Pa.;—Fruit and Ornamental Trees, etc.—FARSONS & SONS Co., Limited, Flushing, N. Y.;—Hardy Ornamental Trees, Flowering Shrubs and Vines.—PITCHER & MANDA, United States Nurseries, Short Hills, N. J.;—Hardy Perennials.—TEMPLE & BEARD, Shady Hill Nurseries, Cambridge, Mass.;—Trees, Shrubs, Vines, Plants; also, Hardy Perennials.—DAVID G. YATES & Co., Mount Airy Nurseries, 5774 Germantown Avenue, Philadelphia, Pa.;—Hardy Ornamental Trees and Shrubs, Greenhouse and Bedding Plants, etc.

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Can the Nation Defend its Forests?

THE *Daily Commercial Bulletin* of this city says it is incumbent upon Congress to protect the forests on the national domain, but adds that the plan we have proposed for their defense ignores limitations upon federal authority that must be maintained. The *Bulletin* does not say what these limitations are, but it appears to think it would be wrong for the nation to use adequate means for the protection of its own property. We are not aware of the existence of any limitations which forbid the nation to guard its forests from spoliation and destruction, and if the people of the country can be brought intelligently to consider the magnitude of the interests involved, they will, no doubt, find a way, or make one, to protect the forests on the public lands in the Pacific and Central States. There was much solemn argument in this country in 1860 and 1861 to the effect that the nation could not preserve or defend its own property; that there were insurmountable limitations in the way. But since 1865 intelligent men have mostly been of the opinion that the American people can defend their own national property—if they want to. There is nothing whatever to prevent the people of the nation from providing effective means for the preservation of the forests on the public lands, except the lack of popular interest, intelligence and foresight regarding the relation of these forests to the welfare and civilization of the country.

But the timber thieves, of high and low degree, who have grown rich by plundering these forests, the mining and railroad corporations and private individuals who for many years have been appropriating the public property to their own use and aggrandizement, are all earnestly opposed to the exercise of the power which the people of the country unquestionably possess—the power to defend the nation's forests from systematic and exterminating pillage. They would think it very improper, perhaps unconstitutional, to employ the army for this purpose, although its officers have been educated at the expense of the nation, and the whole force is maintained for the purpose of having a body of trained and competent men always ready

for the service of the country; and the defense of national property is one of the principal objects for which the national army exists.

Is it not absurd to insist that although the nation owns these forests, and can dispose of them as it chooses, it cannot provide for the sale of the trees when they need cutting, but must allow mature and valuable timber to go to waste, or be stolen, because it would never do for the "Government" to sell lumber? The Government is already, and always has been, an extensive lumber dealer. It buys lumber in large quantities, while it permits enormous thefts of valuable timber from its own forests. The Government sells land, and old iron, and a great many other things. What kind of catastrophe would result if competent officers should be empowered to sell timber from the public lands, under regulations embodying some knowledge of forestry? The timber of the public forests is constantly sold with the land on which it grows. Of course, if the nation chooses to do so it can sell the timber, while it retains possession of the land and protects it so that a new forest-growth will in time be produced. To do this would be a very simple and commonplace business transaction.

There is not much force in the argument that because the nation does not employ the machinery of the "Government" to do something which is entirely unnecessary, that is, to manage mines and ranches, therefore it cannot, or must not, employ it to protect its property in the forests on the public lands. If the relation of certain mines and ranches on the public lands to the welfare and civilization of the country were the same as that of the mountain forests in California and Colorado, the nation could assume their management, and it would be entirely proper that it should do so. It could even employ its own soldiers to guard and defend its mines and ranches from plunder and destruction if this became necessary.

No well-considered objection to the plan for the care of the nation's forests, which was proposed in this journal a few weeks ago, has been brought forward. The unanswerable argument and sufficient reason for the adoption of that plan is the fact that it presents the only means available for the permanent conservation of forests which are the indispensable guards and regulators of the flow of the rivers which have their sources in them, and that upon these rivers a great area of country must forever depend for the water without which agriculture, and even inhabitan-
tancy, will be impossible.

These are the essential and intimately related facts in the case: A great region, now nearly uninhabitable on account of extreme desiccation, could be made highly fertile and capable of supporting a dense population, by means of irrigation. The water required for this purpose can be obtained only from the rivers which rise in the forest-covered mountain-lands which are still public property. If the forests are destroyed the water will not be available or controllable for irrigation. The forests are being rapidly destroyed, and under existing methods of government control their speedy extinction is certain. They belong to the nation, and could be protected by employing the national army for their defense, until a system for their permanent conservation could be devised and put in operation.

Tree-planting.

TREES are generally planted in this latitude during the month of April or in early May, although certain advantages may be gained by autumn planting. It is best, as a rule, to secure the trees in October, while nurserymen have time to fill orders properly, even if the planting is delayed until the following spring. As soon as the trees are secured all bruised roots should be carefully cut away with a sharp knife, and if the trees are carefully heeled in, the wounds will have time to form a callus and small rootlets will be made before freezing weather. These feeding roots will help to keep the tree supplied with moisture as it is dried out by the winter winds, and they will be ready

for immediate work when the tree is planted in its permanent position. The ground should also be prepared the previous season, broken up and deeply trenched by hand, if practicable, with the surface-soil left on the top. Next to trenching, the best practice is to dig holes for the trees in autumn. If the trees are to grow to large size, a hole three feet deep and twenty feet across is none too large. The soil should at once be returned to the holes with the surface-soil on the top, unless it is thin and gravelly, when good peat or mould should be thoroughly mixed with it. By planting-time the prepared soil will have firmly settled and small holes can be dug in the centre of the large ones. These should be considerably wider than the spread of the roots. One man should then hold the tree in an erect position while another spreads out the roots in their natural position, when finely pulverized soil should be dropped upon them, and, by a gentle movement of the tree, every cavity about the roots should be filled. It is essential that the soil be brought into close contact with the roots, and when the hole is nearly filled the earth should be trodden down, working from the outside of the hole toward the trunk of the tree. After this, the remaining loam should be thrown in and rammed down solid. No water should be poured about the newly-planted tree, but tall trees should be securely staked to prevent swaying and loosening the roots.

Trees will often survive when planted with less attention to details than is here recommended, but careless tree-planting is wasteful and disappointing. To be reasonably certain of having healthy, vigorous and long-lived trees, the work must be done thoroughly and intelligently. The rules here given are not new, but thousands of trees are lost every year by neglecting them, and they can hardly be repeated too often. We add a few other general directions which every novice should heed. Make a careful study of your ground, and decide exactly where each tree is to be planted before you send your order to the nurseryman. Never buy your trees first and then hunt for a place to put them. Never let the roots of trees, and especially of Conifers, become dry for an instant. It is good practice to dip the roots in thin mud as soon as they are unpacked, and then to keep them covered until the tree is planted. Dry weather and a moist soil are better conditions for transplanting than rainy weather and a water-soaked soil. It is generally a waste of time and money to transplant large trees. A tree with good roots and two or three feet high will soon overtake one that is transplanted when twenty feet high, or more, and will make a more beautiful specimen.

Special cases demand special treatment. Maples, Elms and Lindens, for example, have shallow roots, and larger trees of such species than of the more deeply-rooting kinds can be successfully transplanted. Trees with tap-roots, like Oaks and Hickories, should be planted when very small. Larches should be planted very early, because they are among the first trees to start into growth. It is safest to transplant Tulip-trees and Magnolias just after the buds have started, otherwise their fleshy roots are liable to decay while dormant. As a rule, Conifers can be transplanted later than deciduous trees, because they begin growth later. Better plant one tree well than a hundred without deliberation and care. Even a well-selected and properly planted tree will prove a disappointment if it is neglected.

A considerable share of public attention here has been directed of late to the trees in Central Park, through the efforts of a public-spirited, but in this instance imperfectly instructed, body of citizens, who have formed an organization to look after the interests of the upper part of the city. An expert representing this association has recently made a report concerning the cutting down of the trees in the park, and as this report has been circulated, and as the statements which it contains are calculated to bring discredit on the park officials among persons who are not familiar with the circumstances, it is proper to state that if they have

erred at all in cutting it is in the direction of omission and not of commission. Many of the statements made by the expert of the West Side Association have no foundation in fact. In some cases he has failed to discriminate between the necessary pruning of trees and shrubs and their destruction; and he has made no distinction between the cutting out of dead trees and the cutting down of living ones.

The condition of things in Central Park, so far as the trees are concerned, is this: More trees were properly planted when the park was made than could grow eventually in the space allowed to them. It was intended, of course, that all these superfluous trees should be removed as necessity dictated. But this thinning, which the poor nature of the soil over much of the park made all the more necessary, was neglected for years, and the trees were allowed to grow up huddled together, without sufficient room, light or nourishment. Some native trees died from this cause, as well as many foreign trees which are now known to be unsuited to this climate, and which were planted in large numbers; and dead and dying trees even were allowed to remain to the detriment of more promising neighbors.

Two or three years ago the Superintendent found that a general system of cutting would have to be inaugurated all over the park, or that in a comparatively short time there would be few trees left. He sought and obtained the advice of experts, and proceeded with great caution to the task which public ignorance in such matters, and public clamor have made disagreeable and difficult. The cutting, up to this time has been confined principally to the removal of dead Conifers, particularly Norway Spruces, which are scattered all over the park, and to a few glaring cases of overcrowding about which there could be no possible question as to the propriety of removal. The number of trees which have been cut is large, perhaps, in the aggregate, but no proper impression has been made upon the plantations, and the work has been allowed to languish, probably because the fear of public outcry was too strong for the Commissioners. There are hundreds of good people who cannot be made to understand that an intelligent lover of trees will feel impelled to cut away an offending one whenever its removal will add to the beauty, the health and the longevity of half a dozen others. At the present time dead trees, or trees so nearly dead that a few years more will finish them, are allowed to disfigure the park, and a half-dead, misshapen Spruce, fast pushing really fine and vigorous deciduous trees out of shape is a common sight. Few parts of the park are not disfigured or injured by sickly, misshapen, or diseased trees, and it is the duty of the Commissioners to cause such trees to be removed. What they need is the support and encouragement of the public and the wild assertions which have been made in this city during the past month about destroying the trees in the park will, if they have any effect, retard well-advised and well-considered plans for its improvement.

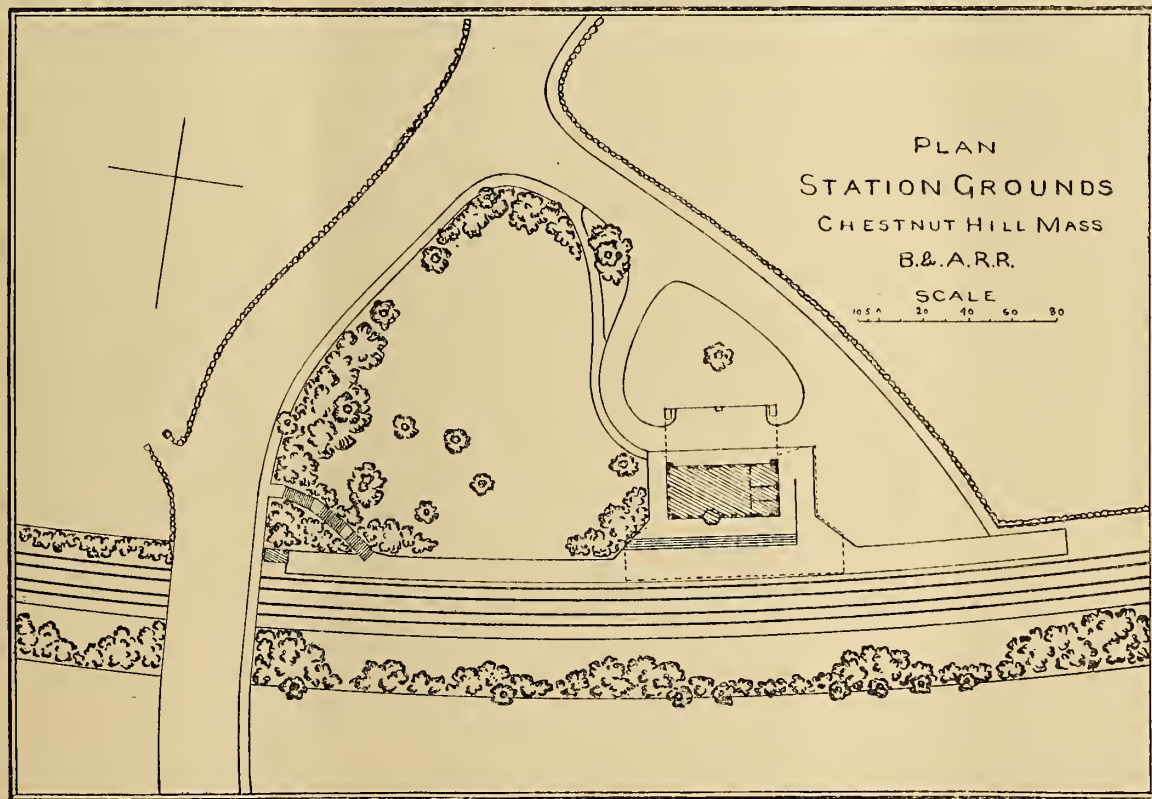
The most important and valuable piece of work performed up to this time by the Board of Forest Commissioners of this state is the preparation of a bill (Senate Bill number 354) which will, if the Commissioners succeed in securing its passage, prevent railroad corporations from obtaining a location over the state-lands now held in the forest-preserve, or which may at any time in the future be joined to it. This is a matter of public importance deserving the careful attention of the members of the Legislature, and the support of all persons interested in the development and prosperity of this state.

The most immediate danger which now threatens the north woods comes from the railroads. A number of projects to extend lines already operated in the wilderness and to build new ones are now on foot; and their promoters are pushing them vigorously. The preservation of any portion of the Adirondack forests is due to their re-

moteness and inaccessibility to railroad communication, for it must be remembered that they are composed largely of hard woods, which cannot be made to float down the streams to the mills. The Pine and Spruce has been cut, or is rapidly disappearing, but the removal of these trees does not destroy the forest, unless fire, fed by the *débris* from the evergreens, is allowed to follow in the track of the lumberman. As long as the hard-wood trees which form probably nine-tenths of the Adirondack forest are not cut and are not allowed to burn up they will continue to perform those services which make these forests valuable to the people of the state. But if railroads penetrate the wilderness, every stick of hard wood which these forests contain will, in a surprisingly short space of time, be brought to market; while the danger of fire will increase in proportion as they are built. Fires will spread from the railroad locations far into the forest, and, as the region becomes more accessible, the number of fires set by hunters, campers and log-cutters will necessarily increase.

ing the White Pine shown in our picture, page 163, a clump of old White Willows, a branch of which is seen near the Pine, and a symmetrical American Beech that stands in the centre of the lawn opposite the carriage entrance. Another American Beech, the leafless form of which shows at the extreme left of the picture, stands in the grounds of a neighboring residence, which, of course, the landscape-gardener took care not to conceal from view. In other directions, as may be seen from the plan below, masses of foliage border the grounds. On the other side of the track, as at Auburndale, is a narrow strip of grass, edged with trees and hardy flowering-shrubs, and everywhere these masses are neither stiffly arranged nor scattered without purpose, but carefully grouped so as to secure variety in unity, interest, grace and harmony.

The extreme size and solidity of the arches which form the porch of the station have been criticized as inappropriate in so small a building. But we may recall what was lately said of Auburndale—a station is essentially a



Plan of the Chestnut Hill Station Grounds—Boston and Albany Railroad.

The creation of railroad lines over private property cannot be prevented, but the state is able to protect its own property, and it is not wise to maintain an administration to protect these forests, and then to give to private corporations the right to destroy them.

The Railroad-station at Chestnut Hill.

THE station at Chestnut Hill, near Boston, like the one at Auburndale, which we recently described, was built by the late H. H. Richardson for the Boston and Albany Railroad Company, and the grounds were laid out by Mr. Frederick Law Olmsted, and are cared for by Mr. E. L. Richardson.

This is perhaps the prettiest and most picturesque of all the great architect's rural stations, nor are its grounds equaled in beauty by any others. The road descends somewhat steeply towards the entrance of the grounds, and then more steeply after they are entered, while the building itself stands a little higher than the tracks, and is connected with them by a flight of steps extending across its whole length. Several fine trees ornament the grounds, includ-

shelter, not a dwelling-place, and its roof is therefore of far more importance in giving it the right expression than its walls. These arches sustaining only a roof, would indeed be inappropriate in a house, but they can be permitted in a station even by the most exacting of purists, if he remembers the true purpose of the design. Nothing could be more beautiful than their vigorous, simple curve, and nothing could be more hospitable and protecting than the air they give the building. Nor is it a misleading air, for the comfort supplied by this great porch in wintry weather can hardly be exaggerated. In judging of these stations, it may be remarked, the same standards cannot be applied that would be justly applied in many other parts of the country. They are small because freight-traffic need not be accommodated; yet their approaches must be capacious and their porches must afford protection to considerable numbers of people at once, as the local passenger-traffic at certain hours of the day is very large. They are suburban stations, and everyone knows what that means in the neighborhood of a busy American city. And for the same reason it was appropriate to build them in a more costly manner than might have been wise in a really rural stopping-place. In this station, again, Richardson used granite

for the walls, Longmeadow sandstone for the trimmings, and slate for the roof. The treatment is as simple yet artistic, inside and outside the building, as we found it at Auburndale, but the waiting-rooms are wainscotted in wood instead of brick. In this case the conformation of the ground made it better to carry the pathway close to the walls rather than allow a space for planting between. Otherwise the path would have had to ascend the slope and descend it again at an inconveniently steep angle. But this conformation of the ground hides the path from many points of view and allows the walls to look as though they sprang directly from the plantations—an effect that will be increased at the spot shown in the picture by additional shrubberies which are to be set out this spring.

The business standpoint is not the highest from which to advocate the furtherance and development of good art. Yet it is a standpoint which few persons can wholly ignore, and least of all a railroad company, the directors of which are the custodians of its stockholders' interests. It is worth while, therefore, to ask, Could there be a better advertisement for a suburban neighborhood than a station and grounds like these? They imply refinement, good taste and a regard for the amenities of life in the local community. They predict that the company which has provided them will care for its patrons' comfort in other directions too. And they promise that those moments of detention which are a daily factor in the business man's existence will not mean that purgatory of impatience, disgust, and even physical distress which in most places they have meant for so many years to thousands of long-suffering Americans. It is not too much to say that these stations of the Boston and Albany Railroad, taking buildings and grounds together, are the best of their class in the world; and the company which was wise enough to build them has found them a good business investment.

New or Little Known Plants.

Calochortus Obispoensis.*

THE Mariposaes, or "butterflies," of California well merit this name given to them by the Spanish settlers. Scattered here and there over the hillsides, with their wing-like petals of very diverse hues and patterns broadly expanded, they appear in truth like so many butterflies hovering in the sunlight over the low weeds and bushes among which they grow. One of the most bizarre of the many species and varieties is the *Calochortus Obispoensis*, which was discovered by Mr. J. G. Lemmon, the well-known adventurous and successful collector of California, in 1886, on dry, stony hills eastward of San Luis Obispo. Its general habit and character are shown by our illustration, page 161—the deep-seated, fibrous-coated bulb, which is very dark-colored; the sparingly branched stem a foot or two high, as usual in the genus, with narrow convolute leaves and conspicuous flower. Of their coloring, however, no idea can be given in the figure. The sepals themselves are unusually strongly colored on the inner surface with orange and purplish brown upon a greenish-yellow ground. The petals are remarkable in not having the ordinary broad, fan-like form, but are shorter than the sepals and not much dilated, terminating quite abruptly and often cleft at the summit. The ground color is lemon-yellow, deepening to orange toward the base, and becoming brownish-red at the apex, the effect of which is heightened by a dense covering of long delicate hairs of the same or somewhat darker hues. Near the base is the usual roundish pit or nectary, which is margined by a dense fringe of long orange-colored hairs converging together over it. The erect filaments and anthers are of different shades of orange, the upper part of the filament being often tinged with purple. The whole combination is very peculiar and striking.

S. W.

* CALOCHORTUS OBISPOENSIS, Lemmon. *Bot. Gazette*, xi., 180.

Foreign Correspondence.

London Letter.

LAST summer in England was a bad one for most plants. Our indoor collection of Nymphæas made few new tubers through lack of proper summer weather, and these few are small. We keep them moist all winter, as we keep Caladiums, Arisæmas, and indeed all deciduous or tuberous Aroids. They winter better when kept moist. Thousands of such plants as Caladiums are annually sacrificed to dry treatment. The tuberous Begonias keep best in dry sand or cocoa-nut fibre. To know what requires a dry rest and what must have moisture at all times is of great importance. For instance, one finds the greatest difficulty in making young men understand that whilst Hippeastrums and some Crinum must be kept absolutely dry all winter, Vallotas, Nerines, Brunsvigias and other Crinums must be kept moist. The watering-pot is the greatest friend the bulb-dealer has.

Poppies are now great favorites as garden flowers, but it is not many years since all such plants were rooted up from the garden as noxious weeds. A few here and there, and these invariably the exotic species, might be seen, but they were not popular. In the fields in autumn the great blaze of scarlet Poppy is a picture scarcely to be excelled anywhere. Some great traveler, Wallace I believe it was, has stated that not in any part of the tropical world had he ever beheld anything half so glorious as an English field of scarlet Poppy or a wood carpeted with Blue-bells. We have taken a leaf out of the book of the Chinese and Japanese gardener so far as regards our native Poppy (*P. Rhæas*) and we have as the result of a very few years' cultivation and selection a most beautiful strain of what in itself is a grand Poppy. By "we" I mean the secretary of the Royal Horticultural Society, the Rev. W. Wilks, whose Shirley Poppies are now in great demand, on account of their clear and rich tints. Nine years ago Mr. Wilks noticed in his garden a common field Poppy with a white-edged flower. From seeds saved from this plant he obtained varieties with more white in the flower, and others of a uniform pale color. By careful selection he succeeded in fixing the most distinct and attractive shades, and the Shirley Poppies are now available for every garden. The colors range from pure white through pink to glowing scarlet, minus the blotch of black at the bottom of the petals, a conspicuous character in the type. Some are red with white edges, others white with red edges. Singularly enough I brought seeds from South Africa two years ago which were said to be gathered from wild plants, and these produced flowers of *P. Rhæas* with bilobed petals, which were white with red edges. It is surprising that a plant which appears to have been unaltered in a wild state, during thousands of years, should have broken away from its color characters so readily under good cultivation and selection as has *P. Rhæas* in the hands of Mr. Wilks.

Hippeastrums are fast developing their flowers, about a week's clear weather being all that is needed to bring the majority of the kinds into full blow. Messrs. Veitch and Mr. B. S. Williams are the most famous workers at the improvement of these plants as garden flowers. Dean Herbert, greatest of bulb-mongers, raised many hybrids and seedlings, and Mr. James Douglas has been very successful in obtaining improved forms. The prices paid for good kinds of Hippeastrum are almost as high as the best Orchids fetch. Veitch and De Graaf, of Leiden, have been most successful in breeding large-flowered, clear-colored, well-shaped varieties, whilst Williams has paid more attention to form and color with medium size. Some of the latter are charming plants, without any coarseness, and perfect in color. I note one, a new seedling, named J. R. Pitcher, raised from a deep red-flowered kind, crossed with Mrs. Lee. The flower is medium in size, a perfect trumpet in shape, and the color deep crimson, with darker veins, the throat being almost maroon. Hippeastrums have become very popular here. The only defect in these highly-bred kinds is in their supposed weak constitutions; although the raisers have no difficulty in keeping the best of their productions from year to year. Coburgias are also in bloom now. These and the Stenomessons are of the choicest and most interesting of garden Amaryllids, but they are rarely met with. They are all Andean, and require the same treatment as the Hippeastrums, which they resemble in leaf and scape, but the flowers are long, tubular, drooping, with the limb about one and a half inches across. *C. luteo-viridis*, with flowers lemon-yellow shot with green, and *C. incarnata*, with rosy red, green-tipped flowers, are both in flower at Kew.

Growers of fruit trees, such as Apples and Pears, are paying particular attention to the selection of the most suitable stock for grafting the different kinds upon. Valuable statistics on



Fig. 101.—*Calochortus Obispoensis*.—See page 160.

this question were collected and published by the Royal Horticultural Society in their Reports of the Apple and Pear Conferences held at Chiswick several years ago. Exhibitors were required to state with each kind of fruit shown the nature of the soil upon which it had been grown and the kind of stock used. The general opinion was greatly in favor of the Paradise and Quince stocks. Mr. G. Bunyard, of Kent, a most successful grower of fruit and fruit-trees for market, has

recently discussed this question, and as his opinions on a subject interesting to your readers may be valuable, I quote them: "Now, I maintain that it stands to reason and common sense, that surface roots must receive the benefit of the rains, sun and air more than the anchor roots, which are, by reason of their position, more removed from such benign influence; and the teaching of fact in this case follows out the leading of logic, and we find by experience that Pears grafted upon the

Quince stock and Apples upon the Paradise can, do, and will produce handsome, clean, well-colored and full-flavored fruit, even in adverse summers, whilst in more propitious seasons the quality is super-excellent, and still proves our theory." The wild Pear stock, with its strong roots and few fibres, and the Crab-Apple stock, equally coarse-rooted, are used for trees intended for orchards, but they will not bear comparison with those recommended in the production of large crops and fine fruit in a short time.

'That those who plant Pears grow fruit for their heirs,
Is a maxim our grandfathers knew;
But folks have learnt since, if you graft on the Quince,
The fruit will develop for you.'

A few days' sunshine would transform our Orchid-houses into paradises, but we must wait till April for the great flush. *Cypripedium Elliottianum* is now in bloom, and proves even better than my description of it a few weeks ago; *Odontoglossum Edwardii* bears its tall, branched spikes of purplish flowers, the nearest approach to true blue in an *Odontoglossum*; *Angracum citratum*, with the most charming little wreath-like spikes of creamy-white flowers; *Arides Vandarum*, truly a "thin" Orchid, although its pure white, curiously formed, large flowers are both interesting and pretty; *Dendrobium Ainsworthii* and its second, *D. Leechianum*, the handsomest of all hybrid *Dendrobiums*, and taking rank with the best of the genus; *Calogyne cristata Lemoniana*, and the pure white form, a pearl of snowy whiteness, and the new *Phalanopsis gloriosa*. These are the pick of what are in bloom now. I have recently seen some magnificent examples of *Dendrobium* which had all their old pseudo-bulbs cut away last spring and were apparently a great deal stronger for it. Pruning appears to be good for most of the strong growing *Dendrobiums*; at any rate I have seen it practiced on about a dozen kinds, which made stronger growth the season after. The rare and beautiful *D. Phalanopsis* apparently prunes itself, the pseudo-bulbs dying at the base the year after flowering. By fastening these to rafts of Sphagnum they are induced to develop offsets, and thus out of what looks like an evil, good may come.

Kew, March 9th.

W. Watson.

Cultural Department.

Orchard Notes.

Hints on Grafting.—Any good whittler can make a scion live. But making a scion live is the smaller part of grafting when one operates on large trees. To secure a new top of good shape and proportions, which shall be easy of access, is a difficult matter. If one attempts to get the head very low, in order to make it convenient, he usually grafts too large limbs and sacrifices too many important branches. If, on the other hand, he aims to graft small limbs he generally makes a top which will be almost inaccessible—a series of what are called "mules' tails," long, naked branches with a bush on the end of each. That grafting is best which modifies the original shape of the tree the least. Stand at a distance from the tree and form an accurate idea of the shape the new top should assume. Then cut the main "stubs" at about the same distance from the body of the tree, using small limbs—say one inch in diameter—and many of them. Then fill in the top with "stubs" along the sides of the main limbs, in such positions that the symmetry of the head will be maintained and supports for the picker's feet will be secured. Use a great number of scions. Part of them may need to be cut out, perhaps one in nearly every "stub," as the new top becomes thick, but if the thinning is properly done good results will follow.

Shall we Whitewash Fruit-trees?—There are several reasons given for the practice. One man would whitewash to stop up the pores in the bark, that disease may not enter. But really the bark on the trunks of trees has no pores. Another whitewashes to protect the trunks from the hot sun—a wholly imaginary benefit. But the greater number whitewash without any reason. Something must be done to the trees, and whitewash is as cheap, handy and conspicuous as anything. Others whitewash to kill insects, and in this there is apparently some reason. But there are better washes for this purpose. The soap or caustic soda washes, with a slight addition of carbolic acid, are better. And if it is desired to soften up the bark on young and slow-growing trees—and this is often the chief benefit of a wash—whitewashes are of little avail.

Peach Yellows.—Yellows and yellowness should not be confounded. Yellows is a disease; yellowness is a condition. Yellowness may be due to poor soil, poor culture, borers, hard winters. It is amenable to treatment. Yellows is wholly different. It is communicable and does not submit to treatment. It has no relation whatever to soil-exhaustion or

methods of culture. I have lost a whole orchard upon new ground. I have seen orchards set upon virgin soil die with yellows. One who has had wide experience with the disease cannot hold to the soil-exhaustion notion, if he is an honest observer. Prompt and radical removal of diseased trees will keep the disease in check. No other course has been successful. This has. No consideration should allow of dallying. It is time to stop quarreling about the cause of yellows, and check the evil by vigorous concert of action. The investigation of the yellows is one of the things which Peach-growers should demand of experiment stations.

Protection for Young Trees.—This is often needed, particularly on the surface of the soil, and for several reasons: To prevent soil from freezing too deeply; to prevent heaving; to prevent too great drying of the surface by winter winds; to keep trees from swaying in soft weather and forming funnels about the base which collect water. A mound of earth about the tree is good. Some mulch, in which mice will not nest, is good. Snow is excellent when it can be held. To hold it, dump a load of manure in a pile on the windward side of the tree, three or four feet from it. Snow will drift over the pile and persist about the tree.

Longevity of Trees.—Complaint is made that Apple and Peach-trees are shorter lived than formerly. It is probably true. It would be strange if it were not. High culture forces and develops a tree prematurely, as compared with natural growth, and stimulates production. This is, no doubt, in some measure at the expense of long life. But there is no occasion for lamenting the fact. Short life and much fruit is better than long life with the same amount of fruit. When trees begin to decline, cut them down. Younger ones are more profitable. A Peach-tree is seldom profitable after twelve years old, and a Plum-tree after fifteen or twenty.

Cornell University.

L. H. Bailey.

Vineyard Notes and Studies.

BY the third spring after planting the vine will have growth enough to need the trellis. Remove all canes but the best one; prune this to three feet long and tie it to the wire. It may make what growth it will during the summer. Some vine-dressers, thinking that nature may be helped by art, practice "summer-pruning." It is needless and noxious. If one will try summer-pruning for a few years, and also leave a row of vines untouched, he will need no argument to convince him that to summer-prune a Grape vine is to do worse than waste time. Late next autumn the pruner may begin to shape the vine for growth on the trellis. Taking two of the branches grown from the main stem, as near as may be at the height of the wire, shorten them to six buds each. These branches will be made fast to the wire, and the vine when pruned will resemble a capital T. A few spurs, with one bud each, may be left near the crotch to grow renewal canes for next year. On the arms of the T not more than six buds should be left, because not more than six buds will grow. The vine always tends to push toward its extremities. If nine buds be left on a branch, the six nearest its end will start and the three next the trunk will probably remain dormant. In training the vine one must take care that it does not get beyond control. We often see vines with a long stretch of bare and unfruitful cane, a common result of stupidity in pruning. It is easy to keep the vine within bounds, maintaining growth of new wood and fruitfulness near its trunk. In pruning the vine for another year the canes which were made fast to the wire may be cut out and new canes from the spurs left near its middle may be laid on the wire. This is the "renewal system" of pruning, and suitable for varieties of the *Labrusca* family.

A Grape vine thus pruned will seem to have small chance left to bear fruit, but it must be remembered that each bud will form three or four clusters of Grapes, which should weigh about a pound each. Supposing twelve buds be left on the arms, and, say, six buds on spurs about the main stem; these eighteen buds may be counted on to set fifty-four clusters of fruit; too many for the vine, in vineyard culture, to carry.

The renewal system of pruning will not suit vines of the *Riparia* class. These must be pruned on the "spur system," and must be allowed to gradually extend themselves. The Clinton, the Oporto, the Ironclad will fruit best when pruned to spurs. The main arm may be gradually prolonged to one hundred feet in length. For some years I have had the fruit from a *Riparia* vine which stretches several arms more than a hundred feet each in length, and which yields yearly several hundred pounds of fruit. The *Riparia* vines should be pruned in autumn. If cut in February the vines will bleed, and the buds upon the spurs will not grow.

Anything more than general hints on the principles of vine-pruning is useless. To learn to do this well one must do it for some years, and notice results of his work. If he have the gift of observation and the capacity to learn from it he can prune vines intelligently. If he does not learn thus he never will. It is rare to find a good hand at vine-pruning. A poor one is worse than none.

The results of judicious pruning and training, on such a trellis as described (page 136), will be that in a few years the vine (of the *Labrusca* Grape, at least) will be fitted to stand alone, needing no trellis support. Thus, a considerable expense per acre is saved, and, with Grapes at ten dollars a ton, there will be less loss in their production.

When planting the more tender Lilies, it is advisable to prepare a bed and arrange each kind according to its height, and in fall, when they have died down, place a frame over the bed, fill with dry leaves and cover with shutters. In this way all the tender kinds, including those from California and *L. longiflorum*, *L. Harrisii*, *L. giganteum*, *L. Brownii* and choice varieties of *L. auratum*, may be wintered with safety.

Plants that need division (and many kinds thrive better when periodically lifted), such as the tall Phlox, Day Lilies, *Iris Kämpferi* and *I. Germanica*, should be taken up and divided with a sharp knife. The soil should be enriched before replanting, for such plants are gross feeders. Delphiniums, to succeed well, need a moist soil. If the soil is sandy, and liable



Chestnut Hill Station, Boston and Albany Railroad.—See page 159.

For the *Riparia* vines a trellis is necessary, or they may climb over trees. They demand room to spread themselves, and then will produce liberally. The flowers of the *Riparia* vines have reflexed stamens, and seem to be benefited by pollenization from other sorts, although I cannot understand why.

Vineland, N. J.

A. W. Pearson.

The Flower Garden.

THE month of April should be a busy time among hardy, herbaceous plants. All dead foliage should be removed and a light top-dressing of well-decayed manure or leaf-mould applied and lightly forked in; care should be taken, however, not to fork where bulbs are planted. Any additions to the hardy plant-border should be made as soon as possible, and this is especially advisable in the case of all kinds of Lilies, for if these are not planted, early root-growth commences, and the prospect of good flowers the first season is not promising.

to dry out in summer, even heavier soil, as clay, should be added. With this treatment even the best double kinds will thrive and be perennial. Choice Alpines, such as *Androsaces*, *Gentiana excisa*, *G. verna*, *G. aculis*, *Dianthus glacialis*, *D. neglectus* and *Arabis Androsace*, should be examined. They will probably be lifted by the action of frost. When such is the case, make them firm, and place a little fresh soil on the surface, and if pieces of porous stone be placed round the plants they will not be liable to injury from heavy rains or dry spells. Hellebores are becoming popular, owing to their season of flowering. These are deep-rooting and need to be planted where they will be sheltered from direct sunshine. We find them succeed best when planted in this way, and when the ground is dug deep and lightened with plenty of leaf-mould. Any bare, dry places should be planted with *Pyrethrum Tschischewii*. This will form a nice carpet even on a dry bank; and for shady places, such as under trees, where grass will not succeed, *Vinca minor* and its varieties may be used, and when planted a foot apart a good covering will be the result the first

season. Such perennials as may have been raised from seed, should, when large enough to handle, be pricked out in pots, and when well rooted be planted in their permanent positions. Seedlings of many kinds when treated in this way flower well the first year.

Passaic, N. J.

E. O. Orpet.

Orchid Notes.

Lælia bella.—This is the most magnificent hybrid yet produced, combining the excellent qualities of *Cattleya labiata vera* and *Lælia purpurata*, both of these being the best representatives of their respective genera. In richness of color it is far superior to both. The habit and general appearance of the plant greatly resembles *C. labiata*, but the bulbs are more slender and the leaves longer and narrower. The flowers are about nine inches across, and of a uniform rosy purple. The large handsome lip is a rich amethyst purple, deepening to a much darker shade towards the front, while the orange throat is beautifully penciled with crimson. They exhale a delightful primrose fragrance. This very rare hybrid first flowered with the raisers, Messrs. Veitch & Sons, in 1884, and I believe only two plants are as yet in this country.

In strong contrast to the foregoing is the pretty dwarf-growing *L. Lindleyana*, a plant seldom seen, and which is probably somewhat rare in its native habitat in southern Brazil. The slender bulbs usually have two very thick, leathery and narrow leaves, light green and dotted with purple. The short peduncle bears 3-4 flowers about four inches across, with narrow, pure white segments, blotched and spotted with rosy purple, the front lobe of the lip being of the same color. This plant does well in an intermediate temperature, and thrives best in a basket with very little soil about the roots, enjoying abundance of water during the growing season.

Another *Lælia* from the same region as the preceding, and now in full bloom is *L. harpophylla*. This Orchid was, until the last few years, very rare, but large importations have now rendered it within the reach of all. It is a very showy plant, producing from the apex of its slender stems clusters of some half dozen orange-scarlet flowers. These are about two inches across, with narrow segments. The long, narrow, front lobe of the lip is recurved, edged with white, and has a very crisp margin. This Orchid will be found very useful for cutting purposes, and a few plants of it with its rare and showy color assist greatly in brightening the more sober tints of its congeners. It requires about the same treatment as *L. Lindleyana*, except that it is more suitable for pot culture, and should be constantly syringed, as it is somewhat subject to the attacks of yellow thrips.

Lælia Pitcheriana is another garden hybrid, now prettily in bloom. It is the result of crossing *Lælia Perrinii* with *Cattleya crispa*. The character of its growth is intermediate between these two, but the flowers are very much like those of the *Cattleya*. They are of wavy outline, white, flushed with rose, and the lip is white with a large purplish blotch on the anterior lobe. The variety *Alba* (also in flower) is devoid of this blotch on the lip. This plant grows freely with us among the general collection. It is still very rare, although it was first flowered in 1868.

Angracum cryptodon.—This rare plant resembles in habit and foliage *A. Sanderianum*, producing a loose raceme about one foot long, bearing about a score of flowers. The narrow sepals are of cinnamon color, terminating in a spur of the same color about three inches long, the broader petals and ovoid lip being pure white. This peculiar combination of color renders the Orchid very interesting as well as attractive. It is a native of Madagascar, and like other species from that country luxuriates in strong heat, with a maximum of moisture, and it may be grown in a basket filled with charcoal and moss.

Cochlioda (*Odontoglossum*) *rosea* is an attractive little Peruvian Orchid, with drooping racemes, which bear a score of rosy, carmine flowers about one inch across, the top of the column being white. It grows in dense masses, and bears abundant flowers, which last a long time. The cool-house suits it best, with a liberal supply of water at all seasons.

Kenwood, N. Y.

F. Goldring.

Propagating the Weeping Sophora.—It is well known to nurserymen and landscape-gardeners that no adequate supply of good, clean specimens of this beautiful and useful weeping tree has yet been accessible, and the sole reason for its scarcity has been the difficulty of getting straight and smooth stems of sufficient height upon which to graft the drooping variety. No trouble whatever is met in grafting or in getting a strong growth of the top, when once a stem tall enough to use is se-

cured. We have learned, by accident, as many such useful things are learned, to produce tall, clean, unbranched stems, of six to nine feet, in one season, at little expense, by the following method: The *Sophora*, like most Japanese plants, loves a moist atmosphere, and will grow extremely fast in a close, moist place. In spring, after the green-houses are emptied, plant dormant *Sophoras*, about three-fourths of an inch in diameter, in the earth-bottom of the house, which should be made fairly rich. Cut them back to the crown and set them one foot apart each way, and by December 1st they will be out of the top of the house, and as smooth as willows. Then lift and keep them protected in a cellar or frame, or heel them deep in a well-drained place till spring, when they can be planted in nursery rows and grafted at the same time, with most gratifying results.

Cambridge, Mass.

F. L. Temple.

Plant Notes.

Cytisus capitatus.—This charming little compact-habited bush, with its dull green, hairy, trifoliate leaves and terminal corymbs of yellow flowers, has attracted the notice of some continental nurserymen who have worked it on tall stems and exported it to England under the name of *Cytisus nigricans nana*. *C. nigricans* is a taller-growing plant, with long, erect racemes. *C. capitatus* is found wild in some of the mountain districts of southern France, Switzerland and in central and eastern Europe. It flowers in England from July onwards, and, according to Loudon, was first introduced to cultivation in 1774.

Genista virgata.—One of the most beautiful of all the showy leguminous shrubs in the Kew Arboretum is, without doubt, the subject of this note. Although a native of Madeira, it seems with us quite as hardy as our native Broom (*Cytisus scoparius*). In spite of its merit the species is far from common; it has small leaves and slender branchlets, every one of which is terminated in July with an upright, golden raceme. There are numerous old specimens at Kew from six to eight or ten feet high and as much through, and these must have successfully passed through many winters which left their mark on not a few of our indigenous trees and shrubs. In some gardens *G. virgata* is cultivated under the name of *G. elata*, which really represents a widely different plant, and is nothing more than a vigorous form of the European *G. tinctoria*, a pretty perennial with a woody base.

Royal Gardens, Kew.

G. Nicholson.

Principles of Physiological Botany as Applied to Horticulture and Forestry.

XIV.—REPRODUCTION IN THE HIGHER PLANTS.

BY means of the multiplication of cells and their increase in size, all growth takes place in the vegetable kingdom. This process of growth can take place, under certain conditions, in parts which have been completely separated from the plant, for instance, as cuttings, tubers and many other underground structures. Moreover, as is well known, it is possible to transfer certain separated parts to other plants with which they unite, after which, both the stock and scion, continue to grow as one. That which is common to the growth of such separated parts, whether they are placed in the ground, as in the case of cuttings, or grafted or budded on some other plant, is this: all the individual peculiarities of the parent plant from which the fragment was derived, are perpetuated with little or no change. In other words, all these fragments have carried their ancestral peculiarities with them, and, as the cells of which their buds are composed multiply and increase in size, they obey all the traditions of their parentage. Hence, in general, propagation by means of buds is a sure way to continue the cultivation of a special variety, and for this reason we perpetuate our choice varieties of fruits preferably by grafting or budding. We recognize the fact that with the planting of the seed we are very likely to obtain some deviation from the straight line in which the desirable variety has come down to us.

It must not be thought, however, that there can be no variation in propagation by buds. It occasionally, though rarely, happens that a bud or a shoot will manifest a capricious divergence from the ancestral traits; and, what is harder still to understand, in some cases the scion may be affected by the stock on which it is grafted. In still others, however, it may affect the stock. But these cases are exceptional in the highest degree, and do not invalidate to any extent the general statement that the bud is relied upon to keep the variety true, while it is to the seed that we look for variation.

It is necessary that we should now glance at the structure and the office of the flower; that mechanism by which in the plants which are called the *higher*, seeds are produced.

THE FLOWER, for instance, in the case of flax, consists essentially of a branch with leaves arranged in definite order, but all so changed in their character that they are readily distinguished from ordinary foliage leaves. With the exception of the outer circle of floral organs (which are frequently much like green leaves), the parts of the flower are of very delicate texture and possess some color unlike that of the outer row. Within the highly-colored crown, or corolla, of the flower, we come to the male organs of the blossom, known as *stamens*, which consist of slender threads, each bearing at its summit a minute sac filled with the fine grains of *pollen* or fertilizing dust, by which the *ovules* (delicate roundish bodies in the central organ of the flower) are to be impregnated. The central organ, termed the *pistil*, bears the ovules in a closed case, known as the *ovary*, which is surmounted by a thread-like prolongation at the summit of which is the *stigma*, a receptive sticky surface to which the pollen clings.

The pollen, or male element of flowering plants, consists of microscopic grains which vary considerably in size, shape and sculpturing of the surface. The forms and markings in a few instances are so characteristic that they may be employed for distinguishing large groups of plants, but in general the grains are merely round or ovoid, and have no very distinguishing features. Pollen grains are either simple or compound, the latter sort found in comparatively few species. One of the most interesting forms of clustering of grains is found in the milk-weeds and in the Orchid family, some of their clusters being provided with minute stalks and sticky discs, by which they can be carried by insects from one flower to another.

A vast amount of pollen shed by some of our forest trees and shrubs is scattered far and wide by the wind, borne, one may say, at random, with only the merest chance of any of it falling on the female flowers of the same species. And yet, as matter of fact, it is waste with good results; for out of the prodigality successful fertilization is secured. It is a familiar fact that the amount of pollen collecting on the shores of our northern lakes is so great as to attract attention from the sulphur-yellow color which it imparts to the water. With the pollen grains which collect on the shores there are generally commingled the spores of some of our lower plants, notably those of Lycopodium, or Christmas evergreen. These spores are enveloped in a delicate film of resinous matter, which makes them water-proof for a long time, and causes them to burn with a flash when they are brought into contact with flame. In this way they can be distinguished from the pollen with which they are mixed.

At the opening of a flower, the pollen, borne in some way, either by the wind or by insects, reaches the sticky stigma, to which it adheres. After a variable time, there protrudes from the pollen-grain a microscopic tube, containing protoplasm or living matter. This tube descends through the style to the cavity of the ovary, where it comes into contact with the ovule. For every ovule, there is supposed to be required, at least in nearly all cases, one pollen tube. The ovule possesses an intricate structure which, in its simplest form, may be said to be a sort of minute vegetable egg (in fact, the word *ovule* means this very thing), containing in one part a cell somewhat larger than those surrounding it. This larger cell contains, as do the other smaller ones, protoplasm or living matter, but the protoplasm in this larger cell presents certain peculiarities of form which need not be further described. It is sufficient to say that one part of this protoplasm becomes affected in a remarkable manner by the protoplasm in the pollen tube, and, as a result of this action, the former begins to divide and subdivide, the other cells of the ovule undergoing changes, but of a less remarkable character. The dividing contents of the large cell of the ovule become sooner or later distinguishable as forming the embryo or germ, and associated with this is a certain adequate amount of food, all being enclosed in the hardening ovular coats, which become the integuments of the seed.

Unless the ovular protoplasm is acted upon by the contents of the pollen tube, the globular body withers away and comes to nothing. Contact of these two diverse elements is requisite to the formation of the germ within the seed. There are a few anomalous cases known as those of *parthenogenesis*, in which germs appear to be produced without the action of pollen, but these are so very exceptional that they may be disregarded in the present treatment of the matter.

After the seed begins to ripen, concomitant changes take place in the ovary, the whole ripening into the fruit. The fruit may be defined as the ripened ovary; the seed may be called

the ripened ovule. In the ripening of the fruit there is generally more or less change in the neighboring parts, and these modified parts may become conjoined to make what is popularly called the fruit. For instance, the Strawberry consists of a thickened pulpy stalk, which has acquired sweetness and a delicious flavor. Upon this rounded or conical fruit-stalk are borne numerous ripened ovaries, which seem so much like seeds that until one cuts them open he is unwilling to believe that each is a fruit-case holding a seed.

Ripened seeds and fruits bear some curious relations to each other. For instance, it is rare to find any ovary containing more than a couple of seeds, which is incapable of opening and discharging some of its seeds. On the other hand, fruits which have only one or two seeds are very apt to remain closed even when they are "dead ripe." The bearings of these relations on the manner of dissemination can be easily thought out by any observant person who will note the different sorts of fruits and the numerous contrivances which they possess for distributing their seeds. In connection with this it should be said that one-seeded fruits are often furnished with some means for dissemination, such as by wings, plumes, hairs, hooks, claws and the like.

If one were to examine the flowers of our common forest trees in the hope of finding such flowers as we have described in the case of the flax, he would be disappointed. A few have showy blossoms, like the Magnolia, Tulip-tree, and Catalpa, and, among shrubs, Rhododendron, Azalea, and so on, but these are exceptions. Most of our trees have flowers which are very much reduced in numerous particulars, but all of them agree in this: that they contain either the male organs, the pollen-bearing stamens, or else the female organs, the pistils with their ovules, or in very many cases, both of these in the same flower. But the flowers of trees at the North are, as a rule, brought down to very narrow limits as regards color and complexity. Nevertheless, since they possess the essential elements of the flower, they can produce seeds with germs, and hence carry on that form of reproduction by which variation is introduced into the line of succession.

In conclusion, it may be said that a seed is an embryo plant, supplied with a sufficient store of food and provided with a protecting case. It has also been given some means by which it may be carried to some distance from the parent plant, thus lessening competition.

Cambridge, Mass.

George Lincoln Goodale.

The Forest.

Forestry in California.

THE following extract is taken from the last report of the California State Board of Forestry. The report was prepared, we believe, by Mr. Abbot Kinney, of whose efficient services the state has recently been deprived:

The debris of the hydraulic mines in this state is infinitesimal and harmless in its damages compared to what must occur if the high Sierras are unduly denuded of their forest covering. In such case the rains must flow off more rapidly and the snows melt more suddenly than at present. Thus the perennial value of the streams for irrigation must diminish, and sudden and destructive floods are certain to occur. The histories of such countries as Palestine, Persia, Greece, North Africa, Spain and the south of France demonstrate the results of unwise forest extinction, especially upon the mountains. That California will prove no exception to the rule is shown by the instances of the diminution of springs and streams, and by the formation of torrents in this state due to forest destruction, collected and presented with time, place and witnesses in our last report. Now that these mountain water-sheds in forests so important to the irrigators, farmers and consequently to all persons in the state have generally passed into private hands, there seems but one way left to deal with the question. This way is by education of the people, to demonstrate that a wasteful and unscientific destruction of forests upon certain critical points of important water-sheds, while temporarily beneficial in a gain of a few thousand dollars to some individuals, threatens the loss of millions of dollars of property to others. Thus the carelessness or improvidence in the mountains of one man may destroy the property and means of livelihood of thousands of his fellow citizens in the valleys below. This point established, legislation in the line of the forestry laws of other experienced and civilized countries can be had. We will then have a reasonable regulation of lumbering methods, upon important water-sheds of the state, with a view of preserving the integrity of our springs and streams for the pro-

ductive interests of the state. No doubt a cause of action would lay against any one who by such use of his own forest property did damage to his neighbors, either by diminishing their water-supply or by so suddenly augmenting it in the form of torrents as to destroy their property. Such remedy will be the state's last resort, and can only be relied on after great damage has been done. Wise measures should prevent such serious injuries to the people. The active attention of the Board has been given not only to the preservation of our forests, but also to the planting of trees for economic and ornamental purposes. Our native trees have been too much neglected, but with the exception of the Monterey Pine they are generally of slow growth, especially in dry situations. The foreign trees introduced have disadvantages in most cases, and that extraordinary grower, the Blue Gum, of Tasmania, is not capable of supporting the frosts of many of our interior points, nor the excessive drought of others. It happens that the very places where trees would be of the greatest advantage are those where the trees usually relied on for planting will not succeed or do but poorly. The Board has endeavored to remedy this condition by the introduction of other trees suited to the more difficult climates of the state. After extensive correspondence, the Board felt justified in recommending several trees as being better able to resist excessive drought and to grow with reasonable rapidity than any we had hitherto tried. The trees recommended were the Locust, Catalpa, *Eucalyptus viminalis* or Manna Gum, the *Eucalyptus leucoxylon* or Blue Gum of South Australia, and the *Eucalyptus corynocalyx* or Sugar Gum. Taking all things into consideration, the last is probably the best. Our recommendations were largely based on the experiments of the forest department of South Australia, under the able direction of Mr. J. Edine Brown. His department has planted a number of stations with trees in the dry interior of Australia, where the climatic conditions bear a close resemblance to those in the drier portion of our state. While in these extreme stations the Blue Gum of Tasmania (*E. globulus*) did not do well, the other trees named flourished beyond expectation. These trees and even their seeds were not to be had in this state. The Board, therefore, imported seeds from Australia, and distributed them free throughout the state. Many successful plantations are the result. No tree has been found to grow more rapidly in situations suited to it than the common Blue Gum. Experiments by a member of the Board show, however, that there are other trees not very inferior in this respect, while much more valuable in other qualities. Two trees planted from the pot, six inches high, in the middle of August, a year ago, at Santa Monica, nineteen months from the seeds and fourteen months from the transplanting, are now respectively fourteen feet six and a half inches and fourteen feet six and three-quarters inches in height. One of these trees is a *Eucalyptus corynocalyx* (Sugar Gum) and the tallest a *Eucalyptus viminalis* (Manna Gum). A tree of the *E. gomphocephala* (Tooart Gum) of the same planting is fourteen feet one inch high. It must be said, however, that the soil and climate of Santa Monica are especially favorable to almost all forest trees.

Periodical Literature.

Professor L. Wittmack, of the Landwirthschaftliche Hochschule at Berlin, has recently contributed to the *Berichte der deutschen botanischen Gesellschaft* an important paper on "Die Heimath der Bohnen und der Kurbisse" (The Home of the Bean and the Pumpkin). He says that as early as the year 1879 he expressed the opinion that the Garden Bean of Europe (*Phaseolus vulgaris*) was not of Old World origin, but came from the New World, the remains from the ancient Peruvian mummies brought from the necropolis at Ancon by Drs. Reiss and Stübel, entrusted to him for identification, having led him to that belief. Later, in the meeting of naturalists at Danzig, and before the Agriculturists' Club at Berlin, he had spoken more positively. He had at the same time endeavored to point out that what the ancients had called *Phaseolus*, *Faseolus*, etc., was in all probability a sort of *Dolichos*, and Professor Körnicke had, in consequence, further shown that it was *Dolichos Sinensis*, or a variety of the same, *D. melanophthalmos*. Professor Wittmack further observed that the word *frizol* or *frisol*, from which the Spanish *frijol*, the German *fisolen*, etc., had come, was an American word, and, according to Reiss, was of West Indian origin; unfortunately, it had an accidental resemblance to the Greek and Latin *phaseolus* in sound.

Alphonse De Candolle had shown that *Phaseolus vulgaris* had no Sanskrit name, and therefore its origin must be in western Asia, but there it had never been found. It is, there-

fore, almost incomprehensible that the idea of its American origin should not have been conceived, particularly when, out of the sixty different sorts of *Phaseolus* there are twenty-eight native to Brazil alone, mostly of the large varieties. Had the old writers who relate the story of the Spanish conquest been studied, the opinions would have been different. Acosta mentions two kinds of Beans, Garcilasso de la Vega speaks of three or four kinds. Oviedo (1525-38) alludes to them in San Domingo, the other islands, and still more on the continent; in the province of Nagranda (Nicaragua) he has seen hundreds of bushels gathered, and in another place he observes that they are indigenous. Cabeza de Vaca found *frisoles* in Florida in 1820, and, in 1835, in the northern limits of his journey in New Mexico and Sonora. He mentions them repeatedly, mostly in connection with Pumpkins. Pedro de Cieza de Leon describes them as cultivated in Popaya (Colombia).

Alphonse De Candolle, in his classic work "*L'origine des plantes cultivées*," after citing the observation of Professor Wittmack, says: 1. *Phaseolus vulgaris* has not long been cultivated in India, south-western Asia and Egypt. 2. It is not certain whether it was known in Europe before the discovery of America. 3. At this epoch the number of varieties in European gardens suddenly increased, and all authors began to mention it. 4. The majority of the varieties of the genus exist in South America. 5. Seeds apparently belonging to this kind have been found in Peruvian graves of uncertain age (meaning whether before or after the conquest), but mingled with many plants, all of American origin. At the end of his book he places *Phaseolus vulgaris*, to be sure, among the three plants whose nativity is either wholly unknown or uncertain. The two others are *Cucurbita moschata* and *C. ficifolia*, Bouche (*C. melanosperma*, Al. Br.).

In the meantime two high authorities have likewise pronounced for the American origin of the Garden Bean—Asa Gray and Hammond Trumbull. According to them, Columbus found, three weeks after his arrival in the New World, near Nuevitas, in Cuba, fields of *faxones* and *fabas*, very different from those of Spain, and two days later, on the north coast of Cuba, again land "well cultivated with *fexoes* and *habas*, very different from ours." Faxones or fexoes are, as the editor of the journal, Navarrete, notes, the same as "frejoles" or "judias," the Spanish name for *Phaseolus vulgaris*.

De Soto found in 1539, on his landing in Florida near Tampa Bay, fields of Maize, Beans, and Pumpkins in great quantities, and the same elsewhere. Jacques Cartier found Maize and Beans among the Indians at the mouth of the St. Lawrence in 1608. Lescarbot speaks of various kinds of Beans among the Indians of Maine, Virginia, and Florida, planted between the hills of Maize; Lawson, in his voyage to Carolina, 1700-1708, says that the Kidney Beans were here before the English came, very abundant in the Maize-fields. The "Bushel Beans," a wild kind, very flat, white and with a purple spotting, were trained on poles. Asa Gray and Trumbull here say in parenthesis (*Phaseolus multiflorus*?), but Professor Wittmack thinks *P. lunatus* must have been meant. Lawson mentions further: Miraculous Pulse, so-called on account of the long pod and the great yield, very pleasant in taste; and further, Bonavies, Calavancies, Nanticoches, and an abundance of other kinds with pods, too numerous to mention, which we found the Indians possessed when we first settled America.

The Beans in the Northern States were named Indian Beans, in contrast to the Sow Beans introduced by the English, which were called Garden Beans.

In no Egyptian sarcophagus and in no pile-structure of Europe have Garden Beans been found, says Professor Wittmack; whereas the Sow Beans have been, though only recently, and very few in the Egyptian graves, since they were regarded as impure. He also points to Sow Beans in the collections of Schliemann and Virchow at Hissarlik (Troya), and by Schliemann at Herakleia.

"On the other hand, I have now had the good fortune to find prehistoric seeds of *Phaseolus vulgaris* from North American graves. At the International Congress of Americanists held in Berlin from October 2d to 5th, Professor Edward S. Morse, of Salem, and Mr. Sylvester Baxter, both delegates of the Hemenway Expedition, showed a portion of the collections made by that archæological undertaking, which was instituted by a lady of scientific enthusiasm, Mrs. Hemenway, for exploration in the south-west of North America (Arizona). Among the specimens were some examples of Maize from Los Muertos on the Rio Salado, in loose, charred kernels, together with a thin cob exactly resembling the prehistoric Maize from the mounds in Ohio. But who can depict my astonishment when, with the permission of Dr. Uhle, of the Museum für Völkerkunde, I examined the little box of Maize somewhat more

closely and found therein indubitable Garden Beans, besides some fragments of a pod somewhat resembling in shape a string of pearls? The latter, which is distinguished by strong, forked, netted veins upon the surface, I would regard as *Prosopis glandulosa* (*Algarobia glandulosa*), the so-called Mesquite. It is six to seven millimeters broad, two to three thick, and agrees very well with the figure of the same in the annual report of the Commissioner of Agriculture for the year 1870, Washington, p. 410, plate XXI., although no veins are shown on the latter, which is only superficially drawn. The Mesquite is to-day an important article of food for the Indians in the desert. The fruit is eaten like St. John's Bread; also ground and mixed with water, eaten as porridge or (unbaked) bread. The seeds of the Garden Beans that I found are all small, much smaller than those from the Peruvian graves, which compare with our larger and largest kinds. The smallest from Arizona are only 6.7 millimeters long, 3.8 wide, 2.9 thick; the largest 8.9 millimeters long, 4.8 broad, 3.2 thick. Many Beans are split in consequence of the charring.

Among these halves is a very large one 10.3 mm. long, 6.3 broad and 2.7 thick. We have yet to-day many Pearl Beans as small as this. The prehistoric Beans would also appear somewhat larger if the hull of most of them were not lacking. When hulled, a modern Bush Bean, "round, pale yellow wax," in form corresponding to the last-mentioned half Bean, has a length of 10.4 mm., breadth of 6.0 and thickness of 4.0, and a "white Pearl Bean" from the collection of Von Marten, unhulled, is only 7.5 mm. long, 4.7 broad and 3.4 thick. This latter corresponds most nearly to the prehistoric example; and, accordingly the Bean from Arizona is to be regarded as a Pearl Bean, *Phaseolus vulgaris saccharatus*, Von Martens (the Garden Beans, No. 97), which belongs to division VI., Ellipticus, the Egg Beans. Prehistoric Beans, so far as I know, have not until now been encountered in America. The present discovery is, therefore, of universal interest, and it confirms the American nativity of the Garden Bean. That it is in reality the latter with which we have to do in this case, is shown by the agreement in the position and shape of the root germ as well as the plumula. In certain of the split Beans are to be seen very plainly both of these characteristic primordial leaves."

In regard to the Pumpkins, Professor Wittmack first calls attention to the fact that Naudin, in his monograph on the subject, holds all three of the cultivated kinds, *Cucurbita maxima*, *C. Pepo* and *C. moschata*, to be of Old World origin, and in his *Nouvelle recherches*, 1856, he says that *C. Pepo* was perhaps known to the Greeks and Romans, but the introduction of the other two in European gardens does not appear to go back over two centuries. De Candolle remarks that the historical data do not disprove, neither do they support, the American nativity of *C. Pepo*, and at the end of his work he classifies it as American. *C. maxima* he regards as native to the Old World, but allows that it has been found by Barter only "apparently wild" on the banks of the Niger in Guinea. Professor Wittmack was personally assured by Professor Schweinfurth, however, that this observation amounted to nothing, for Pumpkins were now always found wherever there were negroes, who now cultivate them extensively. Professor Wittmack had found seeds of *C. maxima* of normal size, and of *C. moschata*, in the Peruvian collections from Ancon; it therefore seems that America must be the home of these, and when De Candolle is disposed to regard *C. Pepo* as American, his designation is perhaps better to be applied to the very similar *C. moschata*. Nothing of the Pumpkin kind has been found among the ancient Old World collections, and there is no recognizable description of them before the discovery of America; they are first encountered in the sixteenth century. Gray and Trumbull have shown that there were Pumpkins in the land of the Hurons before the arrival of the Europeans. Professor Wittmack has examined their references, often in the original where they only had an English translation. This was essential, since the Spanish word *calabazas* was not always to be translated by the English Pumpkin; it seems as if the Bottleneck Squash, *Lagenaria*, were often meant. But when, for instance, De Soto, in 1539, declares at Apalacha, in western Florida, the *calabacas* of Uzachil to be better and juicier than those of Spain, he cannot have meant *Lagenaria*. Professor Wittmack regards the researches of Gray and Trumbull on this subject as very convincing; but since they do not discuss the species, he hopes that the seeds may be found among North American remains, in order to determine the latter. Nothing is known of the nativity of *C. ficifolia*, better known as *C. melanosperma*; De Candolle is of the opinion that it is American, since it is perennial, and all known Cucurbitaceous perennials come from Mexico and California.

Exhibitions.

Flower Show in Boston.

THE spring exhibition of the Massachusetts Horticultural Society is expected to bring together a display of bulbous plants, Indian Azaleas and other green-house and stove plants, and is considered one of the most important held by the Society during the year. In spite of the unusually favorable season, however, the exhibition in Boston last week was less interesting than many of those held in previous years. Many prominent Massachusetts gardens were not represented, and few novelties or remarkable plants were shown. Indian Azaleas did not form a conspicuous feature, although half a dozen compact little plants, shown by Dr. Charles Weld of Brookline, were well done. Larger plants were sent from the garden of Mr. N. T. Kidder, of Milton, but the flowers were not fully open, and lacked size and substance. The Orchids were few in number and not remarkable, and the bulbous plants, with the exception of Hyacinths, were below the average in quality. Of Hyacinths, however, the display was magnificent, Mr. Kidder staging as fine spikes of bloom as have ever been seen in Boston. From the same garden came a collection of Cinerarias in well-selected varieties and beautifully grown.

There was nothing in the exhibition, however, from a cultural point of view, to compare with the forty-eight cut Roses—Mervielle de Lyon, Baroness Rothschild and Her Majesty—shown by Miss Simpkins, of Yarmouth. Such flowers of Her Majesty have not been seen in Boston before. The Tea Roses, shown by Mr. Thomas Mead, of Dorchester, were wonderfully well grown, too. A great mass of *Primula obconica*, shaded with numerous small plants of *Cocos Weddelliana*, was contributed by Mr. Benjamin Grey, and showed the decorative value of these plants when used in this way. A collection of hardy spring-flowering plants, in pots and in flower (not very well flowered or arranged), were sent from the Cambridge Botanic Garden. This collection, judging by the number of people who constantly gathered about it, was the most attractive feature of the exhibition. Mention must be made of a fine seedling Rhododendron raised by Mr. James Comley, gardener to Mrs. F. B. Hayes, of Lexington. It is said to be a hybrid between *R. maximum* and some garden variety of *R. Catawbiense*, although the foliage shows no trace of the blood of the former species. The truss is large, compact and well-shaped, and the flowers are large, white, or faintly tinged with pink, and handsomely marked on the upper division of the corolla with pink spots. The plant is seven years old, and is now flowering for the first time. It has shown itself perfectly hardy, and if it proves to be a free bloomer and possessed of a good constitution and habit, it will make a valuable addition to the list of desirable hardy Rhododendrons, among which there is none with light-colored flowers now known here quite equal to it, if it is fair to judge by the single trees exhibited.

Mr. F. L. Temple, of the Shady Hill Nurseries, exhibited two plants of the Japanese Umbrella Pine (*Sciadophytis*) imported from Japan; each eight or ten feet high, and perfectly furnished to the ground—interesting in themselves, as unusually fine specimens, and as showing how plants of this size can be imported successfully from Japan. R. & J. Farquhar & Co. showed Pansies of a good strain, and there was the excellent display of seasonable vegetables which is always seen at a Boston exhibition.

Recent Plant Portraits.

- CATTLEA SCHILLERIANA, *Gartenflora*, January 15th.
 ERYTHROPHLEUM PUBISTAMINEUM, *Gartenflora*, January 15th.
 RHODODENDRON ARBORESCENS, *Gartenflora*, January 15th;
 reproduced from GARDEN AND FOREST, vol. i., p. 401.
 CATTLEA HARRISONIÆ, *Gardeners' Chronicle*, January 26th.
 CATTLEA LODDIGESII, *Gardeners' Chronicle*, January 26th.
 IXIANTHES RETZIOIDES, *Gardeners' Chronicle*, February 2d;
 a rare Cape shrub, with abundant bright sulphur-yellow
 flowers, in shape like those of Pentstemon.
 LILIUM MARTAGON, var. ATROSANGUINEUM, *Bulletino della R.
 Soc. Toscana di Orticultura*, February.
 CLEMATIS MADAME FURTADO-HEINE, *Revue Horticole*, March
 1st; a variety with handsome violet-colored flowers, raised by
 a French horticulturist, M. Christen, of Versailles, by crossing
 one of the varieties of *C. lanuginosa* with *C. viticella rubra
 grandiflora*.
 CHIMONANTHUS FRAGRANS, var. GRANDIFLORUS, *Gardeners'
 Chronicle*, February 23d.
 JASMINUM NUDICAULE, *Gardeners' Chronicle*, February 23d.
 ABIES BRACTEATA, *Gardeners' Chronicle*, February 23d.

Notes.

The great summer horticultural exhibition at the Crystal Palace, near London, will open this year on the 11th of May.

The death is announced in England of the Rev. J. G. Wood, a very popular writer on natural history subjects. Most of his works have addressed themselves to students of animal life only, but his "Garden Friends and Foes" has a special interest for horticulturists.

At a recent meeting of the Horticultural Society of Paris a red-berried Mistletoe (*Viscum cruciatum*) was exhibited by Monsieur H. Luiseau. It is a native of Portugal, where it usually grows on the branches of the Olive-tree. Its leaves are cuneiform in shape and smaller than those of the common Mistletoe (*Viscum album*), and its berries are a bright crimson-red.

An English correspondent writes: There is little of interest in bloom out-of-doors, but in frames and cool-houses the European Cyclamens, Crocuses, Hepaticas, *Iris Persica*, *I. reticulata*, *Bongardia Rauwolfii*, with numerous kinds of Narcissus, are now in full blow. The Snowdrops, with their numerous names, but all looking alike at a distance of ten yards, are at their best, and so is the beautiful Snowflake.

The *Revue Horticole* calls attention to the merits of the new dwarf Polyantha Rose, Mademoiselle Blanche Rebatil, already figured in the *Journal des Roses*. The value of this introduction, which was raised by M. Alexandre Bernaix, near Lyons, in 1885, is the dark color of the flowers, something unknown before in this class, and a character which the raisers of new varieties will not be slow to take advantage of in improving this charming class of dwarf Roses.

English journals say that a fence about five feet high and of considerable extent which encircles the grounds of a new house erected for Baron Knopp at Forest Hill in the environs of London, is built entirely of "Jarrah timber," and "attracts considerable attention from the passers-by" as the "varied and delicate shades of the wood" are conspicuously ornamental. Jarrah timber is the wood of *Eucalyptus robusta*, var. *rostrata*, a native of western Australia.

M. Crépin has succeeded in obtaining from India a few seeds of the new climbing white-flowered *Rosa gigantea*, which, it is believed, is destined to become a valuable addition to our single Roses. The flowers are dazzling white and of enormous size. It is a native of Upper Burmah, a region where frosts are unknown, so that in the Northern States *Rosa gigantea* must be treated as a green-house climber; but in the Southern States it will doubtless prove perfectly hardy.

Some idea of the new class of demands made upon the American forests will be gained from the fact that a firm of wood-workers in one of the smaller towns of southern Illinois has recently received an order from St. Louis for forty million wooden butter-dishes. Its product last year was thirty-three million butter-dishes, besides immense numbers of fruit-boxes, sugar-buckets, etc. The principal wood used for this purpose in the Mississippi Valley States is Liquidambar or Sweet Gum (*Liquidambar Stryraciflua*).

M. Cornu, Professor of Culture at the *Jardin des Plantes*, exhibited on the 28th of February, before the National Society of Horticulture of France, branches of *Prunus Davidiana*, *Pyrus baccata*, *Forsythia suspensa*, *Deutzia gracilis* and other shrubs, in full flower fully two months earlier than these plants bloom at Paris naturally. These early flowers were obtained by inserting branches, cut from plants growing in the open ground, in moist sand in a green-house where the temperature was maintained between 50° and 60°.

At Ribston Hall, Wethersby, a severe gale recently destroyed the beautiful *Abies Pinsapo*, which was one of the earliest specimens planted in England. It was thought to be about forty-five years old, was over forty-four feet in height, and at one foot from the ground girthed nearly twelve feet. Ribston Hall is the estate which gave us a well-known Apple, the Ribston Pippin. The seed of the original specimen is said to have come from Rouen in 1787, and this parent tree stood until a few years ago, while a sucker which sprang from its roots is still in existence.

The demand for Sycamore lumber, as the wood of *Platanus occidentalis* is called, is increasing very rapidly wherever tobacco is packed. This wood, which does not split readily, is now almost exclusively used in the United States for tobacco-boxes, and immense quantities are shipped to Richmond, St. Louis and other tobacco-packing centres. One mill on the Embarras River, in southern Illinois, has within a few months received orders for eleven million feet of this lumber; and

mills through that part of the country are busy sawing up the great Sycamores, which once were the crowning feature of the country of the Illinois.

Mr. E. S. Goff reports, in *Agricultural Science*, some investigations upon the distribution of starch in the Potato tuber. The study was undertaken partly to ascertain whether any clue to a rational method of cutting Potatoes for seed could be discovered in this way. The test showed that the part richest in starch lies within the cambium-layer and adjacent to it, and that the portion lying nearest the so-called seed-end is richer in starch than that of the opposite end. Experiments have shown that cuttings from the seed-end yielded more than cuttings from the stem-end, but the greater vigor of the eyes at the seed-end as compared with those at the opposite end can hardly be accounted for by the slightly greater amount of starch in that part of the tuber. The only conclusion as to the method of cutting for seed seems to be that it is probably better to cut the tuber longitudinally, since transverse cutting would unequally divide the nutriment of the young plant.

A correspondent of a French botanical journal recently gave several recipes for preserving the color and form of dried flowers. One method is to immerse the stem of the fresh specimen in a solution of thirty-one parts by weight of alum, four of nitre and 186 of water for two or three days, until the liquid is thoroughly absorbed, and then to press in the ordinary way, except that dry sand is sifted over the specimen and the packet submitted to the action of gentle heat for twenty-four hours. Another method is to make a varnish composed of twenty parts of powdered copal and 500 parts of ether, powdered glass or sand being used to make the copal dissolve more readily. Into this solution the plants are carefully dipped; then they are allowed to dry for ten minutes, and the same process is repeated four or five times in succession. Plants may also be plunged in a boiling solution of one part of salicylic acid and 600 of alcohol, and then dried in bibulous paper. But this act should be very rapidly done, violet flowers especially being decolorized by more than an instantaneous immersion. Red flowers which have changed to a purplish tint in drying may have their color restored by laying them on a piece of paper moistened with dilute nitric acid (one part to ten or twelve parts of water), and then submitting them to moderate pressure for a few seconds. But this solution should never be allowed to touch the green leaves, as they would be decolorized by it.

An article on Danny Park, Sussex, the residence of Mr. W. H. Campion, which was recently published in the *Garden* (London), includes an illustration of a most remarkable tree. It is a specimen of our Cottonwood (*Populus monilifera*), and stands near the house, isolated on one side of a wide lawn. "It is probably," says the *Garden*, "one of the quaintest forms of tree-growth" that exists in England. There is no record to show when it was planted, but it must be at least a century old, for "the stem at two feet from the ground girths thirteen feet, the first branch starting about nine feet up the stem, while most of the others are found about two feet higher up," and the greatest spread of the branches being 150 feet. But the most remarkable thing about the tree is not its size, but the curious form it has assumed. Not only do all the lower branches droop so that they lie upon the ground, "but some of them have rooted, and the new roots, infusing fresh vigor into the branches, have caused rival leaders to shoot up, some of which have now attained a height almost equal to that of the parent tree. If these upstarts put out branches like the parent there will be some day a forest of stems, like those of the Banyan tree, which spreads and covers acres. But the Banyan supports its head upon straight stems, which are like a great array of pillars upholding some mighty dome, the ground being left free and scarcely obstructed. The Poplar does otherwise. Its branches form a confused labyrinth of stems, crossing and recrossing one another, entirely impeding the progress of anyone who would walk beneath its shade. . . . If, instead of winding in and out, the branches had all grown out straight from the stem, much more ground would have been covered, for the longest branch, though confusedly interwoven with the others, is forty-five yards in length, that being only five yards less than the greatest diameter of the branch spread. The tree also makes a large mass of distinct and noble-looking leafage, for the broad ovate leaves are nearly all about the size of one's hand." The picture shows the tree in winter, when its singular development of course appears most clearly. It is protected by a railing, but a winding path leads to the central space near the trunk, which in summer must be a thickly over-shadowed bower of considerable size.

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The Boundaries of the New Parks.

THE attempt to secure a legislative enactment authorizing the Park Commissioners to sell such portions of the new park lands in the annexed district of this city as they might deem proper aroused such strenuous opposition that it seems to have been practically abandoned. The promoters of this scheme, however, have conceived another which is a trifle less audacious. They have revised the maps of the new parks to suit their purposes, and now ask the legislature to sanction these changes and to empower the Park Board to sell such lands outside of the new boundaries as the city has already acquired.

In examining the merits of this proposition it should be remembered that really we have no new parks. A park is an organized work; it is the expression of some design. The city possesses only certain pieces of ground which are to be used as the foundation of parks in the future. The boundaries of these lands were not fitted to any design whatever, but were laid down by a board of worthy citizens in accordance with their notions about the adjustment of conflicting interests and a vague idea that the city needed about so many acres. No doubt the particular shape of the territory was a matter of minor consequence to them, and they would probably mock at an expert who should assert that ten acres lying somewhere adjacent to the limits of their park land might be worth ten times as much as any other ten acres next to the boundary line, but on the inside. Of course no cursory examination by the best landscape-gardener in the world would enable him to say where the boundaries should be. No one could tell this unless he had the essentials of a design outlined in his mind, and a design implies serious study. No study by any competent expert has here been made. The boundaries have been determined altogether without relation to any plan, and of course, if any good plan is adopted they will need to be adjusted to suit it.

Here was the fundamental mistake. No one would attempt to construct a park without a design, and certainly the counsel of the designer could never be of greater value than in the selection of a site. When a site is chosen in a

general way, it will be evident to a competent artist that it is adapted to some leading motive. In working out this motive, the prominent features of the scheme will enable its author to decide where the park should begin and end. In studying the plan of one of the new parks the maker will be certain to come to a point where a piece of land outside the given boundaries will be found essential to the consistency and unity of the design, and if this land cannot be secured, another motive must be adopted. Here runs a ridge, for example, and on its crest a road must be laid. It is plain that certain unsightly or incongruous city structures will grow up in full view from this pleasure drive, and they can be only shut out of sight by tree-plantations upon lands outside the present boundaries. After the land for Central Park had been purchased it was plain that more space was needed at Fifth and Eighth Avenues on Fifty-ninth Street to secure some dignity of approach and entrance. To complete the design in the artists' minds blocks were added also at the northern end of the park, and these additions were made at enormous expense. For similar reasons, and because the designers showed that the value of the Prospect Park site would be many times multiplied by the change, its boundaries were swung entirely out of their original position. The same thing will happen in the case of the new parks, unless the designing is entrusted to some journeyman, who will have no trouble to fit his kind of park into any given space. The journeyman's work does not grow out of an idea, but is run into a mould.

But because these boundaries will probably need modifying, it does not follow that their revision should be entrusted to a ward politician, or to his lawyer, or to a firm of brokers in neighboring real estate. To invite counsel from artists of this sort would be worse than the original folly of asking none. It is plain that the boundaries of the park lands should be left as they are until advice is had from some one competent to fit them to a consistent design, and competent to give intelligible and coherent reasons for the changes if any are required. A work of this magnitude demands creative talent of the highest order, and it should be entrusted to no other than a recognized master in his art. The completion of the parks is not a matter of immediate concern, although the city is sweeping towards them with ever-increasing speed, and the selection of a designer should not be long delayed. But until that selection, and the best possible selection, is made there can be no excuse for meddling with the park lands or their boundaries. Let them alone.

There has always been in this country an enormous waste of wood at the saw-mills in sawdust, slabs and other parts of logs too small or of too poor quality for use as lumber. The value of this refuse, could a market have been found for it, would easily have amounted during many years to millions of dollars every year. Its disposition has always been a serious labor and expense to manufacturers. For many years the sawdust was poured from the mills directly into the streams. But this practice assumed such vast proportions in some parts of the country that the streams became entirely choked up and so injured that both the general Government and some of the States were obliged to pass laws to protect rivers from this debasement. The burning up of all the waste from a large mill, amounting perhaps to seventy-five or a hundred cords a day, is difficult and expensive; it necessitates the use of an expensive furnace and a large force of men and teams; but the greater demand for wood-pulp and the improved methods of preparing it recently introduced are gradually turning what was once pure waste into a valuable product. The use of soda, applied in the wood "digester" simultaneously from above and from below, is changing methods of pulp manufacture; and the time perhaps is not remote when the great fires which burn day and night for months at a time, wherever lumber is manufactured on a large scale, will go out, never to be relighted.

A recent number of the *Saturday Review* devotes a page to "Forestry." No special familiarity with the subject is displayed by the writer, and the article contains nothing new and little worth quoting except these sentences:

"In a lifetime a man may find out a tree or two, grand and handsome in their maturity, which flourish on his land. But he plants many, exceedingly pretty and promising when young, which, as they advance in years, show that they languish in a foreign country, and present miserable contrasts to the splendid parent trees from which the traveler has brought the seed. In ornamental planting, except where a mass of thick covert is required for the picturesque, a tree should have plenty of room to display its proportions and full growth."

This can hardly be called forestry, but it is sound doctrine, and it can hardly be repeated too often for the benefit of those who are tempted to plant foreign trees, or to plant any trees without giving them ample space to spread out into strong and characteristic growth.

We have received the following notice from the Corresponding Secretary of the American Forestry Congress:

"The next meeting of the American Forestry Congress will be held in Philadelphia, on the 16th, 17th and 18th of October, 1889. Papers to be read at the meeting should be sent to the Corresponding Secretary before October 1st. I shall be glad to receive, from any source, short and vital papers on any of the practical aspects of forestry, and of tree-culture and preservation in this country. It is desirable to avoid long historical dissertations, and reviews of the general subject of forestry, as they benumb the faculties of the hearers, and lead to no valuable result. We wish to show that we have passed beyond this stage of the forestry movement. Some of the subjects to be discussed, and the arrangements of the local committees, will be announced hereafter. If the press of the country will kindly publish this notice I shall be grateful for their courtesy and cooperation. Every facility will be afforded for reporting the proceedings.

Franklin Falls, N. H.

J. B. Harrison.

Gardening in Florida.

ONE who visits Florida for the first time is impressed most of all with the fact that the land is so largely wild and unsubdued. Outside of a few old settlements, pioneers are everywhere attacking the original forest, and the inhabitants are brought into as close contact with primeval nature as are those on our western frontier. Life in Florida, however, is not pioneer life as known in the West. Hotels, with every modern urban appointment, are to be found in the most untamed sections of the state, and evidences of luxury are seen in clearings where the stumps are still standing. But well-kept gardens are not noticed among other marks of refinement. This does not imply a lack of taste or of inclination to the art, for elaborate gardens cannot reasonably be looked for in a country comparatively new. The whole aspect of nature must be softened and mellowed by years of human control before fair gardens are developed naturally and harmoniously out of their surroundings.

It is not to be inferred from this that Florida has no ornamental planting to show. On the contrary, examples are seen everywhere, and they are full of promise. Great numbers of the shrubs and vines that are the ornaments of northern green-houses are here in full flower in February and March, to the constant surprise of tourists from colder latitudes. The great vine of *Bignonia venusta*, with its mass of orange-colored flowers, which covers the side of a house in St. Augustine, and the sheet of snowy bloom from a plant of *Solanum jasminoides*, stretching across the front of the piazza of the Putnam House in Palatka, will not be forgotten by anyone who has seen them. Specimens of Laurestinus, Chinese Hibiscus, Oleander, Allemanda, Poinsettia, Fragrant Olive, Rhinospermum and other flowering shrubs, trees and vines, which are seen everywhere, together with stately Bamboos and such collections of Palms as have been gathered by Mr. E. S. Hart at Federal Point, all prove that in years to come central and southern Florida will have gardens wherein will be displayed whatever is beautiful and luxuriant in the semi-tropical vegetation of the world.

Our purpose, however, is not so much to speak of the future of gardening in Florida as to call attention to some of the possibilities of genuine landscape work with the abundant indigenous growth of the state itself. The grandeur of mountain

scenery is lacking, but the dense forests on rolling lands, the numerous lakes and rivers, the abundant broad-leaved evergreen trees, the Palmettos, which are characterized by a grace and stateliness rarely equaled, furnish material which can be combined in pictures of infinite variety and interest.

The home of Mr. A. H. Curtiss, at Talleyrand, on the bank of the St. John's River, a few miles from Jacksonville, well illustrates what can be accomplished by a careful study of the natural features of the region in the way of bringing out the beauty that was waiting to be revealed. About the house are disposed many rare and beautiful plants, but they add little to the general effect produced by the broader treatment of the grounds. Back from the river bank, which is covered with low trees and shrubs, among which Honeysuckle and Smilax clamber, with yellow Jessamine rioting over all, is an open space, and beyond this is the Orange-grove, which forms a feature of the grounds of every home in Florida—and a grove of healthy Orange-trees, with glossy foliage and golden fruit, is a spectacle of which the eye never tires. Behind this is a heavy forest of Live Oak, Water Oak, Hickory, Magnolia and Red Bay. The rich undergrowth of small trees and shrubs—Holly, *Andromeda feruginea*, Sweet-leaf, Vacciniums and a score of other shrubs, with inter-twining vines and a more modest growth of Scrub Palmetto, Partridge-Berry, Ferns and other lowly plants upon the forest-floor are all allowed to remain and encouraged to grow. Winding roads are cut through the woods, opening here and there, to give glimpses of the Orange-grove framed in with moss-draped branches of the Oaks, or of the broad river with the thickly-wooded banks beyond, or of some striking object like a great Magnolia, which is remarkable for its size and for that dignified expression that only comes to these trees with great age.

There is little more to be said; for it would be impossible, even if it were not outside of our present purpose, to give any adequate idea of the beauty of these distant pictures, or any satisfying description of the fine native trees in the forest or standing in loose groups about it. The lesson to be enforced is that whether in the low levels of the South, or on the rocky coast of New England, or in a glen among the Alleghanies, the aim should not be to transform home-grounds into something foreign or fanciful, but to unfold and enhance the native and peculiar beauty of the spot; to develop its own beauty rather than to decorate it with imported ornament. This is not an easy achievement, it is true. It implies an artist's sense, and it means an ability to treat nature with respect, if not with reverence. Surely one who agreeably leads you to a point where you unconsciously pause before a well-composed picture from which all incongruities are shut out by a frame of foliage, is accomplishing what the landscape-gardener aims at in his best constructive efforts. Many who attempt this kind of work in Florida or elsewhere will fail of very high attainment; but they will not be in such danger of displaying impertinence and pretentiousness as will those who endeavor to obliterate from their land everything that is distinctive, and rid it of everything common, so that they can trick it out in exotic finery of their own choosing.

The Art of Gardening.—An Historical Sketch.—III. Egypt and Mesopotamia.

AFTER the isolation in which the Egyptians lived during the earlier centuries of their civilization had been broken through—after their kings entered upon that long series of foreign conquests which the monuments so lavishly celebrate—exotic plants were cultivated as well as those native to the valley of the Nile. The Rose, for example, was not a native of Egypt, nor can we guess at the date of its introduction, yet in later years it was very largely exported to Rome. The sacred Lotus itself was probably an exotic; and on certain bas-reliefs we see large trees in pots which are being transported by water, thus illustrating the statement that the triumphant armies of Egypt brought home from other lands such plants as struck their fancy, and placed them as trophies in front of palace or temple.

Flowers and ornamental plants were used in profusion, not only to enliven the Egyptian garden, but to perfume and adorn the apartment. The Rose was doubtless a prime favorite, but no plants were so beloved as the Lotus (see page 172) and the Papyrus. These grew in masses in the Nile, and were cultivated in every canal and basin. And the degree to which they were employed in sacred ceremonials is proved by the direct influence they had upon architectural development. We are all familiar with those Egyptian capitals which simulate an open Lotus-flower or a closed bud, and with the reeded shafts which show so strong a likeness to bundles of Papyrus

stems. But neither of these forms is found in the earliest monuments, nor would they readily occur to an architect under ordinary conditions. Their existence is best explained by the belief that the plain shafts and rectangular capitals originally employed were decorated for festivals with sheaths of reeds and wreaths of blossoms, and that the charming effects thus produced were afterwards translated into stone.* Thus gardening paid back to architecture a portion of the debt it owed for its own development. It is hardly needful to refer to the frequency with which Lotus blossoms appear in Egyptian picture records, held in the hands of priest and king during the performance of the most sacred rites. There is abundant testimony—graven, painted and written—to prove that flowers, and especially the Lotus, were thought essential to every act which the Egyptian performed in life, and followed him even into the grave. Only a few months ago withered garlands of Roses were unearthed from certain tombs in Lower Egypt—tombs which date, indeed, from perhaps the third century after Christ, but nevertheless embody the traditional customs of a far earlier time.

When we pass from the gardens of Egypt to those of Babylonia and Assyria, historical evidence is not so rich, but still convinces us that formal arrangements prevailed. There was as much reason here as we found in Egypt why picturesque and varied effects should not have been desired, and why gardening should have been the handmaid of architecture. Here again was an immense, flat, featureless country, peopled by a race of mighty builders.

Nothing that existed in all antiquity was more famous than the "hanging gardens" of Babylon. They are as well-known by name as the Pyramids of Egypt, and, like the pyramids, were counted among the Seven Wonders of the World. Yet not a trace of them remains on the site of Babylon, unless it be in certain foundation walls which have been assumed to belong to them; and from the historian's page we can scarcely gather much accurate knowledge. They were designed in harmony with the design of the Chaldean temple—in the form of a great square, artificial mound, the several stages of which, rising one above the other, rapidly decreased in size, leaving wide terraces on all four sides. Strabo thus describes them: "The shape . . . is a square, and each side of it measures four plethra. It consists of vaulted terraces raised one above another, and resting upon cube-shaped pillars. These are hollow and filled with earth to allow trees of the largest size to be planted. The pillars, the vaults and the terraces are constructed of baked brick and asphalt. The ascent to each story is by stairs." Modern artists, relying on this passage, have often pictured the terraces as flanked by rows of great stone columns, and their fantasies have been reproduced even in serious histories of gardening, whose authors, while diligently consulting all records which deal professedly with this art, do not seem to have thought it needful to study architectural evidence with regard to architectural facts. Columns were not used in Babylonia, where no building stone existed,† and were rarely employed even in Assyria, as, though stone could readily here be obtained, the Assyrians clung to the precedents of Babylonia whence their civilization had been derived. "Many stately rooms of all kinds," says Diodorus, whom other writers confirm, were constructed along the sides of the terraces; but we must believe that their arched roofs were supported by solid piers, not columns. Or, as the picture-reliefs show a frequent use of slender shafts, constructed of metal or of wood sheathed with metal, to support the walls or porticos of small pavilions or kiosks, the apartments may have been flanked by projecting pavilions thus sustained. The surface of each terrace was covered with a coat of bitumen to prevent the percolation of water into its mass of sun-dried brick; and upon this was laid a stratum of earth thick enough to nourish flowers, shrubs, and even large trees, among which the Cypress and the Palm were doubtless most conspicuous. Strabo says that at the sides of the stairs were "water engines by means of which, persons, appointed expressly for the purpose, are continually employed in raising water from the Euphrates into the garden; for the river . . . flows through the middle of the city and the garden is on the side of the river." And Diodorus says that one of the apartments "had in it certain engines whereby it drew plenty of water out of the river through certain conduits and conveyances from the platform of the garden, and nobody without was the wiser or knew what was done." Nevertheless, we cannot fancy any extensive hydraulic machinery. No trace of preparation for such machinery—no tanks, canals or conduits—have been found in the great artificial mounds which supported the palaces of

Assyrian kings. The most recent historians believe that their enormous water-supply must have been carried up from the adjacent Tigris by endless files of human beings; and thus, too, the hanging gardens of Babylon must have been watered; or, at the most, such simple hand machines and wheels as are still used on the banks of the Nile may have served to pass the buckets up from one terrace to another. Direct architectural evidence apart, it seems unlikely that large tanks and conduits could have been constructed in a land where unburnt brick was the main building material and stone was used merely to face the lower portions of interior walls.

The walls of the terraces were twenty-two feet in thickness, and tradition has given them an enormous area. But if we accept even the widest measurements of ancient writers (who were more prone to exaggeration than to understatement) we can compute them to have covered a space not much exceeding three acres; and even if this denotes the size, not of the lowest but of the uppermost terrace, it does not mean a very large garden, according to modern ideas. Yet when we consider the wholly artificial and very singular method of their construction, and the surprise a traveler must have felt to find a garden of any size flourishing under such difficult conditions, we can easily see how the hanging gardens won their exceptional fame.

The history of Mesopotamia falls into three great periods—those of the early Chaldean or Babylonian dominion, of the Assyrian or Ninevite empire, and of the second Chaldean empire, when Babylon more than renewed its ancient power and splendor. The hanging gardens of Babylon were associated in all classic times with the name of the fabled Semiramis, and their origin was sometimes carried as far back as the year B. C. 2000, into the period of the first Chaldean empire. But even Diodorus saw the folly of this idea and attributed them to the second period of Babylon's glory. A plausible supposition is that they were built by Nebuchadnezzar, the mightiest monarch of this second period, who left his capital the most splendid city in the world, to console his wife, a Median princess, for the loss she suffered when she left the mountains of her native land for the level plains of Mesopotamia. But, in truth, nothing is known of their origin or its date. They were still flourishing in the time of Alexander, but perished, we can imagine, when ruin overtook the town, even more quickly than its other vast monuments, constructed like themselves of thick cores of crude brick, only slightly protected from drenching rains and scorching suns by a facing of kiln-dried brick or of stone.

New York.

M. G. van Rensselaer.

Foreign Correspondence.

London Letter.

THE meeting of the Royal Horticultural Society on March 12th was of exceptional interest, because of Mr. J. Gilbert Baker's lecture on the Saxifragæ. That the addresses by specialists, which form part of the Society's programme for the year, are likely to promote the welfare of the Society, as well as of horticulture itself, was plainly indicated by the number of fellows and visitors who assembled to hear Mr. Baker's lecture. Saxifragæ do not appeal with much force to the popular gardening spirit, although both Mr. Baker and his scientific view of the genus and Mr. George Paul in his instructive practical paper on the cultivated Saxifragæ made it abundantly clear that the genus is eminently worthy of general cultivation. The geographical distribution of the 180 species recognized by botanists, the diversity of character in habit, foliage and flower, the beauty of the flowers of many of the species, and the comparatively few hybrids known, were the principal points dealt with by Mr. Baker. About ninety species are in cultivation, the best of which belong to the section *Kabschia* of Engler, and of which *S. Burseriana*, *S. media*, *S. marginata*, *S. casia* and *S. Tombeanensis* are examples. In the group called *Porphyron* we have the pretty *S. oppositifolia*, *S. retusa* and *S. Pyrenaica*. These are all cushion-like in habit and bear numerous large Primula-like flowers. *S. pyramidalis* and *S. longifolia* are the best of another group, which is characterized by rosettes of longish foliage and tall, graceful, pyramidal racemes of beautiful white flowers. *S. pyramidalis* is one of the most beautiful of all plants for the rockery, and even when grown in pots for the green-house it has few rivals. Mr. Paul's paper was devoted chiefly to showing how easily Saxifragæ, as a rule, may be cultivated in an ordinary garden. Both these papers, as well as two others by specialists on the cultivation of Saxifragæ, will be published in full in the resuscitated journal of the Society, the first number of which was

* See Perrot and Chipiez, *History of Ancient Egyptian Art*.

† See Perrot and Chipiez, *History of Art in Chaldæa and Assyria*.

issued on Tuesday last. The revival of the Journal is a most commendable step, and cannot fail to do the Society good.

There was a fair number of interesting plants exhibited as well as some excellent groups of cut flowers, the Daffodils being the great attraction. A superb strain of Persian Cyclamens was sent by the St. George's Nursery Company, Hanwell, the flowers being remarkable for their large size and their purity and wide range of color. Market growers in the neighborhood of London are wonderfully successful with Cyclamens, and in the last ten years the improvement made in the form, size and color of the flowers has been considerable. *Clivia* (*Imantophyllum*) *miniata*, var. Lady Wolverton had the honor of receiving the first certificate awarded by the Society for a seedling *Clivia*. It is by far the handsomest *Clivia* I have ever seen, not forgetting the many fine varieties shown at the great Ghent Exhibition in April last. It bore three enormous heads of large, full, well-formed flowers, the segments overlapping and spreading so as to form a perfect limb, such as florists delight to see. The color was bright orange-scarlet, yellow in the throat. In Belgium and in France the *Clivias*, and particularly *C. miniata*, have been favorite garden plants for many years. The latter species was introduced from Natal by Backhouse, of York, in 1854. In 1877 Van Houtte distributed a hybrid raised from *C. miniata* and *C. nobilis*, which was named *C. cistanthiflora*. It blooms at Kew every spring, but it is not much better than the last-named parent as a garden plant. All the best *Clivias* are seedling forms of *C. miniata*. They are fast coming into favor in England on account of the time they flower (February to April), the length of time the flowers last and the bright colors of some of the forms. Amongst the best are Ambroise Verschaffelt, Marie Reimers, Van Houtte, Baroness Schröder, Sovenir de F. Vervæne, Madame Lemoir, Joseph Spæe and Madame Donner. They grow and flower best when treated as intermediate plants.

Other plants were Amaryllis, John Ruskin, a new Veitchian seedling with broad, rounded petals, the flower very large and crimson in color; *Iris Rosenbachiana* of the Persica group, dwarf, with mauve standards and stigmas, the falls orange and purple, said to be quite hardy, having been tested by Barr & Sons, Covent Garden, who exhibited several plants in flower; *Primula petiolaris*, a pretty little Alpine species, with a tuft of Auricula-like leaves and a cluster of short stalked, large, pale violet flowers—a new introduction, and, if easily cultivated, likely to become popular with all who admire Alpine plants. *Mutisia clematidis*, a most delightful climbing composite, with the leaves of a Vetch and large pendant flowers, in which the thick-spreading scarlet ray florets are like those of a single Dahlia, the disc florets being almost entirely hidden in the long urceolate involucre. To botanists this last was much the most interesting, *Mutisia* being the only genus of *Compositæ* in which the leaves bear tendrils. Horticulturists know the difficulties of successfully growing *Mutisias* in England. *M. decurrens* is one of the most beautiful of all hardy plants; so, too, is *M. ilicifolia* and *M. grandiflora*. Probably you know more about these plants than we do. In a few gardens one or other of those named are a success for a time, but they perish suddenly, just when one begins to feel that he has established them. If *Mutisias* are in American gardens, all lovers of hardy plants in England would be thankful for information concerning them.

Cypripedium Rothschildianum was exhibited in flower. It is a magnificent plant. The dorsal sepal two by two and a half inches, buff-colored, with deep crimson lines, the lower sepals smaller, but similar in color; the petals are six inches long, and half an inch broad at the base, from which they are gradually narrowed to a deflexed point, their color being buff, with crimson longitudinal lines and basal spots; the pouch is like that of *C. Stonei*, but vinous purple in color; and the curved, beak-like rostellum is most remarkable. The plant is as robust in growth as *C. Stonei*, and the scape is erect, stout, a foot long, with two flowers.

By its side was a plant, also in flower, called *C. Elliottianum*, but I have good grounds for suspecting that some mistake has been made in regard to the plants introduced and sold under this name. There can be no mistake about the type plant which was described by Professor Reichenbach and figured by Mr. Moon, a thoroughly trustworthy artist, who has drawn hundreds of *Cypripediums*, and who told me that *C. Elliottianum* was, in his opinion, the most beautiful of all. The type had white sepals with dark red lines, drooping petals, white, with purple stripes and freckles, and a brown-red pouch. But the plant shown under this name was simply a diminutive pale-colored form of *C. Rothschildianum*. The probability is that two distinct species have been collected and sold under one name. A splendid example of *Dendrobium nobile*, var.

Wallichianum, was exhibited as a proof of the wisdom of pruning, so far as regards the cultivation of this species and its nearest allies. The specimen was four feet in diameter, and bore about eighty flowering pseudo-bulbs, each over two feet in height and bearing numerous fascicles of flowers. There must have been at least a thousand fully-opened blooms upon it. All the pseudo-bulbs, save those in flower, had been removed, and the grower stated that these will be cut away as soon as the new growths push new roots. A hybrid *Cymbidium* from the Messrs. Veitch combined the characters of its parents, *C. eburneum* and *C. Lowianum*, but was inferior to both; the sepals and petals are pale buff, the lip creamy white, with a rone of dull crimson and a white margin.

Dendrobium Schneiderianum, a Veitchian hybrid obtained from *D. aureum* and *D. Findlayanum*, was shown in flower. It is dwarf in habit, the flowers are in fascicles of about three, and are somewhat nodding; they measure nearly three inches across, and are ivory-white, with pink tips to the sepals and petals, the lip having a yellow throat and a blotch of purple in front.

The last of the Chrysanthemums appeared under the name of Mrs. J. N. Gerard, and was labelled as of American origin. The flowers were of the flat Japanese type, six inches across, lilac-purple, with pale tips, and chiefly remarkable for their lateness.

Kew, March 16th.

W. Watson.

The Oriental Nelumbium Naturalized in America.

IN the early days of my enthusiasm for aquatic plants I read an item in a foreign horticultural journal stating that *Nelumbium speciosum* had been successfully grown in the open air and had withstood the winter unharmed in the "Jardin des Plantes" at Paris. In January, 1876, while in that city, I made a search to ascertain the truth of the statement, and found an artificial basin five or six feet in diameter in which were standing the dead flower-stalks and decaying foliage of the *Nelumbium*. There was one inch of ice upon the water of the pool at the time, and it was but natural to infer that the plant would prove hardy where lower temperatures prevail in winter than at Paris. During the next few years I cultivated the *Nelumbium* successfully in my garden here and proved its hardiness when its tubers are not exposed to actual freezing. I found that a temperature causing the formation of ten inches or more of ice on the water above the dormant tubers was no obstacle to successful cultivation. Having seen large ponds filled with masses of our native species (*N. luteum*) a desire arose to see how this foreign floral treasure would behave under like conditions.

Two miles from my present home is an artificial pond, a secluded corner of which was selected for the experiment. Many years ago this spot was rich meadow-land, where farmers were accustomed to cut hay. The soil is a dark, greasy clay, and, since the formation of the pond, has been made richer still in vegetable matter by the deposit of sediment in time of freshets by the wash from adjoining hills. *Nuphar advena* was the principal aquatic plant growing there. By the courtesy of the farmer who owns the property the experiment was made, and about nine years ago a single plant of *N. speciosum* was placed in the centre of the little cove where the water is from one to two feet deep. It soon became established and began to spread in all directions, blooming profusely each year. One summer it was nearly destroyed by cattle from an adjoining pasture. They found the foliage a sweet morsel, waded in, and ate it all down.

In a year or two the plants recovered and went on making their marvelous growth, and during the past summer and autumn they showed a solid mass of magnificent foliage and bloom, covering three-quarters of an acre. Last August, at the height of the blooming period, about 500 of the beautifully-shaded pink flowers were open at once. In their last stages of expansion they measure from ten to thirteen inches in diameter. They stand from three to six feet above the water, and in some instances, flower-stalks pulled from their base in the mud, measure eight feet in length. Multitudes of leaves are found twenty-four to thirty inches across, and one season I found a leaf which measured thirty-six inches in diameter. The tallest man is hidden from view when walking through the mass of foliage. Not content with remaining in the water, an occasional plant will creep a few feet out into the thicket of Alders and wild Roses on the bank, apparently satisfied with a moist soil without water on the surface. When the frosts of October arrived a few buds were caught still unexpanded.

Such a tropical aspect does this plant here present that one would scarcely be surprised to see Palms and Bamboos growing upon the shores of the pond. Could similar pictures be reproduced in the parks of our large cities they could not fail to attract the admiring attention of thousands of people.

I believe that the day is not far distant when this so-called "Sacred Lotus" and its beautiful varieties will be as universally cultivated and as popular in America as they now are in some eastern countries. I may here mention one of its habits which would seem to furnish an example of "vegetable intelligence." During the summer the slender rhizomatic stems spread horizontally in every direction, but at only a moderate depth in the soil. Upon the approach of autumn the growing points of these rhizomes descend to a much greater depth (sometimes eighteen inches), and there the tubers are formed which lie dormant until late in spring, when an increase of temperature induces a new growth. This new growth immediately reascends to the normal level, and the process of horizontal growth is repeated. Is this not a design to preserve the tubers from freezing and the depredations of animals? The accompanying illustration was made from a photograph taken in August, 1888, and does not show the entire plantation.

Bordentown, N. J.

E. D. Sturtevant.

and no other plant has played so prominent a part in the ceremonies of royal life, in the rites of religion, or in the development of art.

Many kinds of Water-lilies were familiar to the ancient Egyptians, and the name Lotus seems to have been given to them all. Among them were *Nymphæas* analogous to our common white and yellow Water lilies, and also a species with blue flowers (*N. carulea* or *stellata*), and another which was either red or white with red-streaked sepals (*N. Lotus*). But the true Egyptian Lotus, the "Sacred Lotus" of the whole East, is the plant with rosy flowers which Linnaeus called *Nymphæa nelumbo*, but modern botanists have placed in another genus and called *Nelumbium speciosum*. This no longer grows wild in the Nile, and, perhaps, was not a native of Egypt. It appears in very early pictures produced at a time when Egypt was



The Sacred Lotus in New Jersey.

[We have more than once alluded to the great service rendered to American horticulture by Mr. Sturtevant in popularizing the cultivation of the finest aquatic plants in this country. A still greater service is his demonstration of the fact that the beautiful "Sacred Lotus" can be naturalized here. Its hardiness having been demonstrated, there is now no reason why this Lotus cannot be made to cover shallow ponds from Cape Cod through all the coast-region of the middle and southern states; or why this beautiful plant may not become as conspicuous a feature in American life and art as it is in those of Japan, where, although doubtless introduced from continental Asia, it is as widely spread as any indigenous plant. If the Bordentown experiment proves to be the precursor of many thousand more, as it is sincerely to be hoped that it may, Mr. Sturtevant's name will deserve to live among those of men who have made valuable contributions to American civilization.

As far back as written history or the picture-records of ancient peoples reach, the "Sacred Lotus" may be found;

practically shut off from the rest of the world; and if it was, indeed, an exotic, must have been introduced in those primitive days when this part of the world was being peopled, or re-peopled, by tribal immigrations from the East. But there is nothing improbable in such a supposition. Tree-worship was one of the very earliest forms of religion, and where trees were adored certain flowers may well have been held sacred and have been transported from place to place, together with such herbs and roots as had proved themselves possessed of healing properties. The Lotus seems to have been revered in India as well as in Egypt from the dawn of history; and it is not impossible that it traveled from the former country—where we know it is indigenous—to the banks of the Nile at a time so remote that even Egyptians of the earliest historic dynasties may have believed in its local origin.

The difference in habit between this plant and the *Nymphæas* will readily be appreciated from our illustration. "It is at least one-third larger," says an observer who has

studied it in Egypt,* "than our common Water-lily, from which it differs also in the behavior of the leaves and of the stems which bear the flowers. These do not float on the surface of the water, but rise above it to a height of from twelve to fifteen inches. The flower, which stands higher than the leaves, is borne upon a stalk which, instead of being soft and pliant like that of the Water-lily, has the firmness and consistency of wood. It has an agreeable smell like that of Anise. In the bas-reliefs the Egyptians are often seen holding it to their nostrils. The fruit, which is shaped like the rose of a watering-pot, contains seeds as large as the stone of an Olive. These seeds, which were eaten green or dried, were called 'Egyptian Beans' by the Greek and Latin writers because they were consumed in such vast quantities in the Nile valley. . . . Even the root was not wasted; according to the old historians it had a sweet and agreeable taste."

Herodotus compares the seeds of the Nymphæas to those of the Poppy. They, too, were eaten, being pounded in a mortar and made into a kind of bread. But neither of these plants should be confounded with the Lotus which formed the food of the so-called *Lotophagi*, in Ethiopia, and has been so widely celebrated for its Lethe-like effects by ancient and modern poets. This was the "Lotus-tree," which Pliny says some persons identified with the Celtis, but which modern commentators believe to have been the *Rhamnus Lotus* of Linnæus, the *Zizyphus Lotus* or more recent botanists.†

The extensive thickets which the Lotus formed along the banks of the Nile are frequently pictured on Egyptian monuments, with men in boats hunting aquatic birds and animals among their crowded stems; and ancient writers tell us that popular festivals were held among these green and rosy water-groves. Constantly when sacred ceremonies are portrayed, Lotus-flowers are held in the hand of the chief figures. They were the symbols of generation, life, resurrection and immortality, and therefore consecrated to Osiris. The four genii of the future world are sometimes depicted standing upon them, and they likewise form a seat for the infant Horus, while historians tell us that they were appropriately presented to the guests at funerals.

In Assyrian and Persian sculptures the Lotus is almost as conspicuous, alternating with the Pine-cone as an accompaniment of the most solemn rites. In India, again, we find the same thing—constantly the Lotus occurs, and its sacred character is always apparent. Hindu legends say that Brahma came forth from its blossom, and Sri and other gods are sculptured sitting upon an open flower and holding buds in their hands. Buddha is likewise thus portrayed, and, according to some accounts, first appeared floating on this mystic flower.‡

Perhaps it was the spread of Buddhism which carried the Lotus to China and Japan. But from whatever place it came and at whatever time, it soon grew to be as familiar and beloved as it had been at home. At every step in Japan one finds great tanks filled with the Lotus, and in many religious ceremonials it has its function, while the peculiar grace of its habit and its beauty of form and color in leaf and bud and flower and fruit, added to its religious significance, have made it chief among the artist's models. Countless works of Japanese art are based, palpably or remotely, upon the Lotus, from the delicate lines of the surface-decoration applied to some tiny object or the pattern on a woven stuff, to the great bronze vase in which

the living plants are grown. Our illustration on page 175 shows such a vase or tank, which was brought to New York a few years ago by the late Mr. Edward Greey.* Nothing could be more beautiful than its outline, faithfully copied from nature, yet admirably adapted to the chosen purpose; nor could a more splendid piece of decoration be imagined for a public park or the terrace near some stately mansion than such a vase filled—as we now know it could be filled—with the "Sacred Lotus" of the East.

But it is not alone in Japan that the Lotus has conspicuously entered into decorative and instructional art. Its portrayal as a sacred emblem was not the only manner of using it in Egypt. On page 170 will be found a reference to the vital part it played in the development of Egyptian architecture, while in all the decorative work of this country it is the dominant and sometimes almost the only motive employed. The leaf, the bud, the flower and the fruit-pod, all were conventionalized in the most artistic way, and woven into the most graceful and harmonious patterns. The same is true to a lesser degree of Assyria, Persia, India, Phœnicia and Cyprus. Lotus motives are of common occurrence on the Cypriote vases in the Metropolitan Museum. Doubtless the sacred character of the plant had much to do with its universal adoption in art; but must not the artistic instinct have been keen among peoples who first chose so exceptionally beautiful a plant as a sacred emblem, and then adapted it so admirably to the painter's the sculptor's and the architect's use?

The subject of architectural development is too wide and complicated to be here examined. But we may at least briefly say that some writers believe that Lotus-forms, starting from Egypt, vitally influenced in later ages the course of Assyrian and even of Greek architecture. They believe, for example, that the so-called palmettes, rosettes and anthemions of the Greeks were derived not from the Palm-tree but from the Lotus, and that even in the Ionic capital we may see a conventionalized reproduction of its downward curling sepals or petals, with its clustering stamens or petals in the centre.†—Ed.]

Cultural Department.

Why Seeds Fail to Grow

THIS question is a vital one, and pertinent to this time, when all farmers and gardeners are preparing their soil for planting seeds. We all know that a large proportion of the seeds sown fail to make plants, and for this there are many reasons. In the first place, many seeds sold and sown have lost vitality because of age. It is not an uncommon practice for seedsmen to sell from a given stock until it is used up. No matter how old a dealer's seeds may be, they are liable to become mingled with the new. This is particularly true of what are known as commission, or "box seeds." Many seedsmen endeavor to build up a large business by selling cheap seeds, instead of giving customers seeds perfectly fresh, and of choice selection, so as to remove one cause of failure.

Again, through climatic influences, or some other condition of growth, many seeds are abortive, or have a low vitality, from imperfect development. For instance, nearly all the Sweet Corn grown the last year germinates badly. On an average it will not test more than two-thirds the usual percentage of sound seed. The same is true of many other seeds. These are simply misfortunes, for which neither seedsmen nor planter is in fault.

But, after all, the main cause of failure is the planter himself. He fails to comprehend the needs of newly-sown seeds. His success should be in proportion to the care he has given to the preparation of his ground. But the very fineness to which he reduces its particles adds a new danger to the seed, unless soil and seeds are closely compacted together. Neglect to firm the soil about seeds is the main cause of failure to germinate. Peter Henderson's paper on "The Use of the Feet in

* Perrot and Chipiez, *History of Art in Ancient Egypt*, vol. ii., p. 124.

† "It is about the same size," says Pliny, "as the Pear-tree. . . . The fruit is about the size of a Bean. . . . It has branches thickly set with leaves like the Myrtle. . . . In the country where this tree is indigenous the fruit of it is so remarkably sweet and luscious that it has even given its name to a whole territory and to a nation who, by their singular hospitality, have even seduced strangers who have come among them to lose all remembrance of their native country. . . . A wine is also extracted from this fruit very similar to honied wine. . . . Such is the tree that is so-called in Africa, the same name being given to a certain herb," which was probably Melilotus, a leguminous plant, "and to a stalk that grows in Egypt belonging to the marsh plants." This stalk, of course, is the true Lotus.

‡ T. F. Thistleton Dyer, "The Folk-lore of Plants." See also the illustrations in Fergusson's "History of Indian Architecture."

* This picture was prepared for Mr. Greey's pamphlet on *Japanese Bronzes*, and shortly before his death he kindly consented to its reproduction in GARDEN AND FOREST.

† See W. H. Goodyear, "The Lotus in Ancient Art," *American Architect and Building News*, February 9th, 1889, et seq. These articles are extremely interesting from the point of view of art; but the author has not clearly seen the general difference between the Nelumbium and the Nymphæas. Nor can there be any doubt that the Nelumbium was the true "Sacred Lotus" of Egypt. The witness of all Oriental nations would suffice to prove the fact.

Sowing and Planting" has been of great value to the planter. By following his instructions, loss of seeds, loss of time, loss of crop, and loss of patience can be avoided. The reasons why firming the soil around the seed when planted are so important, can be easily understood. There is stored up in every perfect seed a latent germ, the development of which is conditional upon the presence of proper proportions of warmth,

puts forth furnishes the young plant with food ; it simply holds the plant in position until the true or feeding roots are formed. The seed itself contains sufficient food for the infant plant, until its true leaves and roots are formed.

The feeding rootlets of any plant are delicate fibres, and their furniture of root-hairs is never seen by the casual observer. Now, when the rootlets are formed, if the soil is not



A Japanese Lotus Vase.

air and moisture. When any seed is put into the ground, and loosely covered with light, dry soil, it is exposed to drying winds which carry away the moisture, while the same circulation of air prevents the persistent warmth which is needed to promote the chemical action needed for germination and growth. It often happens that seeds germinate without making growth afterward. When growth commences it is in two opposite directions, upwards into the atmosphere, and downwards into the earth, the two sources from which plant-food is supplied. It is a mistake to suppose the first root the seed

pressed firmly around the main root, the feeders have nothing to hold to or live upon, but dry up and perish in the open spaces between the loose-lying particles of soil. When the earth is closely packed the young rootlets at once find moisture, which contains food, and find support, as well, in the thin crevices through which they feel their way. In thinning out plants where they have come up too thickly in the seed-beds, the feet should always be used in pressing the soil firmly around the plants left.

Deep planting is another cause of the seed's failure to ger-

minate or to grow after having started. The importance of more care in this direction cannot be overstated. Observation and experiment made in planting various seeds at different depths show some wonderful results. Take, for instance, Sweet Corn, and in planting several rows, cover from one-half inch in depth to five inches. The first will germinate without a loss of five per cent., while the last will not grow five per cent., and an almost exact ratio will hold between the increased depth and the percentage of failure; at the same time, the vitality of the plants will vary in the same proportion as the germinating properties. The cause for this difference is, that at the season of Corn-planting sufficient warmth is not found much below the surface. Again, Corn planted at a depth of three or more inches will not make as rapid or healthy growth as when covered only half an inch or one inch, because it makes two sets of roots—surface and underground roots—the one being quite as important as the other. The surface roots form at the first joint, just above the kernel, when it is covered to the depth of three inches; this joint is below the surface, and the plant ceases growth until a new or unnatural joint is formed at the surface of the ground, from which these roots proceed. When Corn is planted in mellow ground the hoe should never be used in covering, the feet being the best implement that can be employed for the purpose. When the Corn is dropped, with the foot scrape sufficient earth over it to cover to the depth of half an inch, then step on the hill in such a manner that it will get the whole weight of the body, and the work will be well done. The same rule will apply to the planting of many other seeds. The diameter of a seed is generally the proper depth for its covering when planted.

Mechanical assistance in planting will often help the germination of seeds, and consequently the growth of plants. If seeds of squash and the like are put in the earth endwise and germ down, they will sprout much sooner and with more certainty. It is true, also, of Lima Beans, that when planted edgewise and eye down they come up more quickly and surely.

Pertinent to this time and subject is a word on transplanting, as it shows the importance of firming the soil around the roots of young plants. Last year in GARDEN AND FOREST, I gave a few hints on transplanting, taking the ground that the proper time for this work is in pleasant weather rather than a rainy day. I stated then that plants, when removed from the seed-bed into the position they are to occupy, should be puddled in, and that the earth should then be pressed around the roots, after which loose dry earth should be scattered around the plant to prevent evaporation. I never put out plants in any other way, and never lose one; while plants set in a rainy day often fail, unless the rain is very heavy after transplanting, so that by its own force the earth is thoroughly packed around the roots. If plants are taken up when the soil is quite dry it drops from the roots without injury; on the contrary, if wet and heavy it carries away, in parting, many of the fine roots with it, and from this injury the plant is slow to recover.

But a few days since a gardener from Long Island thanked me for the article of last year, saying that he followed the instructions to the letter, put out the plants on a pleasant day without discomfort, and did not lose a single plant, and had the largest and finest crop of cabbage and cauliflowers ever known in that section. His neighbors, who waited for a rain, had only half a crop.

In cases of failure in germination the blame is usually charged upon the seedsman. He is sometimes guilty, but I am convinced that fully ninety per cent. of the failures result from improper methods of sowing and planting.

Garden City, N. Y.

C. L. Allen.

Palms.

A LITTLE extra care given to this class of plants at this time of the year will be well repaid by a more vigorous growth and greatly increased beauty during the remainder of the season. Cleanliness is absolutely essential to their welfare at all times, but especially now, when careful washing with a sponge will effectually rid the plants of the various insect pests, such as scale in variety, and mealy-bug, so often found upon them. Thrips and red-spider, though capable of doing much injury to the foliage, are not often found in quantity when the plants are syringed regularly and thoroughly. By giving this work proper attention now, much labor will be saved later in the season and finer plants secured. There is a difference of opinion as to the best wash to use. Many growers consider "Fir-tree Oil" the most efficacious, but although this is undoubtedly good, it will be found more expensive and also more likely to injure the tender young foliage than a solution of whale-oil soap. The kerosene emulsion has also been

tested for this purpose, but needs careful preparation, and its use is also attended with some danger when the mixture is allowed to remain on the foliage for any great length of time. A similar objection holds against the use of a carbolic acid solution, although it has proved most effective in some cases. If not already re-potted, this work should be attended to at once, since active root-growth has commenced, and if the plants are allowed to become very much pot-bound the foliage will soon lose color and become more or less stunted.

Clean pots should always be used, and they should be well-drained with potsherds, cinders, charcoal or some similar substance, because a majority of Palms luxuriate in an abundance of water at the root as well as overhead during the growing season. If any plant should be found with unhealthy roots, the old soil should be shaken out or washed off the roots, and the plant should then be re-potted in as small a pot as possible, care being taken to work the new soil firmly in among the roots. Where a rapid growth is desired, it will be found best to make the compost rather light, by the admixture of about one part of peat to two of loam, and some good sharp sand, with the addition of one-sixth of the mass of short, well-rotted stable manure. If the space at hand is somewhat limited, it may be advisable to merely top-dress some of the larger plants, or to shift into a heavier soil than the above mixture, so that the plant will be kept in healthy condition without being encouraged to rapid growth. It will also be found necessary to give a light shading on the Palm-house quite early in the season; at least on the side exposed to the afternoon sun, otherwise the foliage of some of the more tender varieties may suffer, but it is well to avoid over-shading, particularly where some of the plants are used for house decoration, as the leaves become too delicate for this purpose, and consequently are soon disfigured.

As to general treatment, it may be added that Palms should never be allowed to become very dry, and during the growing season should be watered very freely, many of the stronger-growing sorts being benefitted by a good watering with liquid manure occasionally. This treatment, combined with a moist atmosphere, plenty of fresh air, and a temperature of sixty to sixty-five degrees at night, includes the most essential points of culture for those in general use, but is not intended to apply to all species without any qualification, as some of the delicate sorts require a special treatment.

Holmesburg, Pa.

W. H. Taplin.

Orchard Notes.

North and South Slopes.—There is a wide difference of opinion as to the best aspect for fruit. Some contend for northern slopes, some for southern, and both are right. The decision turns upon locality and varieties of fruit. Near large bodies of water late spring frosts seldom do damage. Spring comes on more gradually, evenly, and plants do not start so early. In such localities southern slopes are usually preferable. But away from such bodies of water spring temperatures are commonly more fluctuating, and plants start relatively earlier. Here northern slopes are usually best, as blossoming is retarded. This is particularly the case with early blooming varieties. I often hear people remark that in certain years the only peaches they had were on trees standing on the north side of a building. The reason is that these trees had blossomed late and had escaped late frosts. In many localities late frosts are more to be dreaded than severe winters, and the only successful practice comes from close study of one's individual conditions.

Atmospheric Drainage.—Cultivators usually overlook the fact that with many crops atmospheric drainage is fully as important as drainage of the earth. Cold air is heavier than warm air, and settles in the hollows. The chief reason why hills and slopes are better for fruit is because the cold air drains off. Hedge-like wind-breaks and natural barriers often obstruct atmospheric drainage, and late spring frosts and early fall frosts are the result. I have known a hollow to be drained of cold air, by a channel cut through a bank, with remarkable results.

Grafting Cherries.—A current horticultural journal says that Cherry-trees are very difficult to graft. I have never found them so. The buds swell early, and the grafting must be done very early, otherwise there is no difficulty. Cherry-tops can be changed as readily as Apple-tops. I often hear it remarked that stone fruits cannot be grafted, but the remark has no foundation. Did not Thomas Andrew Knight give us the practice of root-grafting as the result of experiments upon stone fruits?

Too Few Varieties.—It is good counsel that advises growers to set but few varieties, but the advice and practice may be carried too far. The number and kind of varieties must depend upon conditions, largely conditions of market. It is not good practice to set a variety simply because every one else does. Markets often demand a variety of products. Tastes change. Many apple-growers in western New York would have been glad of something besides Baldwins last fall. Plan a succession. Plan for various available markets, and a variety of ways of disposing of the crop. This usually demands more than one or two varieties. *L. H. Bailey.*

Cornell University.

Notes from the Arnold Arboretum.

THE season here is a very early one, at least twelve or fifteen days earlier than the average, and fully twenty days earlier than that of last year. There is hardly any frost in the ground, except in deeply-shaded situations, although it is unusually full of water. Broad-leaved evergreens and conifers, without exception, look unusually fresh and well; of deciduous plants it is still too early to speak with much confidence, as they rarely show the ravages of winter, until it is time for the leaf-buds to begin to swell.

The earliest shrub in flower (it has been in bloom for fully two weeks, and is still fresh) is the Japanese Witch Hazel (*Hamamelis Japonica*). As it now appears, covered with its bright canary-colored flowers, it is a cheerful and pleasing object, which may well find a place near the window of every northern home for this early cheerfulness, which does not succumb to hard freezing or to the inevitable spring snow-storm of New England. The Japanese species is very closely allied to our familiar American Witch Hazel, although the leaves are somewhat narrower, more inclined to be slightly lobed, of rather different texture and of a duller green. The flowers are produced in very early spring, instead of in late autumn, and the petals are narrower and perhaps brighter colored. In the flower on the Arboretum plant the calyx is yellow; but that it is sometimes purple or red appears from the figure of this species (*t.* 6,659) published in a recent volume of the *Botanical Magazine*. But this evidently is not a constant character, and was not considered by *Franchet & Savatier*, who discussed the differences between this and the American species (*Enum. pl. Jap. ii.*, 368). They found the best distinction in the number of the principal veins of the leaf; a character which does not, however, at all hold in our cultivated plants. The time of flowering very well separates the two species, however, for any garden purpose, at least; while the differences in habit and in the general appearance of the leaves are equally well defined and constant. *Hamamelis Japonica* becomes in its native country a small tree. It was introduced into Europe and thence to the United States by the Veitches. A third species (*H. mollis*, Hooker's *Icones Plantarum*, *t.* 1741) is one of the new discoveries in central China.

Erica carnea is beautifully in bloom, and so are the native and some of the foreign Alders. These were closely followed by several foreign species and varieties of Hazel, most of which bloom ten or fifteen days earlier than our native species. The two earliest (probably merely forms of the same species) are two north China and Manchurian plants, cultivated here under the name of *Corylus Manchurica* and *C. heterophylla*. They form neat, compact bushes, three feet high, with ashy-gray branches and handsome foliage, which turns brilliantly in the autumn. They now bear male and female flowers abundantly, so that there is a prospect for fruit, which has not yet been produced here. These are plants to be better known and more often seen in gardens, although, of course, they will never be favorites with people who only value shrubs for their showy flowers.

It is interesting, now that the winter is over, to look through the collection and see what plants have retained their fruit bright and fresh up to this time, and which are, therefore, the most desirable for the winter decoration of shrubberies. The list is not a very long one; six weeks ago it could easily have been made much longer, for it is the rains and the warm suns of February and March which cause the fruits of many plants to become discolored from decay. The fruit of *Berberis Thunbergii* is perhaps in the best condition of any in the collection. It is as bright and nearly as abundant as it was in November, and has not shrivelled perceptibly. The fruit has disappeared almost entirely from all the other species of *Berberis*. The scarlet fruit of *Viburnum Opulus* (the Cranberry-tree) is still hanging on the plants in considerable profusion, not having been devoured this year by birds, as is generally the case. The fruit shows the effects of hard freezing, but is almost as

bright in color as it was in the autumn. And this is true of the fruit of the Black Alder (*Ilex verticillata*), which birds do not seem to relish and which is still very abundant and fresh, making the plants conspicuous and beautiful objects. Many Roses a month ago were still covered with brilliant-colored hips, but these have now turned black on nearly all the species, native as well as foreign. The most conspicuous exception, however, is our common Swamp Rose (*Rosa Caroliniana*), which is loaded still with highly-colored fruit, and *Rosa repens*, with its slender, pear-shaped maroon hips. The fruit of *Rosa nitida* is still presentable, although less so than that of either of the species just named. Scarlet and red fruits seem to keep better, on the whole, than black ones (although, no doubt, the coincidence is quite accidental), but the exception is *Ligustrum vulgare*, whose jet black berries are as abundant and deeply colored now as at any time during the year. Birds, apparently, have nothing to do with them. The black fruit of *Cornus sanguinea* is still abundant upon the plants and fairly well colored, although losing fast its freshness. Of other black fruits there is hardly a trace left in the collection.

Among plants here which are conspicuous in winter on account of the highly colored bark covering their stems and branches, by far the handsomest and most desirable in every way is that variety of *Cornus alba*, sometimes known in nurseries of *C. Sibirica*. It is evidently a variety of the widely-distributed *C. alba*, but what its origin or history is I have not been able to discover. The bark is bright red, much brighter than that of *C. alba*, or of any other species of *Cornus*—a genus which furnishes some of the brightest objects which can be used for the decoration of winter gardens or shrubberies.

March 29th.

J.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XV.—SEED-BREEDING.

AS we have already seen, a plant, for instance an Elm, is a community of individuals, and it possesses such a degree of unity between all the component parts, that in popular language we speak of it as an individual. This term "individual" can be used also in scientific language with convenience, and hence it is frequently customary to speak of a given elm, rose or phlox as an individual. When, now, we compare all the elms with all the roses and all the phloxes, we see at once that we are dealing with widely-separated kinds of individuals. These kinds are known as *genera*.

If, next, we restrict our observation to all the elms we know, we are struck at once by the existence of certain differences which render it necessary for us to divide the genus elm into minor groups, such as the Slippery-elm, the American Elm, the English Elm and the like. In the same manner we classify the roses into such groups as the Sweet-brier, the Dog-rose, the Prairie-rose, and so on. The phlox genus readily breaks up into such groups as Drummond Phlox, Panicked Phlox, Spotted Phlox, etc. These minor groups, into which the genus is divided, are known as *species*.

But these species comprise innumerable individuals which differ from each other in some particulars. For example, Drummond's Phlox is a species containing countless forms which differ from each other in the matters of color, height and smoothness. These divergent forms within the limits of the species are known as *varieties*.

It was formerly held by botanists that between varieties and species there exist absolute distinctions, but, of late years, the view has been gaining ground that species and varieties may grade into another. Between certain species there are numerous intermediate forms which conceal any line of demarcation. There are wide differences between the degrees of likeness and unlikeness presented by varieties; some varieties are almost like the general average of the forms which make up the species, while others are very different indeed.

There is another very marked difference between certain varieties: some of them can be perpetuated by seeds, while others cannot. The latter vary from the parent plant in many particulars, while the former come, as we say, "true to seed." Varieties which come true, or reasonably true, to seed are termed *races*. If, therefore, we have a choice race of plants, we can, with a fair degree of success, propagate it by means of seeds, and year after year we shall have substantially the same results. If, however, our choice form of plant is only a mere variety, we are compelled to propagate it by means of cuttings or by the transfer of buds in some way. In this manner we perpetuate desirable varieties of apples, pears and roses: by grafting or budding, by layering or by cuttings, as experience

has shown to be the best adapted to the particular case, the special features of the variety are kept with very little, if indeed any, change.

The question is still a mooted one, whether such choice varieties do not after a time wear out? The late Professor Gray was inclined to think that there are differences in this respect; some varieties appearing to lose a part of their distinctive characters, while others seem to maintain them with no loss whatever.

The close observer can, by careful selection of the seeds of the varieties of the plants which he has under cultivation, intensify nearly any given peculiarity which he wishes to keep. In other words, by selection of the forms which he thinks desirable, and using in successive seasons the seeds of those varieties only which he wishes to preserve, he can, within certain limits, direct the development of the variation. But there are two very important precautions which must be observed: (1) The pistils of all the flowers on the plants of the desirable variety must be fertilized by the pollen from flowers of the same plant, and (2) no pollen from other plants must be permitted to act on them. By this close-breeding variations can be led along up to a certain point, not always the same for all varieties, but in most cases where care is taken, the divergence from the ancestral type can be made very pronounced. It frequently happens that after several generations of this close-breeding the variety acquires the power of taking care of itself and can then come true to seed.

Now, as a matter of fact, this continuous close-breeding seldom, if indeed ever, occurs in a state of nature. There are a few plants which do not produce seeds to any extent; for instance, the common Horse-radish, the Banana, the Pine-apple and so on, but these have so long been under cultivation by bud-propagation that the formation of seeds has ceased or, at least, very rarely occurs. But when any variety of plant produces seeds, there is some provision for an occasional break in what might otherwise be uninterrupted close-breeding. As a result of this interruption, the varieties are crossed with others, which serve to check too great specialization. The gross result, then, of all the cross-breeding within the limits of the species is that the average is kept well up to the type of the species.

The varieties which we should cultivate if we had our own way are by no means those which are adapted to cope with their surroundings, in fact, their very specialization may wholly unfit them for success in the struggle for existence. In a state of nature, the varieties which we might regard as desirable to keep for our own wants are very likely to disappear after two or three generations by simply dropping out of a contest for which they are unfitted. In the majority of cases they are merged by cross-breeding with other varieties, and are thus brought up to the type of the species which, from the nature of the case, represents the form which is best suited to meet all the exigencies of the surroundings.

In nature, the cross-breeding between varieties of the same species is effected by the agency of the wind, insects, etc., which may carry the pollen of one variety to the pistil of another. The contrivances* for this purpose are among the most wonderful and complicated in organic nature. A comparison between the results of continuous close-breeding and cross-breeding can be made experimentally. Careful experiment must, for honest thinkers, outweigh all speculation and previous conceptions. Such experiments have been conducted by Mr. Darwin in the case of the common plant, Morning-glory, and the results can be readily seen in the following account:†

"The plants experimented upon in all cases were raised from carefully-ripened seed, and when ready to flower were placed under nets with meshes one-tenth of an inch in diameter, in order that all pollen-carrying insects might be excluded.

"A plant of *Ipomœa purpurea* (Morning-glory), growing in the green-house, was protected in the manner just described, after ten of its flowers had been fertilized by pollen from their own stamens, and ten others by pollen from a distinct plant of the same species. The seeds from the first ten flowers may be termed *self-fertilized*, those from the other ten, *crossed*. The two kinds of seed were placed on damp sand on opposite sides of a glass tumbler covered by a glass plate, with a partition between the seeds, and the glass was put in a warm place. As often as a pair of seeds germinated they were put on opposite sides of a pot, with a superficial partition between them, and the same procedure was followed until five or more seedlings of exactly the same age were planted on the opposite sides of several pots. The soil in the pots in which the plants

grew was well mixed, and the plants on the two sides were always watered at the same time; thus the seedlings were subjected to practically the same conditions from a very early stage.

"In the same manner, self-fertilized and crossed seeds were secured during ten generations. The results, so far as these can be shown by measurement of the plants, are exhibited in the following table:

IPOMœA PURPUREA.

Number of the generation.	Number of crossed plants.	Average height of crossed plants in inches.	Number of self-fertilized plants.	Average height of self-fertilized plants in inches.	Ratio between average heights of crossed and self-fertilized plants.
First.....	6	86.	6	65.66	100:76
Second...	6	84.16	6	66.33	100:79
Third....	6	77.41	6	52.83	100:68
Fourth...	7	69.78	7	60.14	100:86
Fifth.....	6	82.54	6	62.33	100:75
Sixth.....	6	87.50	6	63.16	100:72
Seventh..	9	83.94	9	68.25	100:81
Eighth....	8	113.25	8	96.65	100:85
Ninth....	14	81.39	14	64.07	100:79
Tenth....	5	93.70	5	50.40	100:54
All ten generations taken together.	73	85.84	73	66.02	100:77

The results of close and cross-fertilization, as shown by the weight of the seed-capsules, are given by Darwin thus: "The offspring of inter-crossed plants of the ninth generation, crossed by a fresh stock, compared with plants of the same stock inter-crossed during ten generations, both sets of plants left uncovered and naturally fertilized, produced capsules by weight as 100 to 51."

Similar experiments by Darwin upon other plants confirmed his experiments related above, and show conclusively the advantage which plants derive from occasional inter-crossing. But the manner in which this advantage to the species may counteract the work of the cultivator, in his improvement of special varieties, appears in its clearest light when we recall what has been said in regard to the diverse directions which variation may take. We can, by constant care, preserve the variations which we choose, but Nature keeps, in the long run, only those which are fitted for the surroundings.

Cambridge, Mass.

George Lincoln Goodale.

Correspondence.

The Mutilation of Conifers.

To the Editor of GARDEN AND FOREST:

Sir.—About 600 feet from my house is a clump of Norway Spruces, some fifty feet high, of vigorous growth and in perfect health. During the winter and early spring months the ground under these Spruce is invariably covered with tips and branches from two to twelve inches long. For some years I attributed to squirrels the cutting of these branches, although I have never seen a squirrel on or near the trees. This clump of Spruces is the winter home of several pairs of blue jays, whose screams and noisy demonstrations enliven our neighborhood throughout the year. My present belief is that the jay is responsible for the broken tips in this instance. This opinion has been strengthened by the reading of Mrs. Olive Thorne Miller's charming little book, "In Nesting Time." Mrs. Miller's patient investigations and her acute observations of the habits of some of our every-day birds are exceedingly valuable. Her account of the eccentric behavior of a pair of blue jays which she sheltered and watched during one winter may help elucidate the present discussion. If your well-informed correspondents who have so admirably discussed the mutilation of Conifers will read pp. 176 to 203 in Mrs. Miller's work they will doubtless conclude that, if the jay be guiltless of the offense now charged, it is assuredly not from inability on the part of the jay. Should this bird prove to be the culprit, it is to be hoped that horticulturists will spare the jay on account of his many valuable qualities, his beauty and his cheerfulness.

Boston.

J. R. Leeson.

* See Gray's Text-Book, Vol. I., Cross-fertilization.

† Gray's Text-Book, Vol. II., page 448.

Editor of GARDEN AND FOREST:

Sir.—I was glad to see your recent article entitled "How Trees Grow Tall," reproducing Professor Gray's clear explanation, for I had long wondered how so many people, familiar from their youth up with growing trees, could so constantly misunderstand their method of development. Here is another instance of almost incredible mis-statement which I clip from a little article recently published in the New York *Sun*, describing "Queer Trees" in Connecticut. "In Westfield," we were told, "a boulder weighing over half a ton is to be seen about ten feet from the ground, in the crotch of an enormous Apple-tree, and old residents say that they can remember when that boulder could be sat upon, so near to the ground was it when they were young." Perhaps the correspondent of the *Sun* did not believe the fable he reported, but undoubtedly the "old residents" had no idea they were telling an impossible yarn.

New Haven, Conn.

R. H. K.

Periodical Literature.

The larger part of *Bulletin* No. 8 of the Botanical Division of the Department of Agriculture, recently issued, is devoted to notes upon grasses and related subjects, from the pen of Dr. Vasey. Most interesting to the general reader will be his description of the new grass experiment-station, lately established in Kansas by the Department under authority from Congress. The aims of the Department and the actual condition of these experiments are best made known in Dr. Vasey's own words:

"For several years past the Department of Agriculture has been making special investigation of the grasses of the West, particularly those of the arid districts, with a view of ascertaining what are the prevailing or prominent species, what is their range of distribution as to locality and soil, what their value for grazing purposes, and what kinds offer a reasonable prospect of being valuable for cultivation. Great interest has been felt in this subject both by farmers and cattlemen, and government aid has been invoked for the purpose of conducting suitable experiments, and such aid has been strongly recommended by the Commissioner of Agriculture.

"In response to these requests, Congress, a few months ago, made a moderate appropriation for the purpose of establishing grass experiment-stations. It was determined that one of these stations should be located west of the one-hundredth meridian. After careful investigation a location was selected at Garden City, in south-western Kansas, where a public-spirited citizen made a free lease to the government, for five years, of 160 acres of land on the high prairie two miles north of the city. This is so located that irrigation can be employed on such portion of the land as may be desirable. The chief object of the station is to experiment with grasses and forage plants, both native and foreign—with any kinds, in fact, which give promise of utility and adaptation to the climatic conditions of the arid plains, and furnish a substitute for the scanty pasturage now existing. This is a great necessity. In order to secure the permanent settlement of this portion of the country, it should be ascertained what can be depended upon in the occupation and cultivation of the dry uplands where irrigation cannot be applied. It is a vital question, affecting the interests of thousands of settlers over a great extent of country.

"Upon the location of the station the Commissioner appointed Professor J. A. Sewall, of Denver, as Superintendent of the station, and he has up to the present time had eighty acres fenced, forty acres plowed, a quantity of grass-sods transplanted into prepared ground; has put a small seed-house, and made everything in readiness for more extensive work next spring. The results of the experiments will be watched with great interest; but definite results cannot be expected without the allowance of a considerable period of time.

"The need of some grasses suitable to the climate of the dry region lying mainly west of the one-hundredth meridian has been long felt and acknowledged. It is estimated that there are in eastern Colorado, western Kansas, western Nebraska and southern Wyoming 120,000 square miles, or over 76,000,000 acres, of this arid, elevated country. This region was known to be covered principally by short grasses, called 'Buffalo' and 'Mesquit,' in some places thickly covered, in others more and more sparsely, while in some portions the amount of grass was exceedingly small. During the greater part of the last twenty-five years this region has been occupied for cattle and sheep ranches, for which purpose alone it was thought to be adapted. But even for this purpose its ability to support the domestic grazing animals was very small compared with its vast extent. This arises partly from the fact that only such portions as were within reasonable distance from water could be utilized, and partly from the scanty supply of grass. The

estimates as to the supporting capacity of these plains vary much according to localities, some statements being that forty to fifty acres are required to support one animal, others that twenty or thirty acres are sufficient, and yet others that ten to fifteen acres are enough.

"Sufficient time has not yet elapsed to determine what will be the ultimate success of general agriculture in this section, but there can be no doubt that the country is eminently adapted to pastoral uses, and the settlers would do well to bestow their attention largely on stock-raising and dairying. But it is evident that in order to make this business profitable for small farmers or men of limited acres, some means must be devised for an increased production of grass upon the land. This is the present most important problem for the arid districts. It is asserted that the commonly cultivated grasses will not be successful in these arid lands, except where irrigation can be applied. The native grasses of the region, which are mostly 'Buffalo grass' and 'Grama grass,' are acknowledged to be very nutritious, but the yield is so light as to require a large area for cattle to range over to obtain support. The inquiry naturally occurs, 'Cannot some grasses be obtained which will not only endure the aridity of the climate, but also make a more vigorous growth and a more abundant production?'

"It may safely be laid down as a principle that no great improvement in this respect can be expected without a cultivation of the soil. With this even the Buffalo and Grama grasses may be expected to double their production."

The second part of the *Bulletin* is devoted to vegetable pathology, and includes a number of papers prepared by Dr. B. T. Galloway, including essays upon the "Potato Scab," on the "Foot-rot of the Orange," upon "Parasitic Fungi in Missouri," etc. These are all papers of interest and value.

Exhibitions.

The Flower Show at Philadelphia.

THE Spring Exhibition of the Pennsylvania Horticultural Society, which was held last week, was probably equal in merit to the very best that have preceded it. It would have been still more attractive if the tables had been covered with moss or green cloth and if the broad zones of buff wrapping-paper, nailed about the stages to hide the trestles, had been replaced by a neat curtain of some more suitable color. From some points of view the obtrusive presence of the paper defeated well-meant attempts at an effective grouping of the plants, but the mass of foliage upon one side of the stage was most impressive. The plants in this group were from the famous gardens of Miss Baldwin, and her gardener, Wm. Joyce, deserves especial credit, inasmuch as the houses where the plants were grown are situated in the very heart of the city of Philadelphia. A superb *Kentia Forsteriana* had the place of honor, and it was supported by other rare Palms with noble *Dracænas*, Ferns and the like. Among the noteworthy specimens here placed were an immense variegated *Pandanus*, furnished to the ground, and a large *Cocos Weddelliana*, in fruit, and yet as green and perfect from bottom to top as a thrifty young plant two feet high.

No better Hyacinths were ever seen here than those shown by Wm. Janison, gardener to Mr. R. S. Mason, and they were well worthy of the gold medal offered by "the General Union of Holland for the promotion of the cultivation of Bulbs." The same exhibitor also received the medal for Tulips. In Orchids, the exhibition was unusually strong. The first prize went to Messrs. Pitcher and Manda, of Short Hills, New Jersey, and so did the first prize for cut Orchid-blossoms. Among the interesting plants of this collection was a *Cypripedium Boxali atratum magnificum*, *C. barbatum biflorum*, *Odontoglossum Andersonianum* and a fine specimen of *O. luteo-purpureum* with extraordinary spikes of bloom. The collection of Siebrecht & Wadley, which gained the second prize, contained the rare *Aganlina cyanea*; and the collection of Mr. Charles Dissel, which won the third prize, showed, among many other treasures, one of the largest plants of *Dendrobium nobile* ever grown. It probably bore 500 flowers. Near these Orchids were many fine specimen plants trained by David Emery, Mr. Dissel's gardener, among them a conical Azalea, Roi d'Holland, covered with flowers, and a finely-grown Fuchsia. Other attractive features of the show were a group of twelve Ferns, by Thomas Long, gardener to Mr. A. J. Drexel, and some wonderful Cinerarias by the same exhibitor.

But, after all, the interest of the exhibition centred in the cut Roses, which were shown in abundance and of the very highest quality. General Jacqueminot, Captain Christy, American

Beauty, Baroness Rothschild, The Bride, La France and Papa Gontier were all seen at their very best. But since pink Roses are in such exceptional demand this year the great rivalry was between the two leading varieties of this color, and it would be difficult, and perhaps impossible, to find specimens of Mrs. John Laing to excel those grown by Evans & Battles or of Madame Gabriel Luizet superior to those grown by Edwin Lonsdale.

Notes.

Among the fine specimen plants in the Drayton Garden is a *Pittosporum*, ten feet high and thirty feet in diameter.

The Grape Hyacinth (*Muscari botryoides*), grown in pots and arranged with Lily-of-the-Valley, makes a beautiful combination.

Forty-six Japanese gardeners are now employed, it is said, in California, where it appears that the taste for Japanese fruit and ornamental trees has greatly increased.

Dr. Charles Mohr, of Mobile, and Professor Eugene A. Smith, the state geologist of Alabama, have united in presenting their herbaria of Alabama plants to the University of that state. Dr. Mohr is at present engaged in cataloguing and arranging the collection.

Mr. Edward L. Davis, of Worcester, Massachusetts, to whom his native city is indebted for the generous gift of the land for its new park system, now proposes to build, at his own expense, upon the highest summit of Lake Park, a massive and stately stone observation tower, as a further gift to the people of Worcester.

The latest atrocity in the way of "fashionable" floral arrangements is a muff composed of flowers, for the use of bridesmaids at weddings. People seem slow to learn that there is a right way and a wrong way to use natural flowers, and that all ways are wrong that force them to simulate the form of some article of dress or ornament!

Nos. 165 to 169 of the Journal of the Linnean Society, being the first half of Volume XXV., are devoted to a list of plants of Kohima and Muneypore, collected in 1885 on a march from Galaghat, in central Assam, to Cachar, with descriptions of new species by Mr. C. B. Clarke. This important paper is illustrated with forty-four plants.

We have received the early numbers of a new monthly journal of horticulture—*L'Horticulteur*—published at Mons, under the auspices of the horticultural society of the district. Judged by these early numbers, the new journal is chiefly cultural in scope. M. Wesmael, the accomplished Belgian dendrologist, appears among the list of contributors.

The Duc de la Rochefoucauld has presented to the Agricultural Society of France the sum of \$20,000, the interest of which is to be given as a bounty to the author of an agricultural almanac, which must contain, in addition to the theoretical principles, a summary of the leading experiments in agriculture made during the year. A condition of the gift is that the book shall be sold for five cents.

The people of California are to be congratulated upon Professor Hilgard's decision to refuse the position of Assistant Commissioner of Agriculture, offered to him by the President, and to remain the Director of the California experiment station, where he can accomplish infinitely more than he could do in Washington, under the demoralizing political influences which beset the Department of Agriculture.

Mr. E. W. Reasoner, of Manatee, Florida, writes to the Agriculturist of that state that a seedling variety of the Southern Dewberry (*Rubus trivialis*), which was found growing originally among grass and rubbish in a rich part of an old cornfield, has proved very productive of delicious fruit, better in flavor than any Blackberry. This Dewberry ripens in Florida about the middle of April, and bears for three weeks. Mr. Reasoner considers it more profitable than the Strawberry, in his section of the state.

It is believed in California that the discovery of the fuel value of Peach and Apricot-stones will largely increase the dried-fruit industry in that part of the country. Peach-stones are said to make as good fuel for domestic purposes as the best coal sold in California. The present price is \$6 a ton; Apricot-stones do not burn as well, and sell at correspondingly lower rates. The great piles of stones seen in the neighborhood of fruit-drying establishments are gradually being sent

to San Francisco, and the profits of California fruit-growing are greater than ever.

The pest of ground squirrels has become so great in California that the farmers in some counties are organizing against them. It is proposed to pay a bounty, raised by local taxation of so much per acre, to every owner of land who shall keep it free of squirrels; and to appoint squirrel inspectors, whose duty it shall be to destroy the squirrels when the owners of the land neglect to do so, and who shall be paid for their services by the community. A bounty of fifteen cents an acre is suggested for the most seriously infested lands.

The *Manufacturer and Builder* gives some interesting statistics of the manufacture of tooth-picks in a factory at Harbor Springs, Michigan, which is said to be one of the largest of its kind in the United States. The wood of the Canoe Birch is used exclusively. The logs are sawed into pieces twenty-eight inches long, which are thoroughly steamed and then cut into veneer. The veneer is cut into long ribbons three inches in width, and these ribbons, eight or ten of them at a time, are run through the tooth-pick machinery, coming out at the other end, the perfect pieces falling into one basket, the broken pieces and the refuse falling into another. The picks are packed into boxes, 1,500 in a box, by girls, mostly comely-looking young squaws, and are then packed into cases and finally into big boxes, ready for shipment to all parts of the world. The White Birch tooth-picks are very neat and clean in appearance, sweet to the taste, and there is a wide market for them. The goods sell at the factory at \$1.90 a case of 150,000 picks, or 100 small boxes each containing 1,500, and the small boxes retail at five cents each, or 300 picks for a cent. This single mill produces about seven and a half million tooth-picks each working day.

We are indebted to Mr. John Harshberger, of Philadelphia, for flowers of *Eranthis hyemalis*, gathered in Bartram's Garden, where it has been growing for fifty years, at least, having become naturalized, and is now the first plant to bloom in the spring. Mr. Harshberger suggests "that this would be a good plant to set out in groups under trees in any lawn or garden, where, if once established, it would grow without care. The flowers appear earlier than those of the Crocus, the Daffodil or the Tulip, and their yellow color makes a very pretty showing. The plant seems to follow the habits of some of its sister Alpine plants, flowering almost before the snow is off the ground." *Eranthis hyemalis*, or, as it is popularly known, "Winter Aconite," from a resemblance of its leaves to those of the true Aconite, is a member of the Ranunculus family, and closely related to the Hellebores. It is a dwarf, perennial plant, two or three inches high, with fleshy roots, bright green, deeply divided leaves and bright yellow flowers an inch across. It is a native of western Europe, and for three hundred years has been a favorite in gardens, being one of the very earliest plants to open its flowers. There is a second species, *E. Sibiricus*, which is much less commonly seen in cultivation.

Several correspondents of the *Garden* (London) have protested of late against the use of cotton as a packing for fresh flowers and fruits. One, who signs with the initials of a well-known horticulturist—Mr. F. W. Burbidge—says: "Nearly every day examples come before us of the misuse of this material. As a packing material for cut flowers or living plants, cuttings, scions, etc., it is the very worst if employed in immediate contact with vegetable tissues. I saw some young plants of the rare pink-flowered Banksian Rose the other day which had been swathed up in dry cotton-wool, and the stems were blackened as if by fire wherever it had touched them. Flowers packed with this wool around them arrive limp and drooping, and over and over again have we seen Peaches with all their freshness and beauty destroyed by this substance. If fruits are wrapped up each separately in tissue paper, the wool may then be used with advantage as a soft padding, but if it comes into immediate contact with either flowers or fruit, they are always more or less damaged by it. The rule to observe in using cotton-wool is to wrap everything in paper before using it. It is most useful in packing fruits if this rule be observed, but for flowers and living plants and cuttings of all kinds, fresh, clean, wood Moss is infinitely better in all ways. We have received boxes of flowers packed in living Moss, and have admired the packing almost as much as the flowers themselves. Of course, very delicate white blossoms should also be wrapped in tissue paper before the Moss is placed near them, but as used in any way there is no better and safer packing material for flowers and plants than the fresh Hypnum Moss of our woods, and there is really no comparison between it and cotton-wool."

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The Use of Arbor Day.

THE establishment of Arbor Day in so many of the States of our country is frequently referred to, by persons who write and talk about forestry, as an evidence or instance of a great advance in popular interest and intelligence regarding this subject. But unless more serious and intelligent attention is given to the use to be made of it, and to the character of the proceedings connected with it, the day will not long be observed. Addresses by persons who have no real knowledge of trees, or of their relations to the welfare of a community, are likely to have a tiresome similarity and monotony of character. When the novelty of Arbor Day observances has passed away they will soon cease to attract attention or awaken interest among intelligent people, unless in each town a few persons care enough about the matter to give to it the time, thought and labor required to make the day of some practical value. The reports of Arbor Day observances which come to us from some places indicate that the talk and ceremonies sometimes border closely on the farcical and ridiculous. In such cases it is necessary to remember that tree-planting in villages is not forestry, is no part of it, indeed, and has no direct relation to it.

The subject of forestry is, of course, an appropriate one for Arbor Day, if there is any person available who is competent to present or discuss it. Almost any time would be suitable for the intelligent treatment of this topic, if people will come together to hear and consider it. It is vitally related to the public welfare in a variety of ways, and serious injury to the prosperity and civilization of our country is almost certain to result from the lack of sufficient knowledge to enable our people justly to estimate its importance. Oratory without knowledge is of little value, and will not long be found entertaining; but knowledge regarding the subjects which are appropriate for Arbor Day can be acquired only as knowledge of other important subjects is acquired, by serious interest and application, by study and adequate observation.

The planting of trees by a person able to use it as an object-lesson for popular instruction by describing the

structure and functions of the various parts of the tree, and their relation to each other in its life would in many places be an admirable use to make of Arbor Day. The proper care of trees and shrubs in villages and along country road-sides, their economic value as related to bird-life and insect-life, their influence on health, and on the interest and happiness of human life, their value as a means of seclusion, and their effect in landscape everywhere, are all good subjects for consideration on Arbor Day, if they are seriously and intelligently presented.

If a few public-spirited young men and women in every town will read the new literature regarding these and similar subjects, they will soon be able to supply competent direction for Arbor Day observances, and, what is more important, to give good counsel, and to act intelligently when questions of pruning trees, widening streets and destroying road-sides are under discussion. We observe that in some towns which last year celebrated Arbor Day with much sentimental oratory many fine trees have since been unintelligently and barbarously slaughtered, and the beauty of charming banks and road-sides has been needlessly destroyed forever.

It is pleasant to be able to state that Nicholson's "Dictionary of Gardening" has been completed. The author, by his attainments and his position, was admirably fitted for the task; and he has produced a work which is an invaluable aid to every cultivator and every writer about plants. A work of this character necessarily soon gets out of date, and some arrangement, it is to be hoped, will be made which will enable the author and his publisher to produce, every few years, a supplement. We cordially indorse the plea of the *Gardeners' Chronicle* for the loyal adoption by horticulturists of the names of plants employed in the Dictionary, not because they are always correct, but because a standard international nomenclature of cultivated plants is now greatly needed, and this work is the best standard available for general use. In this connection we cannot do better than to reproduce, from our English contemporary, the following: "We do not mean to deny the right of any one to put whatever names he likes to his plants, so long as he does not publish them, but if he does so, then he should either use English names, concerning the value of which there can be no doubt, or, at any rate, he should not employ such names as by their construction imply that plants have been properly described and registered by a competent botanist. Half the difficulty in nomenclature is caused by the unauthorized use of names botanical in appearance, but purely horticultural or commercial in substance." Every nursery catalogue is filled with names of this character. Every year hundreds of new ones are made in half the States of the Union and in every country of Europe, and the mysteries of the nomenclature of garden plants are well-nigh unfathomable. The coiners of names themselves begin to appreciate the difficulties with which they are investing the successful practice of horticulture, and the time, perhaps, is not far distant when the various associations of nurserymen and of florists will take the steps necessary for a real reform in this matter. They can hardly do it too soon.

Senate Bill number 354, intended to prevent the construction of railroads across state lands in the Forest Preserve of this state, was so amended in the Senate before its passage as entirely to destroy its practical force and value. As passed it excludes only railroads not yet chartered, and as the real danger to the Adirondack forests is from railroads already chartered, the bill in its present shape is worthless. Its original character should be restored; it should be introduced in the Assembly and urged to its passage. Then it should be passed by the Senate and made a law. It is an important measure, as we have before pointed out. Its consideration rightly brings up the general subject of the value of the Adirondack forests to the people of this state, and the present is an appropriate

time for the discussion of this topic in all its aspects and relations. The press of the state, and of the country in general, can render most vital aid in pressing the matter upon the attention of the Legislature and of the people.

If the railroads which already penetrate the Adirondack region are extended across state lands through the Forest Preserve, nearly all the timber of the wilderness will be made easily accessible, and can be readily conveyed to market. It will be rapidly cut off, and as much of the soil will be destroyed by repeated burning, the forest will not be speedily reproduced, or only trees of very inferior quality will grow.

The people of the state should consider the subject intelligently and fully before they decide to permit the railroads to be extended across lands belonging to the state into those portions of the forest which are at present inaccessible. The permanent value of the great waterways of the state of New York depends in large measure upon the maintenance of forest conditions on the mountain slopes around the sources of streams and along their upper course. The varied attractions and interests of the region as a sanitarium, as a place of resort for rest and recreation, are all now menaced by the most serious danger which has ever threatened them. If the railroads are extended the region will be robbed of all the features which now make it of value to visitors and to the people of the state in general, and its attractiveness cannot be restored until centuries have passed away. It would be a most wise and practical step forward—a real advance in civilization—if the people should determine that the forests of the state lands shall be protected from further encroachment and injury, and especially that right of way across them shall not, under any circumstances, be granted to railroads.

Easter Flowers.

FOR generations the white Lily has been the accepted symbol of innocence. Purity is expressed by its aspect more plainly than any other quality is expressed by any other flower—not the shrinking, timid kind of delicacy which avoids even the gaze of criticising eyes, but the fearless dignity of an innocence that is too well assured of its spotless strength to be afraid of comment. References to the Lily as the type of innocence are scattered thickly through mediæval as well as modern poetry, and the force of the association is well shown in a belief which still persists in some of the rural districts of Germany that if a person be unjustly executed Lilies will spring up on his grave. It is easy to see, therefore, why the Lily, usually conceived as our common garden species (*Lilium candidum*), became the most familiar attribute of the Virgin Mary. Many other flowers were dedicated to her, and among them, of course, the Rose. But the Lily, above all, is the Virgin's flower. Very early pictures, like many of later date, portray her with a vase of Lilies by her side. There are usually three blossoms, each borne on a separate tall and slender stalk; and in the number we may divine, perhaps, a reference to the doctrine of the Trinity. The earliest pictures of the Annunciation show the Angel Gabriel bearing either a sceptre or a branch of Olive; but a Lily-wand soon took their place in his hand, and in the great period of the Renaissance, as well as in modern times, it is rare to find him pictured in a different way.

To-day in Protestant lands the Lily is chiefly associated with the festival of Easter. But if we accept the evidence in popular works on flower-lore, its connection with this special festival cannot be of very early date. Many flowers were recognized as Easter flowers. Among them was the purple Anemone (*Anemone pulsatilla*), which thus gained the name of "Pasque-flower," the white Broom and all white blossoms in general, and a so-called Easter-Lily or Lent Lily. But this last was not, as many readers of English books have doubtless believed, the common white Lily or, indeed, a Lily of any kind. It was the common yellow Daffodil, which is still often called "Easter-Lily" in England.

Many local European customs which now have a Christian significance, or are supposed to embalm such a significance long-ago forgotten, are in truth survivals of old pagan rites which incorporated themselves with the new faith in ancient days—either with the discreet connivance or in despite of the most conscientious efforts of the missionaries of Rome. Some such customs are still connected with Easter-tide. In Bavaria the peasants on Easter Day make garlands of Coltsfoot and

throw them into the fire; in the district of Lechrain (we read in Dyer's "Folk-lore") a sacred fire is lighted at Easter and every household brings to it a Walnut branch, "which, when partially burned, is laid on the hearth fire during tempests as a protection charm against lightning. . . . In Bareuth young girls go to a fountain silently, and, taking care to escape notice, throw into the water little Willow rings with their friends' names inscribed thereon; the person whose ring sinks quickest being the first to die."

Of course such customs as these have no existence in our country; but the use of flowers at Easter to decorate the church, to prove remembrance at the grave, and even to serve as gifts to living friends, is yearly becoming more general. There is no anniversary, indeed, when the use of flowers seems so appropriate as at Easter. Their blooming presence typifies the new birth of the year, and this in its turn the resurrection of Christ. Many flowers are employed in America for Easter purposes, but white ones chiefly, and, more than all, the white Lilies; and it is not strange, therefore, that the old name of "Easter-Lily," so long appropriated by the yellow Daffodil, should now be given to these flowers.

To Make a Lawn.

A SWARD thickly and evenly set with the finer grasses, cropped or cut so close as to reveal every undulation in the surface of the land and so smooth and even that the shadows of trees and shrubs as they rest upon it are clearly outlined—this is the foundation element of beauty in home grounds where grass will thrive. The lack of green sward is one of the most serious difficulties encountered by the landscape-gardener in regions like California, where there is a dry season, and in the South, where the grasses are coarse and rank. Even in the most favored parts of the United States our hot summers too often leave a lawn scorched brown, as if it had been burned over. Grass must have moist feeding-ground, and this means a deep and fertile soil. Good drainage is, therefore, essential, as it keeps the land from saturation in wet weather, and hard baking when the rains cease, and in place of these extremes preserves the moist condition most favorable for roots. Good drainage insures for roots more feeding room and more food. It allows air to penetrate the soil and makes it warmer, encourages the grass to an earlier start in spring, helps it to grow later in autumn and lessens the danger of heaving by frost.

Deep trenching is too expensive for large lawns, but at the outset they should be deeply tilled, with fine, well-rotted stable manure thoroughly incorporated with the soil; on land of ordinary fertility forty or fifty loads to the acre are recommended. If this is done in spring the land should be deeply harrowed, over and over, not only to make a fine seed-bed but to compact the soil, which has not had time to settle, and bring the particles closely and firmly together. After thorough harrowing the surface should be rolled and again lightly harrowed, when the seed can be sown, brushed in and rolled again. This is best done in April in this latitude, although seed can be successfully sown in early September if seasonable rains follow.

For a small lawn, it is preferable to use sod from an old pasture. These sods will contain the most persistent and finest grasses, which have survived the trampling of sheep and cattle and developed under close cropping into just such a turf as is desired. Sodding is too expensive, however, for lawns of any extent, and if seed is sown the best and purest should be selected. The so-called "lawn mixtures" cannot be recommended. Professor Beal, of the Michigan Agricultural College, published a few years ago the results of a careful analysis of several of these mixtures. In the best of them the great bulk of the seeds were of Blue Grass and Red Top, but they cost in the mixture two or three times as much as when purchased alone. Some of these mixtures, besides the seed of weeds, contained the seeds of Orchard Grass, which is coarse and bunchy; Perennial Rye Grass, which takes the best food of the soil for a few years and then dies out; Sheep's Fescue and Hard Fescue, which grow in tufts; Red and Pea-vine Clover, which are coarse and short-lived; Italian Rye Grass, which will perish the first winter; Hair Grass, which is a feeble grower, and other varieties altogether unsuitable for the lawn. Manufacturers of standard fertilizers give a guaranteed analysis of the amounts of the different elements of plant-food they contain. Until the venders of Lawn Grass mixtures give the same guarantee of the composition of their wares, buyers have no means of knowing what kind of seed they will sow or what prices they pay for each kind.

Kentucky Blue Grass (*Poa pratensis*) is one of the most common grasses in the north temperate zone, and its spread-

ing root-stocks fill the ground near the surface. It is a perennial, tenacious of life, starts quickly after cutting and in the spring, but does not become thoroughly established before the third year after sowing. Altogether it is the best grass for a lawn, and next to it comes Rhode Island Bent (*Agrostis canina*), which is rather finer than Red Top (*Agrostis vulgaris*, var. *alba*). It will thrive on thinner soils than will Blue Grass, and becomes fairly well established the first year. It is the best grass to mix in quantity with Blue Grass. If in chaff, two bushels of the Bent seed mixed with the same amount of Blue Grass seed should be sown to the acre.

A lawn thoroughly made will last for years, and, if properly cared for, will improve with age. Cut often and leave the clippings on the ground. Give a sprinkling of seed each spring, followed by a heavy rolling while the ground is soft, to fit the surface for the mower, and pack the soil about the roots where frost has loosened them. A dressing of fine compost, or of some complete commercial fertilizer, should be added.

Foreign Correspondence.

London Letter.

WHEN the history of English horticulture in the nineteenth century comes to be written its most remarkable feature will be the position held by the great Orchid family. In a period of less than fifty years the cultivation of Orchids has developed into almost a passion, and has become an important commercial industry. There are millions of pounds invested in Orchids in England alone. Collectors are in all parts of the world searching for them. They are objects of interest to all classes of the community. Society journals open their pages to long articles upon them, and all sorts of anecdotes about them, sometimes true and often fictitious, are told and listened to by all kinds of people. There are a few horticulturists who profess to despise Orchids, and who constantly discover that a reaction against them is setting in. But these plants are more popular now than ever, and this popularity seems on the increase. And yet there is no Orchid Society in England. Such plants as Chrysanthemums, Carnations, Auriculas and Roses have each their own society. Weak efforts to start an Orchid Society have been made, but they came to nothing. There is, however, special representation promised for Orchids now, the Royal Horticultural Society having decided to appoint a committee of specialists to adjudicate on Orchids alone. That such a committee is wanted is abundantly evident. The number of men who possess a knowledge sufficient to enable them to decide which Orchids are good and which bad, what is new, and what is simply an old plant under a new name, is quite limited. When one remembers that at the present time there are close upon 2,000 species in cultivation, not to mention the almost countless varieties and hybrids, the necessity for the step which the Royal Horticultural Society is about to take must be apparent. A man may know ordinary garden plants well, or be an authority on some special department of flower-culture, but that does not qualify him for the post of referee where Orchids are concerned.

Disa tripetaloides is another addition to the useful garden species of this large South African genus. It is not unlike *D. racemosa*, recently mentioned in GARDEN AND FOREST, and it requires the same treatment. Mr. O'Brien, of Harrow-on-the-Hill, has imported plants which have recently flowered. He writes: "It is not only the freest growing and most profuse flowering *Disa* I ever saw, but also the most easily grown of South African terrestrial Orchids." It bears spikes of from twenty to thirty flowers, each about an inch across, white, united with pink, and dotted with rose-purple; the dorsal sepal is helmet-shaped, with a short spur, the lateral sepals are oblong, obtuse, proportionately large, the petals are falcate-oblong and the lip linear. At Kew this plant is growing freely by the side of *D. racemosa*, than which no Orchid appears more easy to cultivate. Whilst writing of a new Cape plant I may notice the flowering of *Drosera cistiflora*, which is now at Kew in bud, having been presented by Miss North, who not only drew attention to it by her picture painted at the Cape, but who has introduced it into cultivation. *Droseras* are delightful plants, and, as a rule, easy to manage. At Kew there is a good collection of species, and they are a source of much interest to visitors. They are grown in a cool, sunny green-house along with a collection of Sarracenias, Darlingtonias and other "carnivorous" plants. Guards of wire-netting are placed in front of the stages, and it is amusing to hear the opinions of visitors with regards to these plants and their "cages." The Darlingtonia is the "Cobra plant," and is supposed to have a deadly

sting. *Dioncæa* is a kind of "vegetable octopus," and so on. The cages are meant to prevent visitors from being injured by these vicious plants! Although not at Kew, yet plants are in England of *Heliamphora nutans*, a very interesting Sarracenialike plant from the Roraima Mountain, and which was discovered by Schomburgk about fifty years ago. Messrs. Veitch are the lucky possessors of a stock of this plant.

Amorphophallus Rivieri.—A very fine example of this well-known Aroid was lately in flower with Messrs. Veitch. The scape was a foot high, the spathe trumpet-shaped and a foot across the mouth, whilst the erect club-like spadix was one and a half feet high by one and a half inches in diameter. The color was dull purple inside, and gray, with green spots, outside. Most gardeners know the foliage of this old Cochinchina plant, but few are acquainted with its flowers. They are extraordinary in appearance, and were it not for their abominable odor the plant might be recommended on their account alone. I believe all the *Amorphophalli* have this peculiarity in their flowers. A new species, *A. Eicleri*, is in flower at Kew now, the spathe being about the size of a wine-glass, but when the tiny flowers which clothe the lower part of the spadix were open the smell was so offensive that the artist who had to make a drawing of it was compelled to inclose it under a bell-glass. When *A. giganteus* is in flower many visitors will not venture into the house where it is. This offensive odor arises from the true flowers as they mature, so that after removing them with a knife, the smell disappears. The marvelous *A. Titanum* (*Conophallus*) is also in cultivation at Kew. Last year the tuber was like a large, flat Pumpkin, eighteen inches in diameter, the leaf-stalk eight feet high, straight and smooth as a gun-barrel, and eight inches through at the base; the blade was divided into three main branches, from which spring numerous smaller ones, the whole forming a huge canopy thirty feet in circumference. This leaf was developed in less than two months, and remained on the tuber till winter. Now the tuber is at rest, and hopes are entertained, from its size and health, that it will flower this year. The inflorescence was described by Dr. Beccari, who discovered the plant in Sumatra about ten years ago, and a life-size picture of it is in the Museum at Kew. In this the spathe is three feet in diameter, and the thick spadix six feet long. Apart from its flowers, this Aroid is one of the handsomest and most interesting of the tropical foliage-plants grown at Kew.

The exhibitions of spring-flowering plants held in the Botanic Society's gardens at Regent's Park are always of exceptional interest and rich in display; that held on Wednesday last being voted one of the best seen in London for years. Besides the usual spring-flowering bulbs, such plants as *Cyclamens*, *Clivias*, *Deutzias*, *Cinerarias*, *Primulas* and *Hippeastrums* were shown in abundance, and with scarcely an exception were splendid examples of culture and selection. Mr. James, of Slough, whose strain of *Cinerarias* is remarkable for dwarfness, largeness of flower and fine colors, surpassed his previous efforts by the group he showed on Wednesday. Messrs. Carter & Co., of Holborn, sent a group of their new seedling *Cineraria*, Emperor Frederick. It is remarkable in having the ray-florets quilled at the base, and colored violet, the spreading portion being maroon-purple. Messrs. Cannell & Sons also exhibited a very fine strain of *Cinerarias*. The *Cyclamens* from the St. George's Nursery Company, Hanwell, and from Mr. Odell, were especially good, both in size of flower and in color. The cultivation of these plants is an art known to only few, if one may judge by the wide difference between the *Cyclamens* of the ordinary garden and those of the specialist. If the latter is asked how the trick is done, he says we must have special houses, special treatment and specially good luck in regard to position, water, etc. Two new seedling *Cyclamens*, which were awarded certificates, were Faust, with flowers of a uniform deep crimson color, and Striatum, with large flowers, purplish-crimson, with a broad band of rosy-white down the middle of each segment. Should this last reproduce itself from seeds it will give us an entirely new race of *Cyclamens*, so far as regards color. It was shown by Mr. Odell, of Hillingdon. *Hippeastrums*, both new and old, were represented by several large collections. The best of the new kinds were: Lustrous, with flowers six inches across, of good form, and almost wholly deep scarlet, with crimson veins (Veitch); Optima, flowers very large, nearly a foot across, bright crimson (Veitch). Amongst the Roses shown by Paul & Son were fine examples of the pretty little fairy roses called Mignonette and Golden Fairy, both forms of *R. polyantha*. As pot plants for the green-house these bunch-flowered little roses are of great value. *R. Hardyi* was also shown in bloom. It is a delightful rose, with flowers like those of *Cistus laurifolius*, but yellow, with a crimson blotch at the base of each petal. *Boronia heter-*

ophylla was shown superbly by Messrs. Veitch. Whatever may be the opinion of horticulturists generally with regard to *Boronias*, there can be no question of the great beauty of this species. It forms a compact, globular little bush, a foot high, and every branch is heavily laden with bell-like flowers as large as peas and bright rosy-purple in color. For the introduction of this plant to English gardens we are indebted to Miss Marianna North, who, when in Australia about seven years ago on a sketching expedition, sent seeds of the *Boronia* to Kew, where it was successfully grown and flowered. It afterwards passed into the hands of Messrs. Veitch, who have been wonderfully successful in its propagation and culture. *B. heterophylla* is as delightful a garden plant as *Erica hyemalis*. Amongst the Orchids exhibited were *Brassia picturata*, *Dendrobium Brymerianum*, *Neottia corallina* (*N. speciosa*), *Lælia cinnabarina*, a very fine variety, the flowers fully three inches across and of the brightest scarlet. These were sent by Messrs. Sander & Co. From the collection of Messrs. Veitch came a fine specimen of *Calanthe vestita gigantea*, a variety which ought to be in every collection where *Calanthes* are grown. *Dendrobium Schneiderianum*, the hybrid referred to in my last letter, and *D. splendidissimum* were also shown. The newest feature in the exhibition was the *Clivias*, of which Mr. B. S. Williams sent a collection of good sorts. A group of the old *C. miniata* spoke well for the type, and also showed what progress had been made in the improvement of this plant, some of the varieties shown by Mr. Williams having flowers twice as large as the type, as full as a *Vallota*, and much brighter in color. Perhaps I ought to mention that *Clivia* is the correct name for the plants commonly known as *Imantophyllums*.

March 22.

W. Watson.

New or Little Known Plants.

Hypericum aureum.

IT was in the month of July, 1776, that the younger Bartram discovered this plant upon the bank of Patse-Lega Creek, a branch of the Flint River, in Georgia, and the account of this discovery, which he afterwards published in his "Travels," gives an excellent idea of it as it now appears in cultivation. "I observed," he says, "growing on the steep, dry banks of this creek, a species of shrub *Hypericum* of extraordinary show and beauty (*Hypericum aureum*). It grows erect, three or four feet high, forming a globular top, representing a perfect little tree; the leaves are large, oblong, firm of texture, smooth and shining; the flowers are very large, their petals broad and conspicuous, which, with their tufts of golden filaments, give the little bushes a very splendid appearance." Afterwards the plant was found to extend from South Carolina to Alabama and to eastern and central Tennessee, although nowhere very common; but its merits as a garden plant were overlooked until a few years ago, when seeds were sent to the Arnold Arboretum by Dr. A. Gattinger, of Nashville, who thus writes of its distribution in Tennessee, where it is more common than in the Atlantic States: "The *Hypericum aureum* is addicted to rocky situations in the Cedar-glades and on bluffs and cliffs along the Cumberland River and its affluents. It is also on the base of Cumberland Mountains as far up as the carboniferous lime-stone reaches. It is not found in silicious or argillaceous soils or in swamps, but prefers such situations where the moisture is longest retained and shade is provided. It associates in the Barrens with *Rosa humilis*, *Forestiera ligustrina*, *Ptelea trifoliata*, *Rhus aromatica*, *Rhamnus Caroliniana*, *Crataegus subvillosa*, *Gonolobus obliquus*, *Nemophila microcalyx*, etc. It is generally not very floriferous, but I have found on the rocky ledges near the water-line on the Cumberland River, specimens with a great profusion of flowers. It grows three to five feet high."

Hypericum aureum is by far the showiest in flower among the considerable collection of *Hypericums* in the Arnold Arboretum, where it is perfectly hardy. It begins to flower about the twentieth of July, and continues in bloom during several weeks.

The branches are angled, covered with thin exfoliating red bark and widely paniculate near their upper extremity.

The leaves are simple, rather coriaceous, oblong-obtuse nearly entire, tipped with a minute mucro, and pale on the lower surface. The flowers are an inch and a half to two inches across when expanded, with coriaceous, reflexed, orange-yellow petals, which are longer than the ovate, unequal sepals and very numerous, golden-colored stamens. The capsule is red, ovoid conical, and acuminate with the connate styles.

There are few dwarf shrubs better worth a place in the garden. Mr. Faxon's drawing is from a specimen grown in the Arnold Arboretum. C. S. S.

Cultural Department.

Cultivation of the Bermuda Easter-Lily.

ON the Island of Bermuda, which lies 700 miles directly south-east of New York, 800 miles due east of Charleston, South Carolina, and 100 miles east of the Gulf Stream, where the yearly range of temperature is from 54° in winter to 85° in summer, there has grown up lately an industry which will soon change the character of the trade between Bermuda and the outer world.

A few years ago an American gentleman, General Russell Hastings, who had grown to like this equable climate because of its benefit to a constitution impaired by wounds received in the war for the Union, began to experiment in the cultivation of the Bermuda Easter-Lily, which he found growing there most vigorously in everyone's flower-garden. The natives looked upon him as a dreamer for supposing that anyone would buy so common a bulb as "our Easter-Lily." And how could a large market be built up for a mere flower which no one could eat or wear? But the most sleepy Islander now begins to see that the Onion has a rival, for in the richest corner of every little farm a patch of Bermuda Easter-Lilies can be seen, while on larger farms acres are devoted to the same purpose, as may be seen from our illustration on page 187.

A market is readily found for the hundreds of thousands of these bulbs, and the supply has never equalled the demand. The Lily blossoms from January to May; the bulbs ripen in July and August, and can be put down in New York, London or Paris by the middle of August, where florists and amateurs by potting them immediately and forcing them hard under glass can obtain flowers for the holidays, or by potting later and at different periods flowers can be had all winter, and especially for the Easter decoration of churches. An effort has been made to utilize the flowers by shipping them to New York, and a box has been invented with a pasteboard receptacle for each flower, but the three-days' sea voyage damages the flowers, and when placed by the side of those grown in the northern green-house they make a poor show. General Hastings does not recommend the shipment of flowers, first, because they do not arrive at their destination in good order, and next, because it is bad business policy to offer bulbs to the northern florist, and then go into the market to compete and disturb it with inferior flowers.

It seems as if the perfume of the millions of blossoms grown here each winter might be utilized in some way. It is a delightful, though rather powerful, odor, and during the flowering season the whole island is fragrant with it. Sailors say they can smell Bermuda when far at sea.

The Bermuda Easter-Lily, sometimes known in the United States market as *L. Harrisii* (which is a misnomer), is a well-known Japanese plant, botanically named *L. longiflorum eximium*. The flower is pure white, bell-shaped, with the segments well bent back at the extremity. The perianth is about six inches long, the root is a scaly bulb, the stem herbaceous and simple, from two to four feet high, bearing the flowers at the summit, which number from eight to forty, though one monstrosity grown here in 1882 produced 145 perfect flowers.

The method of cultivation is very simple. First, very rich red soil, with an enormous amount of well-rotted stable manure is a necessity, as the Lily does not take kindly to any of the artificial fertilizers yet tried. It is a voracious feeder, as long roots are sent out from the base of the bulb, and another set of feeding roots come out from the stalk above the bulb. For successful cultivation these roots must at once strike into rich feeding ground. The bulbs are planted in August, September and October, the large bulbs in rows eighteen inches apart, and the smaller bulbs in beds like Onions. The flower-stalks appear above ground in November, and from time of planting until harvest the grower has to keep constantly weeding during every one of the twelve months of the year.

The harvest season is from the middle of July to the middle of September, at which time all the bulbs in the field, great and small, are dug and carried to the sorting house, where those large enough for the market (from five to nine inches in circumference) are selected out, packed in sawdust and immediately shipped to the United States and Europe. Those bulbs not large enough for the market are sorted into three sizes and replanted for the next year's crop.

The power of this Lily to propagate itself is most wonderful in this climate, and new bulbs are formed in many ways: from seed, from offshoots, from scales of the bulb, and from cut-

These large bulbs which have been stripped of scales are planted, and in two years can be stripped again, and so on forever. Many bulbs propagate themselves by offshoots of the healthy growing bulbs in the field, and a field planted out to Lilies for several years becomes alive with new bulbs from offshoots and bits of scales broken off when the crop is harvested. These bulbs coming up between the rows are spaded under when the soil is cultivated.

The question is often asked, Cannot the business be overdone? This hardly seems possible, as the florist who forces the bulbs in his northern green-house throws them away at the



Fig. 103.—*Hypericum aureum*.—See page 184.

tings of the flower-stalk planted in the ground after blossoming. Even the leaves of the flower-stalk, stripped off and planted in the ground, will form bulbs, and a flower-stalk cut and placed in a bottle of water will form bulbs from top to bottom. The method most in vogue, however, is to take well-ripened bulbs two or three years old, having a circumference of about twelve inches; tear off all the scales, scatter them in a shallow trench and cover with about two inches of soil. Each scale will make from two to six new bulbs, which will grow the first year from the size of a pea to that of a large Hickory-nut, and probably one-third of these bulbs will grow large enough for the market at the end of the second year.

end of the season, and buys again the next year, as he cannot economically "ripen off" his bulbs, and, even if he could, they would not flower well the second year. Again, the demand comes from so large an area—from the United States, England, France, Germany, Austria and Russia—a market field large enough, surely, for a little island containing but 1,200 acres of arable land.

This bulb is grown to some extent in Japan, but it is not possible to get the crop from Japan into the United States and European markets before November, and even then the bulbs are not as floriferous as those grown in Bermuda.

Hamilton, Bermuda.

Paul Harger.

Carnations for Winter Blooming.

NEARLY all the varieties of Carnations grown in America for winter blooming are of American origin. Many of the best English kinds have been tried, but few have proved useful. Most of the imported kinds are too vigorous—"too grassy," to use an old grower's expression. The flowers are too full as a rule, and incline to burst. The majority of our varieties are dwarf in habit, being almost self-supporting. The flowers are thin, but of fine form, and I think these varieties would be useless out-doors in England owing to this very fact.

Mr. Tailby, of Wellesley, who raised Grace Wilder, a very popular variety, with rose-colored flowers, says that when Americans began to grow Carnations, planted out on beds and benches, they found the old English varieties, which they had been accustomed to grow in pots, unsuitable, and therefore commenced to raise seedlings, and they selected the dwarf semi-double ones, which to most people would appear worthless, using these as parents, though occasionally crossing them with others of good habit and color, but with flowers of indifferent form, to produce, if possible, the kind adapted to our needs. The work was tedious, and only those having a real love for it could continue, for good time and space often went for nothing. Many of the seedlings, when first blooming, would appear satisfactory, but when propagated and prepared in the usual way would turn out worthless, and, again, others taken up, after being virtually discarded, have turned out well.

We have excellent scarlets in Alegetaire, Florence and an unnamed seedling; good crimsons in Anna Webb and Orient; violets in Victor and Century; salmon in Madame Rollicker and another unnamed seedling. The only excellent rose-colored variety we have now is Grace Wilder. The good yellow, for winter blooming, has yet to be found. Pride of Penshurst has lovely form and color, but poor habit, and is very late, as also is Belle Halliday. Andalusia is early enough, but of poor habit and form. Of striped yellow varieties of moderate earliness and fair form, Buttercup is the best. Madame Carle is the best white we have, of fine form and color, a free bloomer, of good habit, but a little late. Snowden is an old stand-by, likely to hold its own. The flowers are of good form, but small. Mr. Tailby has a pure white sport from Grace Wilder, which he intends naming Our Mary.

The practice is to strike cuttings in benches or boxes filled with rather coarse sand, with just enough plastic matter in it to retain moisture, and made very solid by beating with a brick. The cuttings require very little preparation. An experienced man would put in 2,000 per day. No knife is used, the tips, with only two to three joints, being snapped off. They are put in with a common dibbler, which is not driven into the sand farther than is necessary to insert the cuttings, and there is little prospect of their rooting unless set firmly in the sand.

The cuttings are kept saturated with water and shaded until they stand well up under sunlight. Pricking off into boxes, or potting into thumb-pots, is the next work. Sandy loam should be used, and made firm in the pots. As soon as established, and growth enough made to allow the tips to be pinched out, this is done and continued until about the second week in July, when they are allowed to develop flowering-stems. A good, heavy loam is the most suitable soil to grow them in, both in the houses as well as when in preparation out-doors. A good, airy house, with night temperature of 50° suits the plants. The foliage should never be wet unless a bright day is assured. During January a top-dressing of wood-ashes and leaf-soil is given, which helps the blooming along until May.

Wellesley, Mass.

T. D. Hatfield.

Memoranda from a Northern Garden.

FOR several years I have been interested in a little native plant found, according to Mr. Pringle, in few localities in Vermont—the Strawberry Blite—*Blitum capitatum*. Spinach will not winter in my grounds, but the Blite does not mind the cold, however severe; and as it starts into growth the moment the snow departs, it makes as early greens as the Dandelion, and to my taste quite as good as Spinach. The Blite is a pretty persistent weed, so far as reproduction from seed goes; and the seeds are almost as small and quite as numerous as those of Purslane, yet it is easily killed with the hoe. The brilliant crimson color of its pulpy but insipid fruit, with its abundance, makes the Blite a pretty plant in the flower-garden, when well grown.

Speaking of Purslane reminds me that though it grows here as freely and as rankly as it grew in my old Kentucky

home, it is worth nothing for greens, for it will not cook tender when grown so far north. I find the same trouble with Okra, the dwarf, early form of which grows and forms pods freely enough in my garden; but they are worthless for use, being hard and woody before they are half grown.

In most years I manage to get fairly good Water-melons and Musk-melons in my garden, from seed started in pots under glass, and transplanted about the tenth of June. Even last year my whole crop of Christiana ripened nicely before the frost of September 5th destroyed the vines; but the first ripe one was twelve days later than the season before. Of course we can grow later sorts by giving each hill a hot-bed to itself, and not moving them. The famous Montreal melons are grown in that way.

Growers about New York decry the Montreal melon as large, but coarse and insipid. Those who have eaten it in its home know much better than that, and some in New York, at least, have had a chance to try those which have been shipped in from Montreal, as they have been quite abundantly in some seasons. The whole secret is, I think, that the Long Island and New Jersey gardeners have not learned the trick of growing them properly. These big melons are gross feeders, and must have ground much richer than that on which smaller sorts will succeed.

Newport, Vt.

T. H. Hoskins.

Heating Green-houses.

PROFESSOR S. T. MAYNARD has been conducting some interesting experiments to ascertain the relative value of steam and hot water for heating green-houses, and a report of the conclusions reached are given in a late Bulletin of the Massachusetts Agricultural College Experiment Station. Two green-houses of the same size—seventy-five by eighteen feet—were constructed as nearly alike as possible in every particular. Two boilers of the same pattern and make were put in, and one was fitted for steam to heat the east house, and one for hot water to heat the west and more exposed house. Records of temperature were made five times a day, and from these the following averages are taken for the month of January: Average out-door temperature, 29.1°. For the house heated by hot water the in-door minimum daily temperature averaged 42.7°; maximum daily temperature, 55.1°. Average in-door temperature, 47.5°. In the steam-heated house the temperature varied between 41° and 55.1°, with an average of 45.9°. The coal consumed in the hot-water house was 2,532 pounds, and in the steam-heated house 3,220 pounds. In February the average in-door temperature of the hot-water house was 49.6°, with a total coal consumption of 2,642 pounds, and of the other house the average temperature was 47.9°, and the coal consumption 3,362 pounds. According to this test hot water, with nearly twenty per cent. less coal, gave a temperature 1.7° higher, and a temperature, too, more uniform than that furnished by steam heat.

This only shows that for this mild winter, and with these particular machines, hot water has proved more economical and satisfactory as a method of heating than steam in houses constructed like these two. Still, so far as it goes, it is a fair test, and we are not aware that any similar trial has been conducted. In larger houses and in a colder winter the result might have been different, and Professor Maynard is preparing for careful and accurately recorded comparisons for another year. Meanwhile he invites all who have kept records of the temperature of their green-houses, together with the amount of coal consumed, to send him the figures, giving also the size of the house and the kind of apparatus used.

Spring Flowers.

OWING to the exceptionally mild spring, hardy-flowering plants and bulbs are making a display fully two weeks in advance of their usual flowering period. First in the order of flowering comes *Ranunculus anemonoides*, with its masses of Anemone-like, pale pink flowers, an inch across, produced in advance of the much-divided, glaucous-green leaves. This plant is comparatively new, being introduced into cultivation from the Styrian Alps in 1883, and it is a charming little plant. *R. anemonoides* succeeds well in a moist position in the open border. *Fritillaria pudica* has been noticeable for its pretty, pendent yellow flowers, usually solitary, on stems six to eight inches high, and lasting a month in good condition. This plant is a native of the western states. Coulter in his "Manual" gives it as distributed through "Utah and Montana to the Sierra Nevada and British Columbia." It cannot, however, be very plentiful, as collectors refuse to supply it at any

price. This is to be regretted, as *F. pudica* has a chaste beauty peculiarly its own. *Iris reticulata* is now at its best. As soon as frost leaves the ground the flowers of this pretty Iris are produced simultaneous with the leaves, and is a good plant for planting en masse for spring effect. Its variety, Krelagei, is a few days earlier, of a paler color, and devoid of perfume, which latter the species possesses to a pleasing degree. *I. reticulata* produces offsets from the bulbs quite freely, and these may be relied on to flower the second year. Beds of *Bulbocodium*

cold, but unless protected by snow or some other covering, bright sunshine scorches the tops in very cold weather. *Eranthis hyemalis*, the Winter Aconite, *Scilla Sibirica* and the Crocusses are all in bloom, making the hardy flower-garden an attractive spot, even though frost does visit us every night.

Passaic, N. J.

E. O. Orpet.

Hot-beds and Forcing-houses.—Hot-beds must go, at any rate for commercial business. Forcing-houses are cheaper in the



A Field of Lilies in Bermuda.—See page 184.

vernum have a pleasing effect already, their purple Crocus-like flowers being produced in advance of the foliage. When these are planted *Colchicum autumnale* should be mixed with the *Bulbocodiums*. This will give a corresponding crop of bloom, of the same appearance in fall. *Erica carnea* is blooming more freely than it has ever done. One plant here a yard across makes a striking display, being literally smothered with its pretty pink flowers. Many think the Heather is not hardy in this section. It is hardy enough here as regards standing the

long run, safer, and give better plants. Any man with a stroke of ingenuity can engage a carpenter and build his own. Build low, with a very flat roof. Heat with steam. Get the tables near the glass. I like a two-thirds span if I can get a nice southern exposure. Ventilate by raising the whole sash. Have all sash removable. Use gas-pipe for pillars. I have just completed a nice house, 20 x 60 feet, for \$800, heat and all complete, and have heating capacity for one or two more of the same size. It is a fine, substantial house.

Plant Patents.—It is certainly desirable that the originator of varieties should be protected. But I cannot see that plant-patents could be feasible, even if possible. In the first place, it is exceedingly doubtful if a patent could be had for those varieties which spring up from a chance seeding, and it is a fact that most of our varieties come in this way. But granted the patent, there are cases innumerable in which no jury, even of experts, could agree concerning the identity or distinctness of varieties. There are those who contend that no two varieties can be alike if they originate in different places, even though there are no characters to separate them. Of this class is Jacob Moore, perhaps the leading advocate of plant-patents, and he argues that expert growers will not confound such varieties. The facts, however, are against this theory. On the whole, there appears to be no better way than for the originator to adopt more business-like methods of handling his new sorts, and to sell under a copyrighted trade-mark.

Cornell University.

L. H. Bailey.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XVI.—HYBRIDIZATION.

IN what we have called cross-breeding, we keep within the limits of the species, using the pollen of one variety to act on the pistil of another variety of the same species. And, of course, we can cross races in the same way.

Now if we pass beyond the confines of the species and attempt to cross two different species, using the pollen of one to act on the pistil of another, we are undertaking what is known as hybridization. A hybrid is a cross between two species. The term has, however, been rather loosely applied; in fact, some writers have included crosses between varieties as hybrids, and such variety-hybrids frequently figure as true hybrids in some catalogues of plants. In the present paper it is designed to restrict the word wholly to crosses between what are accepted as true species.

First, as to the occurrence of hybrids in nature, little need now be said. That there are some well-marked hybrid Willows and hybrid Oaks is generally believed by all botanists, but the evidence on which such conclusions rest is, of course, inferential. Therefore it is better for us to turn at once to the consideration of artificial hybridization and note its methods as well as its results.

The method is simple theory, and not difficult to put into practice. The flower which is selected as the female is carefully freed from all of its stamens, with their pollen-bearing anthers, and then its stigma crowning the pistil is to be carefully dusted by pollen from the flower selected as the male. The transfer of the pollen can be effected by means of a sable pencil or camel's-hair brush. It is not necessary in all cases that the pollen should be absolutely fresh, for the pollen of some plants can maintain its vitality for a long time, but care must always be taken to see that the pollen is perfectly ripe. Moreover, the stigma of the pistil to which the pollen is applied must be just mature and receptive. If it is not mature, or if it has passed its period of complete receptivity, the pollen will not have its full effect; in fact, it would probably not have any effect at all.

After application of the pollen has been made, care must be observed that all insects are excluded, and that no foreign pollen is conveyed in any manner to the flower. Further than this, no special caution need be exercised. If impregnation has been effected the seeds will "set," and the fruit will go on to ripeness. It is worthy of note that in many cases of hybridizing, the fruit will apparently ripen and the seeds will seem to be good, while in point of fact they are worthless. In general it should be said that, in hybridizing, the blanks are many and the prizes are few.

The range of selection of species between which this process can be tried with a fair chance of success is wide. It is not possible, however, to state beforehand whether a given trial will prove successful, for there are some instances in which the process is not even reciprocal; that is, there are cases in which the species A can be used with success as the female element in the experiment, but will utterly fail if it is employed as the male, whereas the species B may behave in just the opposite manner, being capable of furnishing pollen which will be efficient, while its pistil might not prove receptive.

In general, the species selected should be nearly related. There are a few cases on record in which species belonging to different though closely allied genera have been successfully crossed, but it may well be that the limits of such genera

are yet to be changed by systematic botanists. This has already been done in the well-known genera *Azalea* and *Rhododendron*. Certain species of these two genera can be made to cross with each other, and their cases have formerly been cited as showing that different genera can be hybridized. Recent classification, however, has placed these two genera under one head, and the two are now known as *Rhododendron*.

It is an interesting fact that frequently in a genus there is one species which seems particularly well adapted to serve as the male or female factor in hybridization. Among the *Rhododendrons* the species called *Rhododendron Catawbiense* has played this part in the innumerable successful crosses with the tender species of the Himalayan Mountains.

Hybrids generally share, but not in an equal degree, the characters of the two parents. In some instances a sort of average is struck between the two; this, however, is rare. The influence of one of the two parents is sometimes so preponderating that the effect exerted by the other can hardly be discerned. This was the case in the well-known cross produced by Mr. Francis Parkman between the two species, *Lilium speciosum (lancifolium)* and *Lilium auratum*. Of the offspring from this cross only a single plant shared to any marked degree the characters of the two parents, but the wonderful and beautiful exception appeared to combine, in almost equal amount, the striking and desirable peculiarities of both.

As a rule, the roots, stems and leaves of hybrids are stronger and the flowers are more showy than those of either parent, but there is a marked diminution in the reproductive power. Hybrids incline to be sterile, but this sterility is by no means complete. There are many cases of fertile hybrids.

The offspring of hybrids possess a remarkable tendency to vary. The progeny have been said to cut adrift from the ancestral moorings, and they appear to drift passively in subsequent generations. This curious fact has been made use of by cultivators who have desired to obtain variant forms. They first of all secure a fertile hybrid, and employ this for careful seed-breeding.

Since hybrids are so rarely wholly fertile and, besides this, have a marked tendency to vary in their offspring, it is generally best to propagate by means of their buds in some way.

Derivative hybrids are those which result from the union of a hybrid with one of the parent forms or with a hybrid from a totally different source. In all these cases there is a tendency towards reversion to one of the ancestral types.

One of the most puzzling cases of blending of different characters is that known as *graft-hybrids*. When some of the variegated forms of *Abutilon* have been grafted on green-leaved forms, a few of the subsequent shoots of the stock have been more or less affected by the variegation. The most remarkable case of this is that of *Cytisus Adami*,* a plant which presents a form midway between *Cytisus Laburnum* and *Cytisus purpureus*. While there are many who believe that we have here a case of a hybrid produced by seed, the history as originally given indicates that the blending resulted from placing a bud of the former in the stem of the latter. The case is not wholly without its bearing on what has been noticed in some of our fruit-trees.

Cambridge, Mass.

George Lincoln Goodale.

Recent Publications.

A Manual of Orchidaceous Plants. James Veitch & Sons. Part IV. *Cypripedium*. London, 1889.

The present number of this excellent publication is devoted to a description of the tropical *Cypripediums*, which are, perhaps, just now occupying the attention of the horticultural world more strongly than any other class of plants. We cannot give a better idea of the general characteristic of the work and the method in which the subject is treated than by laying before our readers some rather extended quotations from its pages, which abound in interesting information and sound practical advice. After speaking of the fact that the peculiar structure of the flower of the *Cypripedium* shows that many relative or intermediate forms have been swept away, leaving this single genus as a record of a former and more simple state of the great Orchidaceous order, the author goes on to show "that the structure of the flowers does not furnish the only evidence of the *Cypripedes* being a more primitive race of Orchids than any other existing forms. The geographical distribution of the genus, especially of the two sections of it that form the subject of these pages, reveals some remarkable facts respecting the present history of the included species, all of which tend to the conclusion that the individual plants comprising them must at one time have existed in great numbers,

* See Gray's Text-Book, vol. 2, p. 445.

and have been spread over a much larger area than they at present occupy in a wild state, and that a gradual process of extinction has been as surely in operation here as it has been with more primitive types in other Natural Orders that are now become only subjects for the study of the geological botanist, although, of course, the epoch of final extinction may be yet far remote, and the race may be preserved indefinitely by the hand of man. Paradoxical as this may appear to the horticulturist habituated to regard the *Cypripedes* as being among the easiest of Orchids to propagate, the following considerations will go far to show that the statement here offered rests upon a good foundation. Although the *Cypripedes* are still spread over large portions of the earth's surface, both in the eastern and the western hemispheres, the included species have, almost without exception, retreated to sections that are extremely restricted in area, and frequently isolated and remote from each other; so that while some species are abundant in their known habitats, and have been and are still imported into Europe in quantity, it is very different with other species; for example, the habitat of the beautiful *Cypripedium Fairieanum* is practically unknown, and all the existing plants in cultivation have been derived from the three or four that were first casually imported. Two plants only of *C. superbians* that appeared accidentally among importations of *C. barbatum* are believed to be the progenitors of all at present known, and it is quite uncertain whether the species still exists in a wild state. *C. Mastersianum* has been but once imported, and its habitat is unknown to science. *C. tonsum* was sent to us in company with *C. Curtisii* unknown to its discoverer, who informs us that the last-named is quite rare, while its near ally, *C. ciliolare*, although somewhat more plentiful, has retreated to a remote corner of the Philippine Islands. *C. purpuratum* has become almost extinct as a wild plant in Hong Kong, and it is fast disappearing before the pressure of population on the Chinese mainland. The *Cypripedes* of South America present a similar case in their history. *C. Boissierinum*, one of the first species discovered on that continent, has been found only in a sequestered valley high up on the Andes of Peru, while thousands of miles distant from that lonely spot, on the Roraima Mountain of British Guiana, *C. Lindleyanum* and *C. Klotzschianum* have their home; and still further remote from either, on the Organ Mountains of southern Brazil, *C. vittatum* occurs, and nowhere else. Nor are there instances wanting among the hardy *Cypripedes* to prove that the same process of extinction is still in operation. Our native *C. calceolus* has become virtually extinct in this country as a wild plant, although, owing to its extensive distribution over central Europe, it is still comparatively abundant in some spots, while in others it is visibly yielding ground to the pressure of cultivation and the presence of a dense population; and this is also true of all the Japanese and of several of the North American species.

"The true cause of the gradual extinction of the race is probably to be sought for in the reproductive organs of the flowers. A very cursory examination of these must satisfy most observers that self-fertilization is impossible, and the sexual apparatus is so constructed that few among existing races of insects are found capable of effecting the necessary act of fertilization that secures the perpetuation of the plant by seeds.

"That the tropical *Cypripedes* are similarly circumstanced in their relation to insect visits is in the highest degree probable, for direct observations are, unfortunately, altogether wanting; and the probability is strengthened by the fact that among the thousands of plants imported by us during the past thirty years we have rarely noticed a single seed capsule. The inference is thence by no means an unreasonable one that the fertilization of the flower by insect agency is a rare, or comparatively rare, occurrence, and the perpetuation of the species must depend chiefly on new growths from the rhizome, by which the plants spread laterally, so far as food materials are at hand to support them. But the stations in which, for the most part, they are found, and where they must have originally sprung from the stray seeds that lodged there, are in the crevices of the rocks, and in a few cases on the branches of trees, where there is necessarily an extremely restricted accumulation of vegetable matter; their spread by this means is thence reduced to the narrowest limits."

The restriction of the genus first proposed by Reichenbach, by the exclusion of the South American species, now referred to *Selenipedia*, is only attempted under protest, as it were, as the following extract explains:

"We have, however, strong grounds for believing that this dismemberment of the *Cypripedia* is not final; for, notwithstanding the very important difference in the structure of the ovary of the South American species, these cross with the *Cy-*

pripedia of India and the Malay Archipelago, and progenies derived from this hybridization have been for some time in existence, and are receiving yearly additions to their number from various operators. The facts of the case, as it now stands, must, however, be fairly stated; the East Indian species cross freely with each other, and a numerous progeny of hybrids has resulted therefrom; the South American species also cross freely with each other, and many new forms have been obtained; the hybrids in both sections flower within a few years from the germination of the seed. But in the case of the crossing of the Indian with the South American species, the process has been much slower in producing results; an infinitely smaller proportion of seed germinates, and those seedlings that survive are so slow in arriving at the flowering stage that up to the present time, so far as we are aware, not a single plant has flowered, although the plants in our houses continue strong and healthy in appearance and yearly increase in size. Till these plants flower—and there is no apparent ground for belief that they will not—and the structure of the ovary of their flowers shall have been examined, we prefer to adhere to the original circumscription of the genus, certainly a very natural one, and to regard the ovarium character as of sectional value only. This view is strengthened by the discovery and introduction of the remarkable *Cypripedium Sanderianum*, a Malayan species that brings the relationship between the East Indian and South American *Cypripedes* morphologically still nearer than its previously known allies, *C. Parishii*, *C. Stonei*, *C. Philippinense*, etc., have done."

Of the true *Cypripedia*, exclusive of those inhabiting the north temperate parts of the world, "about thirty species are well authenticated, all natives of a region lying between the 27th parallel of north and the 10th parallel of south latitude, and between the 75th and 150th meridians of east longitude; they are altogether absent from Australia, and so far as at present known, from Africa and Madagascar; they are thence confined to a comparatively limited space within the Indian monsoon-region. They either follow certain mountain chains on which the species occur in groups of twos and threes, or are isolated and far remote from each other, or they are confined to particular islands or group of islands. In the former case they usually occur at a considerable elevation, where the rain-fall is copious and frequent, and the dry season of short duration; in these elevated situations they are found growing chiefly on the ledges and in the crevices of the limestone rocks, which constitute the chief geological features of these mountain ranges, in places where there is a small accumulation of decaying vegetable matter. These localities are often steep and precipitous, extremely difficult of access, sometimes fully exposed to the sun's rays, but more frequently in partial shade afforded by projections and overhanging trees. The insular species usually occur at a much lower elevation, not infrequently close to the sea-shore, and where the mean average temperature is naturally higher than that in which the mountain species grow. At least three species have been observed to have their homes on the stems and in the forks of the branches of trees, sometimes growing on the decaying fibrous roots of ferns.

"By far the greater part of the Indian and Malayan *Cypripedia* region lies within the equatorial zone, and is thence subject to all the climatic phenomena peculiar to that zone; these are fully stated in the introductory notes to *Dendrobium*. The species found outside this zone are chiefly north Indian, and occur on the Sylhet, Khasia and Garro Hills, also in parts of the lower Himalayan range, extending from Sikkim to Eastern Assam, succeeded still further eastward in Hong Kong and in the mountains in southern China by *Cypripedium purpuratum*; the climate of this part of the region is also described in our notes on the geographical distribution of *Dendrobium*, to which the reader is referred."

Of the production of hybrids no one can speak with greater authority, and the following cultural notes are therefore of real practical value: "No genus or race of Orchids that has yet been brought under cultivation has yielded so readily, and, we may add, so strikingly, to its influence as the *Cypripedia*. This is not only apparent in the results of hybridization, which will be noticed more particularly after the description of the species, but also in the species themselves, especially in those that have been longest under the cultivator's care. The most obvious effects of the cultural influence have been the development of more robust foliage of a brighter color, especially in those species with tessellated leaves; the normally one-flowered scape occasionally becomes two-flowered; the scapes themselves are more robust, often more elongated, and produce larger flowers, generally attended with some modification of color. Doubtless the chief cause of these changes is the more

abundant and the more regular supply of food material, by which the plants acquire a vigor rarely seen in those imported from their native countries.

"The geographical distribution of the *Cypripedia* included in this section sufficiently indicates the temperature in which they should be cultivated in the glass-houses of Europe, which is that of the East Indian house for most of the species and hybrids, that is to say, a house in which the night temperature in winter is never allowed to sink below 15° – 12° C. (60° – 55° F.), with a gradual rise as the season advances to 18° – 21° C. (65° – 70° F.), at which it should be maintained from May to August. The day temperature, by fire-heat alone, should be about 3° C. (5° – 6° F.) above those of the night. A few species, chiefly insular, including *Cypripedium concolor*, *C. niveum*, *C. Godefroya*, *C. Philippinense*, etc., thrive best in the higher temperature of the Phalænopsis house; on the other hand, *C. insigne*, *C. venustum*, *C. Fairieanum*, and the hybrids obtained from them may be cultivated in the intermediate house.

"It is evident, too, that as the great majority of the tropical species occur within the equatorial belt, or sufficiently near it to come under the like climatic conditions, of which the most noteworthy are the remarkable uniformity of temperature and the high degree of atmospheric humidity throughout the year, there is practically little or no interruption in their vegetation in their native homes. But when transferred to the glass-houses of this country, it is equally clear that such a uniformity of climatic conditions cannot be so strictly maintained by artificial means, owing to the succession of the seasons; hence there is, at least, a partial cessation of growth, if not absolute rest, during the coldest months of the year. Advantage should be taken of the recommencement of their growing seasons to re-pot the plants not then in flower; they should be potted in a compost of sphagnum moss and fibrous peat in about equal proportions; the drainage should be kept quite free; it should consist of clean broken crocks, with which the pots should be filled to one-half or even two-thirds of their depth, according to the size of the plants. As the roots of *Cypripedium* grow vigorously, ample provision should be made for their development.

"The plants must at no time be suffered to get dry at their roots during the growing season; a high degree of moisture must be maintained in the atmosphere of the house, the amount and frequency of the watering and the sprinkling of the floors, etc. of the house being, of course, regulated by the season of the year and the external circumstances of the weather, etc. The ventilation must also be regulated according to external influences, but it should at all times be as free as is consistent with the well-being of the plants, avoiding cold draughts and sudden changes of temperature. In the summer months the plants should be protected by shading from the direct rays of the sun; a very slight exposure to direct sunlight at that season causes the foliage to change color; this is particularly the case with those species that have tessellated leaves."

Of the *Selenipedia*, or South American Lady Slippers: "About ten species are known to be genuine, of which six inhabit the Cordilleras of western South America, from Bolivia to Chiriqui in Central America, at elevations of 3,000 to 5,000 feet; three occur on the mountains of British Guiana, and one on the Organ Mountains, near Rio de Janeiro. The localities indicated on the accompanying map must, in several cases, be accepted only as approximately true; the names given by plant collectors are often not to be found on any map within reach, and are, moreover, frequently misleading.

"CULTURAL NOTE.—The cultural treatment of all the members of this section, both species and hybrids, is the same as that of the East Indian *Cypripedes*, with the exception of the temperature, which, on account of the altitude at which the species occur in a wild state, should be 3° – 5° C. (5° – 9° F.) lower. All the species in cultivation, with the exception of *Cypripedium Schlimii* and, perhaps, *C. Klotzschianum*, whose scapes are few-flowered, continue in flower for several months.

"HYBRIDS.—In our introductory notes we have adduced the principal evidence upon which rests the hypothesis that the flowers of *Cypripedium* in a state of nature rarely produce seeds, owing to the absence generally of the agencies by which they can be fertilized. Under such circumstances, therefore, natural hybrids cannot be expected to occur, even where two species are found growing intermixed if in close proximity to each other; and it is a remarkable fact—a fact that unquestionably tends to strengthen the evidence we have cited, circumstantial as it is in some points—that no *Cypripedium* having the aspect of being a natural hybrid between two recognized species has ever yet appeared among importations of the species, as undoubted natural hybrids have appeared

among importations of *Cattleya*, *Lælia* and *Odontoglossum*. In strong contrast to this stands the multitude of hybrids raised artificially in the glass-houses of Europe, among which are new forms of exceptional interest, and of so vigorous a constitution that they may, in truth, be regarded as the forerunners of new races. Without attempting to anticipate results to be hereafter obtained from the intermixture of these races with each other and with the pure species, it may be safely affirmed that no greater triumph has been achieved in modern times by the gardener's art than the production of these hybrid *Cypripedes*.

"The first hybrid *Cypripedium* was raised by Dominy, from *Cypripedium villosum* and *C. barbatum*, more than a quarter of a century ago, at our Chelsea Nursery, and was distributed in 1871; it is appropriately named *C. Harrisianum*, in compliment to the late Dr. Harris, of Exeter, who first suggested to Dominy the feasibility of hybridizing and raising Orchids from seed. This was followed at short intervals by *C. Dominianum* and *C. vexillarium*. The first seedling raised by Seden is the well-known hybrid that bears his name, and which was distributed in 1874; this has been followed up to the present time by an uninterrupted series of results which, apart from successes obtained in other genera, has secured for the raiser's name a permanent place amongst British hybridists."

But we have already drawn liberally from Mr. Veitch's pages, and for further information about these plants, and for detailed instruction about the cultivation of the different species, we must refer our readers to the book itself. They will find it one of the most interesting and instructive works of horticulture which has appeared for a considerable time. The subject is admirably treated, and this makes it all the more to be regretted that the faults in book-making, to which we have already alluded in noticing earlier issues, are still adhered to—faults which must always injure its value as a work of reference.

Periodical Literature.

The *Popular Science Monthly* for April contains an excellent and timely article by Dr. Shufeldt on "Zoölogical Gardens, their Uses and Management." It is unnecessary to summarize the paragraphs which detail the direct services of such gardens or the many ways in which they may indirectly further the interests of public education and scientific progress. All intelligent persons know that they have a value far beyond that of affording a lounging-place for curiosity seekers. But it is important to emphasize the author's declaration that they infallibly degenerate into such lounging-places if the collection is "heterogeneously collected" and "purposelessly arranged." To be useful in any degree the selected site must be suitable for its purpose, and the collection must be arranged and managed on strictly scientific principles. "If possible," says Dr. Shufeldt, "the form of the grounds should be a regular figure, an oblong being one of the best, with a long side toward the direction whence come the prevailing winds, as this assists in securing good ventilation, and the area should include at least 200 to 250 acres. . . . Another matter of great importance is the character of the country, which should be as diversified as possible, and the enclosure should contain a few sizable ponds or a good, strong stream of water, in which event the former can easily be constructed artificially. Old trees in groups, some low, level, marsh land, and some hills and rocky portions are all points of extreme natural advantage. These latter features, if marked, usually insure, too, another benefit, for then hilly or broken country is likely to be found immediately beyond the limits of the garden, which, though conducive to the building of handsome suburban residences, is not likely to fill up entirely with houses as the city increases in size, and thus excellent ventilation is secured for all time." Of course, common sense, as well as a desire to create an attractive place of resort, demands such a site as is here indicated. Quoting from Professor Flower the author continues: "The old idea of keeping animals in small, cramped cages and dens . . . still lingers in many places. We have a responsibility to our captive animals, brought from their native wilds to minister to our pleasure and instruction beyond that of merely supplying them with food and shelter. The more their comfort can be studied the more they are surrounded by conditions reproducing those of their native haunts, the more enjoyment and instruction we shall obtain when looking at them." For these reasons, it is clear, the area of a zoölogical garden should be large and its surface should be varied to give proper homes to animals of different habits. Can any one deny the truth of these words? or, after reading them, can any one think that there is room within our Central Park for the establishment of a

zoölogical garden worthy of the name? The area which Dr. Shufeldt, who has carefully studied the subject in foreign lands, declares barely sufficient, means one-third of the whole area of this park. The remarks which he adds upon these accompaniments in the way of libraries, lecture-rooms, dissecting-rooms and museums which should be found in a zoölogical garden do not so nearly concern us here. Everything that he asks is desirable, indeed essential, to the creation of an ideal zoölogical garden, and almost everything could be secured in New York did public interest rise to the level of the occasion. There might be a little longer distance between the garden and the city museums and libraries than he thinks desirable, but New Yorkers are used to long distances, and nothing but money enough and a selection of wise and disinterested managers, who shall not be politicians, is needed to secure all other convenient and useful conditions. But the clearer and wider becomes our idea of these conditions the more absurd it seems that anyone should fancy for a moment that the Central Park could be arranged to afford them, even though it were entirely ruined, as a park, in the process of adaptation.

Correspondence.

An Interesting Garden and a Good Gardener.

To the EDITOR OF GARDEN AND FOREST:

Sir.—Good, all-round gardeners are rare in these days everywhere; perhaps they have always been difficult to find, but they are especially rare in the United States. Modern fashions in horticulture have been a serious hindrance to real advance except in a few very limited directions. Gardeners who have learned their business in the last thirty or forty years have learned a great deal about propagating and growing a few varieties of soft-wooded, tender plants, and about massing them together for the summer decoration of unnatural gardens, and they have learned, too, and most successfully, how to flower Orchids and how to develop all the beauty of leaf-coloring of many inhabitants of tropical swamps. But this has often been done at too great a sacrifice, and it is now rare to find a gardener who is as much at home with fruits and vegetables as he is with Orchids or herbaceous perennials, or one who knows much about trees and shrubs or about forcing, or, what is rarer still, one who knows and can grow hard-wooded, green-house plants.

These thoughts came into my head lately as I was walking through one of the old gardens of the Boston suburbs, that of Mr. John L. Gardener, of Brookline, which for nearly a quarter of a century has been under the entire charge of Mr. C. M. Atkinson, one of the few old-fashioned gardeners now left in America, and one of the most successful men in all departments of gardening who has ever been in this country. It is always instructive to visit these gardens, and the visitor never comes away without at least one valuable bit of information, conveyed in quaint and picturesque language, about some now little known or half-forgotten plant.

There is no garden I know where the good old hard-wooded plants are grown so successfully, or where so many different classes and varieties of plants in the different departments of the garden may be seen in better condition. But the hard-wood plants are best worth mention, perhaps because they are less often seen now than any others, and because they are, it seems, more difficult to grow. The variety is not very great, but there are admirable plants of *Eriostemon intermedium*, one of the most beautiful of the winter-blooming Australian shrubs, which, perhaps, cannot be matched now anywhere, and which would have done credit to the great day of English horticulture, when Mrs. Lawrence reigned supreme in the London flower-shows. *Eriostemon* belongs to the same family as the Orange, and its flowers, although slightly tinged with pink and quite destitute of perfume, resemble those of the Orange in size and form. It is a compact shrub, three feet or more high, of excellent habit, and it lasts in flower during eight or ten weeks. One of the plants, the result of twenty years of careful cultivation, was once exhibited at a meeting of the Massachusetts Horticultural Society for a prize offered for the best specimen plant. The prize went to some quick-growing, foliage stove-plant with a spot or a band which had not been noticed in any of its like, the Committee hardly considering the forgotten Australian shrub worth notice. Mr. Atkinson never will forget this incident, or lose an opportunity to repeat it. There are fine old plants of some of the old-fashioned Azaleas, like *Decora*. Heaths are well done and so are Chozemas, of which a large collection is grown. Here I saw, too, for the first time in America, a plant of *Anopterus*

glandulosa, a native of Van Diemen's Land. It is a member of the Saxifrage family, with handsome evergreen foliage and erect racemes of white or rose-tinted flowers.

These gardens are famed for their Japan Irises and for the great masses of spring-blooming shrubs and bulbous plants.

Hinsdale, Mass.

F. S.

Injuries to Conifers.

To the Editor of GARDEN AND FOREST:

Sir.—During several weeks past many observers have been noticing the large number of twigs of Norway Spruce that have been scattered on the ground about the trees. In a number of instances red squirrels have been seen on the limbs cutting the young twigs, from which they usually take the buds, and perhaps a part where the twig was severed. It was interesting to notice the varied replies to questions put to people who had seen the twigs on the ground. The twigs come off too hard to warrant the conclusion that they separate spontaneously. Most of them look as though they had been pulled or torn off, and not cut smoothly, although the squirrels caused the mischief. The twigs preferred are those that made short growths last year. Examination reveals the fact that this kind of work has been going on for some years at this place, and some persons remember to have observed this twig-cutting in former years.

Our squirrels here have no difficulty in reaching any part of the trees, even to the ends of slender twigs. In a very few instances the Scotch Pines have suffered in the same manner as the Spruces.

Agricultural College, Mich.

W. J. Beal.

To the Editor of GARDEN AND FOREST:

Sir.—Since writing in regard to possible causes regarding the injury of Norway Spruces, I have found, experimentally, that a high wind alone, unattended by frost, is sufficient to produce the damage. If you will take hold of a branch of the Spruce and give it a sharp shake, you will strew your lawn with broken twigs of all sizes. Your shake does not need to be any stronger than that produced by a sudden gust of wind. We had quite a strong wind (north-west) last week, and I found a considerable number of twigs, all freshly broken, on the north-west side. Spruces standing right behind, but protected against the north-west, had no twigs broken on the opposite (south-west) side, where the force of the wind was sufficiently checked.

Washington, D. C.

B. E. Fernow.

Recent Plant Portraits.

LOURYA CAMPANULATA, *Revue Horticole*, March 16: The type of a new genus of *Hamodoraceæ*, near *Peliosanthes*, recently dedicated by Baillon to the head of the indoor department in the *Jardin des Plantes*. *Lourya* is a native of Cochin China, where other species of this genus have lately been discovered. It has the port and the general appearance of an *Aspidistra*, while the flowers which are borne in compact umbles close to the ground and at the base of the leaf-stalk, resemble those of the Lily-of-the-Valley, although nearly twice as large. The plant requires the temperature of the stove.

MARMODES LUXATUM, *Revue Horticole*, March 16, an admirable colored figure of this Mexican Orchid, which has long been known in gardens.

LONICERA FRAGRANTISSIMA and L. STANDISHII, *Gardeners' Chronicle*, February 23d.

Notes.

The Department of Agriculture has just issued a circular on "Arbor-Day Planting in Eastern States." It has been prepared by Mr. B. E. Fernow, Chief of the Forestry Division, and it gives excellent advice as to the treatment of trees before and after transplanting, and the proper method of planting.

An international Congress of Pomologists will be held in Ghent in the month of September next, and in connection with it a large fruit-show. In the same city an International Exhibition of Chrysanthemums will be open from November 23d to December 1st, in celebration of the centennial of the introduction of the plant into European gardens.

It is interesting to note that American methods of Rose-culture are attracting attention abroad. An account of several of our famous Rose-growing establishments was recently printed in the *Gardeners' Chronicle* (London), accompanied by practical explanations with regard to the processes which result in the production of their fine winter crops; and a similar chapter was published in the March number of *Gartenflora*.

It has been decided by the Park Commissioners of Brooklyn to devote from \$200,000 to \$250,000 in preserving and beautifying certain portions of the city lands which lie to the eastward of its streets. About seventy-five acres, eleven acres of which are occupied by the reservoir, will be laid out with walks, drives and play-grounds, and, including the slopes of the reservoir, will be suitably turfed and planted. Ultimately, it is thought that portions of the ground may be devoted to the erection of public buildings, but meanwhile they will be made as useful and attractive to the people as possible.

Thousands of acres have this year been planted with fruit-trees in those districts of southern California where the "land-boomer" recently set all the world mad with speculation. In the San Joaquin valley large numbers of new settlers have lately established themselves in colonies for the purpose of fruit-growing, dividing their land into twenty and forty-acre tracts. In San Diego county the acreage devoted to this industry is five times as great as it was a year ago, and in Los Angeles and many other counties it is one-third greater. And, moreover, the old "placer-mining" counties are rapidly transferring their attention to fruit, and it is now the richest crop of Tuolumne, for example, once a conspicuous centre of gold production.

For many years the prizes offered by the Massachusetts Horticultural Society have been open to all competitors, whether they were members of the Society or inhabitants of Massachusetts or not. Several months ago a few members, who are in the habit of exhibiting strawberries, finding that outsiders living in a neighboring state were carrying off the prizes from the home talent, quietly went to work and secured the adoption of an amendment of the constitution, restricting competition to members of the Society. The movement and the method by which it was carried out have been considered unfortunate by many members of the Society, and at its last meeting the matter was reconsidered, and the prizes, by a large vote, are again opened to the whole world.

At the Massachusetts Experiment Station the black knot on Plum trees has been treated with linseed oil, turpentine and kerosene. These remedies were applied with a brush as soon as the warts began to appear, and as they do not all come at once, applications were made three times during the summer, all the warts being painted over each time. In the autumn, microscopic examinations found no spores in the warts, in fact, none of the sacks (perithecia) were developed enough to produce spores before the warts were destroyed by the remedies. Where kerosene and turpentine were applied so liberally as to spread about on the branch and run down over it, the branch was killed. No such injury came from using the linseed oil. The warts should be saturated in every case. The treatment of black knot hitherto recommended was cutting off the diseased branch and burning it. If this dangerous fungus can be controlled by any less heroic treatment it will be a great gain to plum growers.

At the late exhibition in Ocala, Florida, a scale of 100 points was used for judging oranges. Ten points were given each of the following characters, the first five being grouped as "physical" and the second five as "juice" characters: (1) size, (2) appearance, (3) thickness of peel, (4) absence of tissue or "rag," (5) absence of seed, (6) juiciness, (7) sweetness, (8) sub-acidity, (9) vinous flavor or bouquet, (10) absence of free acid. The standard of perfection for thickness of peel, absence of seed, and absence of tissue, was a full one-sixteenth inch peel on a 200-size, seedless orange, with a one-fourth inch core. An orange which sank in water scored ten for weight, that is, for juiciness. Every seed shown counted half a point off, and two rudimentary seeds counted for one. The unanimity of the tasters was remarkable, showing that the four different elements in estimating the quality of the juice were not fanciful distinctions. Several individual oranges under this rigorous test scored ninety-seven and a half.

Pinus Jeffreyi is well figured in the number of the *Gardeners' Chronicle* published on March 23d; the male flowers for the first time. It is one of the few California Conifers which grows satisfactorily in the eastern States, and those persons who have seen the handsome group of this tree in the park at Buffalo will hardly endorse the opinion expressed in our English contemporary "that a well-grown *Pinus ponderosa* is a very handsome object, the best *P. Jeffreyi* that I have seen is scarcely an ornament." As the two trees are seen here the latter is in every way the more satisfactory. As it appears on the eastern slopes of the Sierra Nevada, where this species abounds, and on Scott's Mountain, in northern California, where it was first discovered by the collector whose

name it commemorates, *Pinus Jeffreyi* is certainly one of the handsomest of the family, as it is one of the largest, being surpassed in size only by *Pinus Lambertiana* and by occasional specimens of *P. ponderosa*, grown in favorable situations on the west or moist side of the California mountains.

A large picture of the conservatory at Castle Ashby, in Northamptonshire, the seat of the Marquis of Northampton, was recently published in the *Gardeners' Chronicle* (London). It is interesting to American horticulturists as showing a conservatory of a kind which has few examples in this country. It is a so-called "architect's conservatory," built for architectural effect rather than for practical efficiency. "It is a place of handsome proportions and good workmanship, and an ornament to the grounds, but the gardener abominates it, for do not his best plants lose their leaves and lower branches and become attenuated objects of no decorative value, often falling a prey to insect enemies?" It was designed by Sir Digby Wyatt, and is 140 feet in length by thirty feet in width. The roof is of glass, sloping up to a ridge in the middle, and in the centre of the house it rises into a dome forty feet in height. But the lofty walls are solid, and a double row of columns, supporting iron girders, runs the entire length of the house. These columns are monoliths of Bath-stone, with rich capitals in the Composite style; and however great the practical disadvantages of such an interior may be, it has great beauty of effect, the columns composing admirably with the tall Palms and Bananas that are most conspicuous among the plants.

A correspondent of a German horticultural journal recently called attention to the fact that the current love for Orchids and ornamental foliage-plants has led to the neglect of those great collections of Orange-trees which were once so highly esteemed in the Fatherland. Fifty years ago every royal and princely establishment had its Orangery—a large building of fine architectural aspect, filled in winter with a mass of Orange and Lemon trees, which in summer were set out in ornamental boxes in the pleasure-garden, and at all seasons could be transferred to the palace itself if an occasion of ceremony required its adornment. These trees were often of great age and enormous size, and to keep them in proper shape and bring them into profuse bearing was the chief task of the gardener. Now, however, they have fallen out of favor to such a degree that an Orangery most often presents but a forlorn and neglected appearance. One can well understand why the writer from whom we quote should protest against such a state of things and should ask whether it might not be possible, by means of some "congress or exhibition" to excite renewed interest in these historical collections. There are, indeed, few green-house plants which can vie in beauty with well-grown Orange-trees in full bloom or fruit, and their presence is almost essential to the right effect of a garden designed in the old architectural way.

The sales of plants at auction began a fortnight ago at the rooms of Young & Elliot, in this city, and will be held every Tuesday and Friday until the 1st of June or later. Fair prices have thus far been realized, although the demand for bedding-plants will be more brisk later in the season, when as many as 50,000 are often disposed of in a day. They are offered in lots of 100 or 50, ready packed for transportation, and are bought largely by country florists, who grow them on and sell them at retail. Small plants of Verbena, Lobelia and the like are often disposed of for a dollar or so a hundred. But, besides this cheap material, more expensive plants, like Palms, Dracænas and Crotons, some of them fine specimens, are often sold. Large importations of Roses and ornamental trees, shrubs and vines have already been disposed of. The latter are often in assorted lots, each containing five varieties. In a lot of twenty bundles, for example, each bundle will contain a Golden-leaved Elder, a Red-flowering Horse-chestnut, a Chinese Lilac, a double pink Deutzia and a purple Hazel. In each of a dozen other lots the selection will be entirely different. Finely-grown specimens of Tree-box, four or five feet high, with many Ghent Azaleas, Rhododendrons and the rarer Conifers, were on the list last Friday. Besides dealers in plants, many persons with large places find it profitable to make purchases here. Altogether, these auction-rooms, on sale-days, are never without their attractions, and visitors to the city who take an interest in plants should not fail to look in.

Catalogues Received.

HULBERT FENCE AND WIRE CO., 904 Olive Street, St. Louis, Mo.;—Fencing, Wire-work, etc.—FRED. W. KELSEY, 208 Broadway, N. Y.;—Hardy Trees, Shrubs, Roses and Plants.—WM. PAUL & SONS, Waltham Cross, Herts, England;—Roses, etc.

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The Care of Small Tracts of Woodland.

WE have many letters from owners of small tracts of woodland complaining that their trees are dying, that many of them blow down, and that their “woods are running out.” The writers wish to know what is the matter, and what they can do to save their wood-lots. We note that most of these inquiries come from men who live in cities, or who have lived there, but who have places in the country which they desire to improve and enjoy, and some of them say that the more care and pains they bestow on their woodlands, the worse appears to be the condition of the trees. That comes pretty near telling the whole story ; but let us look into the matter a little.

Nearly every farm of any considerable size should have a due proportion of woodland, a tract where forest conditions upon a small scale shall be permanently maintained. The importance of preserving and perpetuating their wood-lots is not, as yet, sufficiently appreciated or understood by the farmers and land-owners of this country. This is, in part, only a special instance or form of a feeling or mental condition which exists widely among our farmers—that is, a degree of discontent with farming as an occupation and investment, a feeling which leads multitudes of them to desire to escape from agriculture and “do something better.” This has resulted from the habit of migration from the older portions of our country to the newer regions of the West, for the sake of richer and cheaper lands, and is reinforced by the restlessness and illusion which are elements of human nature. At present it imparts to nearly everything connected with the farming interest in America a quality of transitoriness and uncertainty, so far as particular persons and their possessions are concerned. A large proportion of our farmers are men who do not yet heartily accept farming as their occupation or business, and this uncertainty regarding the permanent ownership and occupancy of farm lands has a bearing upon many things connected with our national interests and civilization. We shall have occasion from time to time to discuss this element and its various effects ; at present we merely recognize it as one of the causes of the prevailing low estimate of the value of farm wood-lots.

It is encouraging to see any signs of increasing attention to this kind of property, even if, as often happens, the new interest has an injurious or fatal effect. The intelligent observation and comparison of facts will lead to wiser methods of treatment.

The first thing a man from town usually does, when he comes into possession of a place in the country, is to clear out all the underbrush. He says he wishes to be able to see all over his wood-lot. Perhaps the ladies of his family desire to walk about in it, as in a kind of larger door-yard or lawn, and in order that movements and vision may be free all the bushes and small, “worthless” trees are removed. Let us attend to each point as we go along. If our friend wishes to walk in his woods, to enjoy their beauty, coolness and quiet, why does he not open winding paths through them, leading to the places of greatest interest? The first effect of removing the undergrowth, so as to permit an unhindered view of the whole tract of woodland from every part of it, is greatly to reduce its apparent extent, and as a consequence the sense and charm of possession—of ownership—is diminished in the same proportion.

Let us next note the fact that the removal of the undergrowth, and of all barriers to an unlimited view, destroys entirely the element of mystery, of surprise and expectancy, the quality which tempts and rewards the explorer, the impression and promise of something still before us and beyond what we can see, which may minister a fresh delight. When one can see all over a tract of woods at once, its beauty, its real attractiveness, has been eliminated—thrust beyond the threshold. It may still be a good place to look away from ; as a mere point of view it may be worthy of resort or possession, if from it one can see distant-wooded hills, or long, upward-stretching mountain slopes with cloud-shadows drifting across them, or far-away gleams of the blue sea. But any beauty or charm which the place may have had in itself, or which might have been developed or created in it by judicious management, has been destroyed, and the woodland thus treated will not afterward have any spell or power to minister to the happiness or peace of any human being.

Why do the trees die, if they are not blown down? They usually and naturally die because of the increased desiccation of the ground about their roots, and the abrupt access of heat and light produced by the destruction of the undergrowth. The impoverishment of the soil also contributes to the death of the trees. The undergrowth, while it remained, acted as a mulch for all the trees, large and small. It detained the dead leaves until they decomposed where they had fallen. Where forest conditions are maintained the land grows richer perpetually. Now that the underbrush has been destroyed, the fallen leaves are blown away beyond the limits of the land which produced them, and are wasted wholly, or they feed and replenish the soil of another owner. In woods sustained by undergrowth this natural mulch retains the water supplied by rain, and the trees are fed throughout the summer. Now the water mostly runs off at once, and the effect of the heaviest rain lasts but a short time. When trees have nothing to drink they cannot eat, so they die.

To sum up, the natural conditions which have produced and maintained the trees in these pieces of forest or woodland have been interfered with and changed to such an extent that the trees inevitably perish. The passion for “improvement” often leads to draining the woodlands, thus hastening the catastrophe. In general, the best way to take care of small pieces of woodland is to let them mostly alone, keeping out all domestic animals, and taking needed precautions against fires. Open paths, of course, wherever they will enhance the interest of the woodlands and increase their charm for lovers of natural beauty. But in most of the settled regions of our country the woods will not bear any great increase of sunlight about the roots of the trees, or any considerable change in the natural conditions which produced the for-

est growth, and which have hitherto reproduced and maintained it. In such cases as we have considered the owner might almost as well have girdled his trees at once.

The first great improvement in rural cemeteries was made when the bounds between lots were abolished and the so-called "lawn-system" was adopted. In the earliest rural cemeteries, like Mt. Auburn, each owner of a lot was allowed to surround it with such a fence or hedge or stone curbing as suited his fancy. But the boundary-wall offered nearly as good an opportunity for the display of pretentiousness and individual bad taste as the mortuary monument itself, and cemeteries were converted into stone-yards, to which lavish horticultural expenditure gave no effect of rural restfulness or sanctity. The evil, like many others of the kind, cured itself in time; and now in all cemeteries where modern notions prevail no lot is sold without the special provision that the purchaser cannot in any way define its boundaries except by corner-stones sunk below the surface of the ground. The monument, however, remained, and as wealth increased, developed from year to year into a more hideous inappropriateness and vulgarity; and it became evident that without some active control in such matters on the part of the managers of cemeteries, they must fail in those very directions where, it was believed, American burial-grounds were better than those of any other country.

There is in Brookline, Massachusetts, a small rural cemetery belonging to the town, and governed by a Board of Trustees elected by the people. These Trustees, it appears, have taken the lead in instituting a much-needed reform by prescribing the manner in which monuments can be erected in this cemetery. They have had a number of different designs for simple gravestones made by a skillful architect, and if a person wishes to buy a lot he can do so only upon the condition that he will select one of these designs, or if none of them suit his taste, that he will submit some other to be approved by the Trustees.

The idea that underlies this system is the same which has done away with prominent bounds. It is the idea that no individual lot-owner has the right to do anything on his lot which will injure the aspect of the cemetery as a whole. The Brookline Trustees have further declared, on the same principle, that no monument or headstone of white marble shall in future be erected in the cemetery; they regulate for the general good, the selection, by lot-owners, of plants, baskets and other decorations; and discourage expensive architectural tombs. There is no extravagant horticultural establishment connected with the Brookline Cemetery; no beds of glaring flowers, no novel or misshapen trees, no attempts at display. It relies for its attractiveness upon natural woods carpeted with wild flowers, native shrubs and well-kept lawns bordered here and there by noble masses of natural rocks, after the striking feature of much New England scenery.

The idea of controlling the character of monuments in a cemetery is so novel, and indicates such a long step forward in the right direction, that we have obtained from the Board of Trustees the permission to reproduce, for the benefit of the public, and more especially for the benefit of the Trustees and managers of other cemeteries, the selection of their designs which appear upon later pages of this issue.

Hardy Deciduous Shrubs.

PERSONS who have not given direct attention to the matter rarely appreciate the richness and variety of the flora of our Atlantic States in trees and shrubs. One can hardly walk a mile over a road in any hilly section of these States where the waysides have been left with any liberty to clothe themselves with vegetation, without passing at least twenty species of trees and as many, perhaps, of shrubs. We have in mind a short water-course in northern New Jersey where a little brook, rising in apiece of springy upland, hurries down across three pasture-lots to unite with a larger stream in the meadows. At one

point a rather steep bank rises from the brook to a height of thirty or forty feet, and along this bank for a dozen rods the trees and shrubs have been left to grow. Further down there is a little swamp, but elsewhere all is open grazing land, with single trees scattered sparsely over the fields and along the fences, or drooping over the brook. A visitor recently followed this little stream from its source to where it empties into the larger one, a distance of less than half a mile, and counted thirty species of trees. Here is the list: Tulip-tree, Basswood, Red Maple, Sugar Maple, Black Cherry, Wild Plum, Scarlet Thorn, Juneberry, Flowering Dogwood, White Ash, Black Ash, Sassafras, White Elm, Slippery Elm, Mulberry, Black Walnut, Butternut, Shagbark Hickory, Pignut Hickory, White Oak, Scarlet Oak, Black Oak, Pin Oak, Chestnut, Beech, Hop Hornbeam, Ironwood, Sweet Birch, Aspen, Smooth Alder and White Willow, the last a naturalized foreigner. As many kinds of shrubs and woody vines could, no doubt, be named, and perhaps a dozen other species of trees could be found within a radius of a mile, among them the White Pine, the Pitch Pine, the Hemlock Spruce and the Red Cedar.

This list is not quoted to prove the exceptional richness of this locality in species of deciduous trees and shrubs. There are places among the mountains of North Carolina, for example, where many more could be found. But the small number of coniferous trees, when compared with the others, is worth considering. Except in a few favored locations the ratio between the number of conifers and broad-leaved evergreens, on the one hand, and the number of deciduous trees and shrubs on the other, is very small throughout the central and northern Atlantic States. This would seem to indicate that plantations should be largely composed of deciduous trees and shrubs. On our Pacific coast, conifers form a much larger proportion of the forest-growth, and in England, where the climatic conditions approach those of our Pacific states more nearly than they do those on this side of the continent, coniferous trees and broad-leaved evergreen shrubs are among the most conspicuous ornaments of the garden. It was natural that the earliest attempts at gardening in this country should have followed English models, and, as a matter of fact, many gardens in this country have fallen into premature decay because they were largely planted with conifers and evergreens, which have proved sickly and short-lived in our climate.

But because our hot summer suns and icy winters and long, dry autumns are unfavorable to this class of plants, there is compensation in the fact that these are just the conditions which enable deciduous shrubs to make a strong, healthy growth, to ripen their wood well, to bear flowers and fruit in abundance and to develop into a beauty which they can never attain under the soft, moist airs and equable temperature of western Europe. Not only are our native shrubs beautiful at all seasons, but there is hardly a day in the year when a garden composed of them exclusively would not wear some special attraction. Along the brook referred to at the beginning of this article, the bright fruit scarcely falls from the Black Alders before the Spicewood is in bloom. Flower follows flower all summer, and the wild Roses are still opening when the autumn colors begin to kindle in the foliage of the Sumachs. Even when the leaves are gone the Witch Hazel is covered with blossoms. If we add to such local groups the treasures of our colder northern woods and of the southern Alleghenies we can begin to understand how rich and varied a garden could be made from native shrubs alone. And, again, it cannot be too often repeated that for a combination of good qualities no small trees can be found in all the world to excel our Dogwoods, Viburnums, Thorns, Sumachs, Fringe-tree and several others. In foliage, flower and fruit; in form, habit and autumn color they make so effective an addition to the shrubs that we find no occasion to envy the gardens of England for their superiority in conifers.

But this is not all. Deciduous shrubs from other countries flourish here as well as our own. The trees of Europe, as a rule, do not thrive here, but the shrubs of Europe and those that have been produced in European gardens are readily established here, while those from eastern Asia and Japan can be found in every door-yard. Indeed, the Forsythias, the Spiræas, the Flowering Quinces, the Mock Orange, the Lilacs, the Snow-balls, the Tartarean Honeysuckles, the Weigelas, the Deutzias, the Rose of Sharon—the shrubs most commonly planted—are all of foreign origin, and among those recently introduced into cultivation are many quite as interesting as those of established reputation. Practically the number to choose from is almost limitless. In the Arnold Arboretum more than 1,200 species and varieties of shrubs are now growing, and further south a still larger collection could be gath-

ered. Most of them are easily raised. All they ask is ordinary kindness and they will increase in beauty every year. Best of all, they are adapted to small gardens, and small gardens in this country will always greatly outnumber the large ones. There is no village lot with a square rod of turf which cannot be beautified by a border of hardy shrubs, and there is a place for them, and a place of honor, too, in the most spacious and the most elaborate grounds. They are useful for massing and for single specimens, and the planter who knows how to handle them properly can find a place for them in comprehensive landscape effects as well as in the construction of cabinet pictures—in the middle distance as well as in the foreground of his compositions.

If there is to be anything distinctive in the gardens of eastern America, it will grow out of the freer use of deciduous shrubs, and in years to come those parks and gardens will be most interesting where these shrubs have been planted with the greatest intelligence and skill.

Tombstones for Rural Cemeteries.

MR. J. A. SCHWEINFURTH, a well-known architect of Boston, recently prepared twenty-five designs for simple cemetery monuments, and has kindly joined the Trustees of the Brookline Cemetery, at whose request the drawings were made, in consenting that a few of them should here be reproduced. It was difficult to choose eight as the most interesting, where all were very good; and those we give may be accepted not as better than the others, but simply as showing several different types which, with sundry others, were variously developed by the artist.

The first thing to be remarked in these stones is their simplicity; and it need hardly be explained that this is the most important quality they could possess. There may be many places where highly ornate sepulchral monuments are appropriate, but a rural cemetery is not one of them. But, on the other hand, simplicity should not mean crude ugliness, even in the smallest and most thoroughly rural burial-ground. Stones should be at once unobtrusive yet artistic, plain yet beautiful. Good taste should speak not only in the restricted use of ornament, but in its tasteful application and skillful designing. The artistic excellence of these eight designs will, we believe, be as readily appreciated as their lack of ostentation. In place of the bald shapes, clumsy profiles and mechanical inscriptions with which our simple tombstones in the past have made us familiar, here we have carefully studied proportions, graceful contours and the suggestion of a kind of lettering which, easily executed and easily read, has yet a certain decorative charm.

Perhaps the best of all the designs is No. IV. A flat slab, covering the place where the cofined form has been laid to rest, is undoubtedly the earliest form which the Christian monument assumed when it was placed in an open, grassy spot; and it seems the most natural and expressive form, explaining its purpose and marking the site it consecrates more exactly than an erect stone can do. Its inscription can be easily perused by those who stand beside the grave; and the fact that it is invisible at a distance may be counted a merit, as the last hint of ostentation is thus avoided. Countless memories come to mind of famous men whose tombs are marked by flat stones in those cemeteries of the Old World which most nearly approach in idea to ours; but we need only recall the fact that such a stone was thought sufficient to mark the grave of Albert Dürer in the suburban graveyard at Nuremberg. Those who seek it to-day where it lies embosomed in grass, and read its simple inscription, "*Emigravit*," receive an impression the appropriateness and adequacy of which must convince them that no more conspicuous memorial is needed even for the resting-place of a very noteworthy man. There is a Christian humility and dignity and a simple pathos in the aspect of a stone like Dürer's, or like the one here pictured, which is lost, perhaps, even in the most modest stone which stands erect. And from the point of view of the repose and sanctity of effect which a cemetery as a whole should have, flat stones are palpably preferable to all others.

No. VII. shows a modest type of headstone which is redeemed from poverty by its graceful proportioning and by the simple band of classic adornment which encircles the lettering. No. V. is another classic design which is given a less severe look by a nicely profiled base and cornice. No. VIII. is sturdier, again, in its proportions, and those who think classic ornamentation a little cold and inexpressive on a modern tombstone may be attracted by the Palm-branch which forms its decoration. Here a place for a possible second inscription is indicated on top of the stone, nor is there any reason why

all its sides could not be used if the lettering were discreetly applied; and a single monument, bearing the names of several individuals, is often more desirable than many, being less obtrusive as well as much less costly. Too often we see a pretty lot, where a single attractive monument should have stood, encumbered with a row of stones which, if they are all alike, produce the unfortunate effect of things bought by the quantity or, if they are unlike, contrast unpleasantly with one another. No. I. shows another squarish stone, but with a canted space on the side for the inscription. In another design, not reproduced here, Mr. Schweinfurth varied this idea by making the stone still thicker and inclining both sides to give room for two inscriptions. No. VI. shows a stone which is extremely plain in outline but wins beauty from the decoration. It is intended, of course, for use upon a soldier's grave, and in the artist's series it was accompanied by a second, which was appropriate for a naval officer or sailor.

At the time of the Reformation, or more exactly, in Puritan days, the cross was so generally associated with the rites and usages of the Catholic Church that it was wholly banished from Protestant graveyards. No crosses can be found among the old tombstones of New England, and in Protestant Germany they are still rare. Modern American feeling, however, has again accepted them as the natural symbol of every Christian sect, and the form constantly occurs in all our cemeteries. We are unable to give our readers a strictly simple cross-form from Mr. Schweinfurth's hand; but something better, we think, is offered in the picture No. III. This is one of the very earliest of Christian gravestone-forms reduced to its simplest elements. It shows that combination of the cross and the circle—the emblem of Christ and the emblem of eternity—which more constantly appears than any other design in the oldest sepulchral monuments of the northern nations of Europe. In many parts of the British Isles gravestones may still be seen—not, of course, in their original positions, but preserved in church or cloister, or in some antiquarian collection like the rich and interesting one in the library of Durham cathedral—which antedate not only the Norman, but the English conquest. They have come down to us from that early British Church which flourished when the Romans bore sway in the land, which was wiped out of England proper by the deluge of Anglo-Saxon heathens, but lived on in Ireland, thence extended its influence to Scotland, and from Scotland came back into the north of England again when the missionaries of Rome were converting the more southerly districts. And on almost all these monuments—separated from one another, perhaps, by several centuries of time, but akin in that artistic character which is popularly called "Celtic"—the cross within the circle appears. Sometimes it forms the body of the stone, as in our picture, although seldom so simply treated as here. Sometimes it is carved in relief, sometimes incised; but in one shape or another it is the prevailing motive. Surely, therefore, there can be no motive which is more appropriate for the use of modern Christians descended, as a rule, from the inhabitants of the British Islands. None could have greater historical sanctity, none could be more expressive in its meaning, and none could be more attractive to the eye. It was, indeed, because of its many claims to attention that two designs were selected for reproduction in which this symbol appears. In No. III. it forms the monument; in No. II. it is carried upon a plainly outlined headstone, and interwoven with those ribbon-like lines which were the great and inevitable feature in all kinds of "Celtic" ornamentation. This stone might almost be accepted as a genuine relic of the early British Church, and seeing that it is wholly unaffected, appropriate and modern-looking, the fact will undoubtedly recommend it to those who care for artistic, historical, or ecclesiastical suggestiveness.

There is another merit, we may add, in designs as simple as these besides the great merit of appropriateness to their place. They are not difficult to execute; they can be well formed and carved by any intelligent stone-mason, while an elaborate design with very varied profiles and intricate carvings needs a skillful sculptor for its right execution. Even where money is not grudged is usually difficult to find such a sculptor just when and where he is needed for such a purpose. The original designs which Mr. Schweinfurth prepared were drawn on a larger scale than our reproductions, and were accompanied by sections from which any careful mechanic could work with success.

Of course the good that may spring from the publication of this little series need not be confined to actual imitation of the designs portrayed. Each of them suggests much more than it reveals; each of them may become the text for a large number of variations. Only, it should be borne in mind that to

vary such designs and secure a corresponding degree of excellence is not a task which the client should assume himself or should confide to the average stone-cutter. They are excellent and attractive not because they are simple, but because their simplicity is artistic; and it is artistic because an artist was employed to make them. Yet this fact need not deter any individual or association, however modest the sum of money at command, from attempting to secure their like. The task is one for an artist, but for an artist it is not a very difficult task. There are many young architects in America who could design good gravestones now that Mr. Schweinfurth has pointed out the direction which their efforts should take; and their fees would doubtless not be large for a single stone, or even for a number sufficient to serve as a sample stock, so to say, for the trustees of a rural burial-ground. An architect, be it remembered, and not a sculptor, is the proper person. Quite apart from the fact that well-trained architects are more frequently found in this country than well-trained sculptors, it may be explained that a sculptor's training does not prepare him to deal with formally-shaped blocks of stone, much less with ornamentation of an architectural character, such as incised bands of decoration, and especially profiled bases and cornices. The better sculptor he is, the more certain he will be to recognize this truth. Indeed the best sculptors make no secret of the fact that whenever an architectural element, no matter how small and simple, occurs in their work, they call upon an architect for assistance.

If Mr. Schweinfurth's designs excite the interest they should, if they stir up those who purchase monuments to demand something better than the stone-cutter's clumsy and mechanical wares, and inspire his professional brethren with a wish to show what they can do in the same direction, the public will owe a great debt to him as well as to the Brookline Trustees who employed him. We believe that only in very exceptional, isolated instances has an artist hitherto been called upon to design a simple headstone for a grave; and we are certain that no series of such memorials, designed by an artist, has hitherto been published.

New or Little Known Plants.

New Japanese Chrysanthemum, Wm. H. Lincoln.

IN this new Chrysanthemum, another of the interesting Mrs. Alpheus Hardy collection, we have a combination of qualities seldom displayed in one variety. The habit is strong and bushy, the foliage fine; the flowers are of enormous size, and of a desirable rich yellow color, similar in shade to those of the variety *Jardin des Plantes*; they are supported by unusually stout stems, which always hold them in an upright position. The petals are long, tubular for about half their length, the outer portion nearly flat, with slightly incurved tips.

The illustration shows a flower considerably less than natural size.

A. H. F.

Foreign Correspondence.

London Letter.

BITING north-east winds, with sharp frosts now and again in the early morning, are causing fruit-growers a little anxiety, but the sunshine is calling forth flowers in all sorts of nooks and corners, and the Daffodils are almost in their full glory. Amongst a host of varieties, big and little, distinct and not distinct, there are several which are delightfully good. Among these are *N. cyclamineus*, one of the Calathinus group, whose history appears to be almost as romantic as that of the *Shortia*, *N. minimus*, a pretty little flower, and *N. Santa Maria*, one of Mr. Barr's discoveries, and the darkest yellow I have yet seen. The flowers of the latter are very large, and not unlike the Major variety of *Pseudo-Narcissus*. Erythroniums of various sorts, chiefly of *E. dens-canis*, although your *E. grandiflorum* is also well represented, are beautiful both in leaf and flower. *Primula denticulata*, *Chionodoxa Sardensis* and *C. Luciliae*, the two last being sheets of the brightest blue, and the old *Scilla Sibirica* are almost, if not quite, as pretty. These three plants are largely used at Kew for outdoor effect in early spring, the *Scilla* greeting one in beds and in the grass in all parts of the garden. *Anemone blanda* is still beautiful with flowers; as also are the Hepaticas. Primulas of many kinds are in bloom, most of them in pots in a frame or cold green-house.

Daphne mezereum is now at its best, several large beds of it at Kew being just now a great attraction. Planted in a peaty soil in a moist, somewhat shaded position, this Daphne becomes a large shrub, and flowers most profusely. *Prunus*

divaricata is in full bloom, a large, spreading tree of it being a prominent feature on one of the lawns.

Drosera cistiflora is at last flowering at Kew, and bears out all that has been said and written in its praise as a beautiful flowering plant. The stem is erect, five inches high, with linear leaves two inches long and covered with reddish, glandular hairs. The flower is terminal, saucer-shaped, two inches across, and colored a brilliant poppy-scarlet. *Godwinia gigas*, an enormous-flowered, tuberous-rooted Aroid, is also in flower at Kew. The spathe is boat-shaped, two feet long, very stout, and colored deep vinous purple. The plant is a native of Nicaragua.

The Hyacinth, its history and cultivation, was the subject of three papers read before the last meeting of the Horticultural Society, two of the papers being by well-known Dutch growers of these plants, the third by Mr. Douglas, a noted grower and exhibitor of Hyacinths in England. Amongst much that was of interest, nothing particularly new was started, except a fresh theory as to the origin of the garden Hyacinth, and the suggestion that there does not appear to be any good reason why the Dutch should hold a monopoly of the Hyacinth trade. At Kew some experiments in Hyacinth cultivation have been and are still being made, and as far as they have gone they show unmistakably that these plants, like the Tulip, Crocus and Daffodil, may be grown year after year with as good results in some cases as anything from Holland. Miller preached this practice a hundred and fifty years ago, and it is true several attempts have been made since then by English horticulturists to wrest at least a portion of the Hyacinth trade from the Dutch, but they failed because of the prejudice in favor of the Holland bulbs. The natural conditions which in Holland are said to be exceptionally favorable to the Hyacinth and other bulbs are not really so. I mean, that so far as the real wants of the bulbs are concerned the conditions are just as favorable in many parts of England, and probably in America also. It is simply a question of labor and prestige. There are some even now who recommend Dutch *Narcissi* before English grown, in spite of the superiority of the latter, as has been shown again and again. We know that tulips can be grown at least as well here as in Holland. But the Hyacinth has yet to be grown here. There is something peculiar about the life-history of the latter which I do not yet understand. As a rule, after the bulbs have been once flowered in England they are considered of no further value. Mr. Douglas, in his paper, recommended distributing them among the poor. Is there any reason why the garden Hyacinths should not grow on and improve from year to year, as, for instance, Lilies, *Narcissi*, and many other similar plants do? At Kew we find that the bulbs of many of the sorts after flowering develop two to four crowns, so that there are several spikes, smaller ones, naturally, the year following. In such cases it is likely that the crowns should be pulled apart and grown on as if they were young bulbs. All the garden Hyacinths have sprung from *Hyacinthus orientalis*, a comparatively poor plant, not much, if at all, better than our wood Hyacinth, and, like it, blue-flowered. It is remarkable that, although the first record of the cultivation of the Hyacinth was about the year 1585, there was a white variety in 1602, all colors in 1614, and in 1657 double-flowered forms were known. In 1725 no less than 2,000 named varieties were in cultivation. There appears to have been a Hyacinth, as well as a Tulip mania, such sums as £133 8s 6d having been given for one large and eight small bulbs of a double, blue variety. Nowadays a shilling is a good price to pay for a good Hyacinth.

In Holland the Hyacinths are grown in fields, which are well-manured with cow-dung, cropped once with potatoes, and then the bulbs are planted in September. As soon as the flowers expand the spikes are cut off, and in June the bulbs are lifted, dried and stored till the following September. This is done annually till the bulb is large enough for the market. They are propagated from bulbils produced at the base of old bulbs, which have been cut several times across the bottom or the base scooped out. It takes from four to six years to grow a full-sized bulb from one of these bulbils, and about eight years from seeds. The latter, however, are never employed except by breeders. I wonder what the Dutch growers do with the matured bulbs which remain on their hands unsold? This year Hyacinths have been below the average, owing, no doubt, to the absence of sunlight and warmth during the early part of last summer. Those who have a quantity of bulbs on hand after they have flowered in pots should plant them on lawns or grassy banks in a sunny position. They will take care of themselves and make a beautiful display in spring. There is a bank of them in the wild garden at Kew, and they are, at least, as great an attraction as the thousands of Daffodils and

carpets of Crocuses, which are also a feature of this wild garden.

The following plants were amongst those exhibited at the "Hyacinth Conference" and were noteworthy: *Cyrtopodium Saintlegerianum*, a magnificent Orchid with a spike a yard high, freely branched and bearing over a hundred flowers, which were yellow, thickly barred and blotched with chestnut-red, prettily undulated, and formed so as to resemble butterflies. The large bracts at the base of the branches were as brightly colored as the flowers. It is probably only a variety of *C. punctatum*, an old garden Orchid, though rarely flowered. *C. cardioclena*, a yellow-flowered species was also shown. It is very similar to *C. Andersoni*, differing chiefly in the form of

anum, a very pretty species, or probably a natural hybrid between *O. cirrhosum* and *O. crispum*. *Spathoglottis Kimballiana* (*S. aurea*), a grand Orchid, which a friend well described as a "big, yellow-flowered Phalænopsis." *Dendrobium micans*, said to be a hybrid between *D. Wardianum* and *D. lituiflorum*, but not perceptibly different from some forms of the last-named species, was sent by Messrs. Veitch and obtained a first-class certificate. The same firm sent beautiful little examples of *Boronia heterophylla*, and some new *Hippeastrums*. A *Clivia* named John Laing was exhibited by the nurseryman whose name it bears, and was generally admitted to be the largest-flowered and deepest-colored of any yet seen.

April 5th.

W. Watson.



Fig. 104.—New Japanese Chrysanthemum, Wm. H. Lincoln.—See page 196.

the crest on the labellum. A magnificent spike of *Odontoglossum crispum* var. *Stevensii*, with flowers four and a half inches across, of perfect form and heavily marked with large chestnut blotches, was shown by Baron Schroeder. *Oncidium superbiens* and *O. macranthum* were shown in first-class condition. These two are among the very choicest of *Oncidiums*, indeed, one might say of all Orchids. The last named had a spike eight feet long, and the flowers were each three and a half inches across, with dusky yellow sepals, bright yellow petals, a curiously formed fleshy-purplish lip, bearing a prominent white crest. *Dendrobium melanodiscus*, a hybrid from *D. Ainsworthii* and *D. Findlayanum*, was shown by Sir Trevor Lawrence. He also sent a plant of *Odontoglossum Ruckeri-*

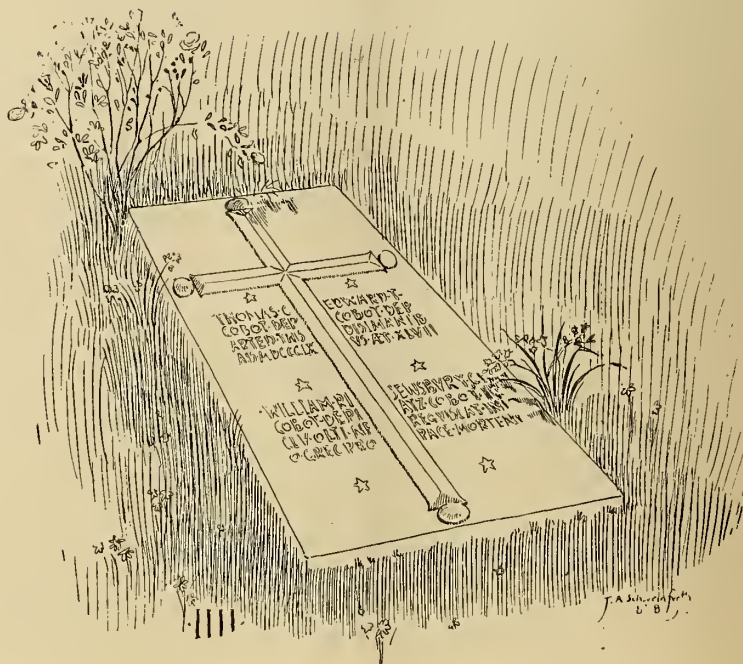
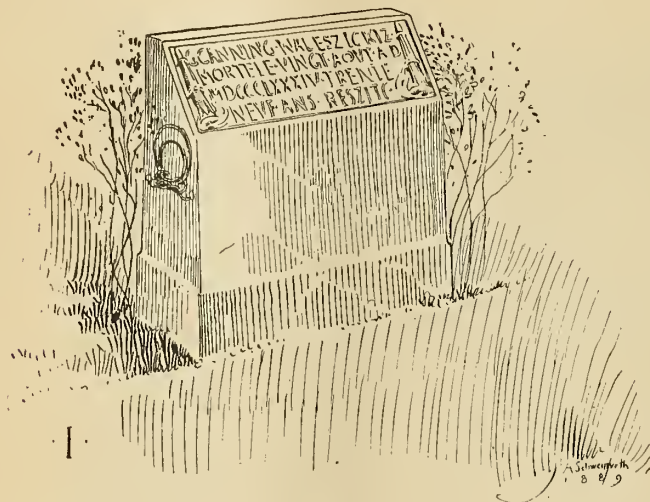
Cultural Department.

Evaporated Sulphur in the Green-House.

THE value of this remedy against many parasitic fungous growths and minute insects which infest plants grown under glass has long been recognized, but the results of some experiments made by Professor S. T. Maynard are so interesting they are worth the attention of everyone who grows plants under glass. The report was made in a bulletin of the experiment station connected with the Massachusetts Agricultural College.

This remedy consists in keeping a kettle or basin of sul-

SELECTIONS FROM TWENTY-FIVE DESIGNS MADE FOR THE TRUSTEES OF WALNUT HILLS CEMETERY. JAS. SCHWEINFURTH ARCHT. BOSTON.

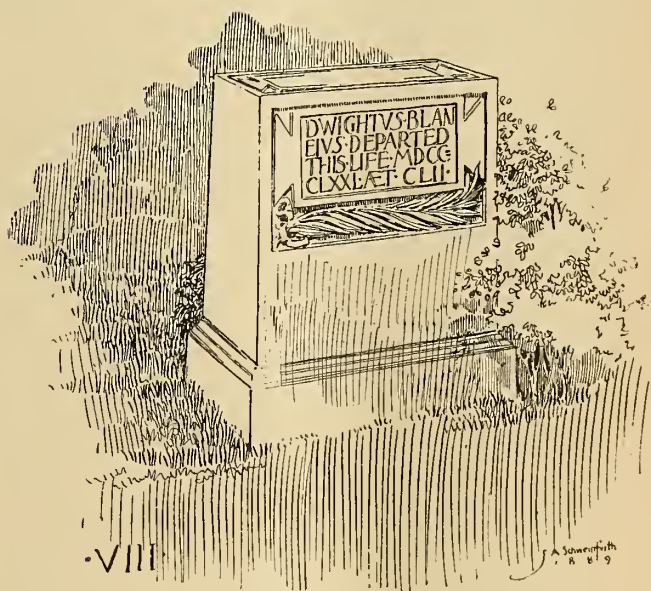
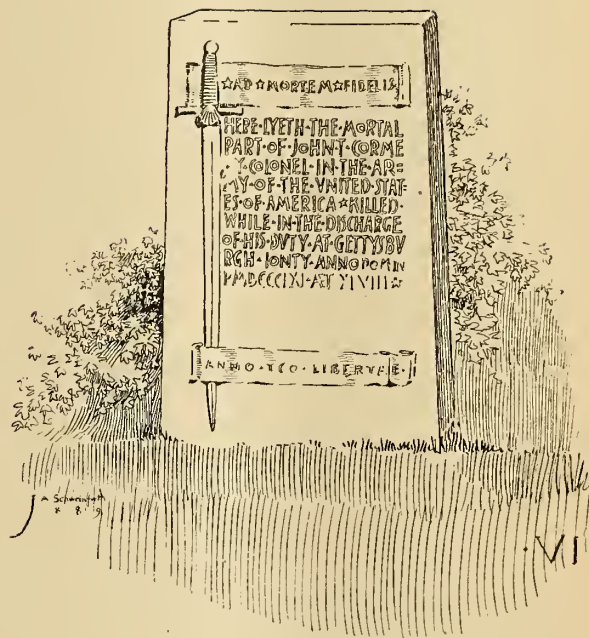


phur (brimstone) heated to nearly the boiling point, in the room for three or four hours, twice or three times a week. The apparatus used at Amherst was a Florence or Monarch hand-stove with the sulphur in a thin iron kettle. Enough sulphur must be evaporated to fill the room with the vapor, so that it will be visible and give something of the odor of sulphur.

Rose mildew (*Erysiphe pannosa*) is a very common difficulty in green-houses not properly constructed. It may be brought on by the exposure of plants while growing rapidly to draught of cold air, by high temperature night and day, by watering and syringing late in the day, by lack of plant-food, bad drainage, extreme dryness, or anything, in short, that may weaken the plant. This mildew was abundant, but after the use of the

sulphur it quickly disappeared totally. The remedy had the same effect on the Rose-leaf blight, *Actinomena rosea*.

The greatest obstacle to the growth of good Lettuce under glass is perhaps the Lettuce mildew (*Peronospora gangliiformis*). A fair trial of evaporated sulphur led to the conclusion that it will prevent the development of the mildew, but when the fungus is once established it will not destroy it. Before trying remedies Professor Maynard suggests, as preventive measures, that Lettuce under glass be grown at low temperature, ranging from 35° to 40° at night to 50° to 70° during the day; that an abundance of plant-food be supplied at all times; that soluble nitrates are valuable in quickly developing a resistant vigor of leaf; that an abundance of water must be



used, but the drainage should be good and the watering done in the morning and on bright days only; that sudden extreme changes of temperature must be avoided.

The reasons for these precautions are that in order to have perfect assimilation and growth in plants under glass, that temperature must be provided under which they grow most vigorously out-of-doors. In the garden we find the night temperature averaging from fifteen to twenty-five degrees lower than that of the day. In the summer when the temperature is high and ranges about the same, night and day, mildew, blight, rust, smuts and all manner of parasitic plants grow rapidly. Now, if in our green-houses we ventilate during the day-time, and at night start up the fires so that the temperature

is as high at night as during the day, we have just the conditions under which mildews develop outside, and if a record of the temperature were kept in those houses most afflicted with mildew this condition of things would, no doubt, be found.

As with the Rose mildew, a sudden chill, when the Lettuce plants are growing rapidly, will check their growth and so weaken them that the cells develop food in the proper condition for the rapid growth of such parasitic plants. That a plant in a vigorous, healthy condition will resist the attack of the mildew longer than a sickly one is shown by the fact that the weakest plants are always first injured by it. It is to guard against such weakness that all the elements of plant-food must be supplied in abundance, and especially in a quickly

soluble form. In an experiment made with Sulphate of Potash, Muriate of Potash, Nitrate of Soda, Nitrate of Potash, Sulphate of Ammonia, Bone-black, Dried Blood and seven other mixed fertilizers, it was found that the Nitrates of Soda and Potash, applied to a soil liberally supplied with stable manure, produced a vigor of leaf that was much less injured than where the other elements were used.

The reason for watering in the morning is that the Lettuce mildew, like most plants of its kind, can only grow under conditions of a close, moist atmosphere and a high temperature, and if the watering is done in the morning, and especially on sunny days, the moisture gets dried from the leaves before night, and the mildew is less liable to grow.

In using evaporated sulphur it should always be borne in mind that burning sulphur is quickly destructive to all plant growth, and every precaution should be taken that it is not heated so hot as to take fire, or that the kettle does not get upset. The lamp or stove should have a broad base or the kettle be placed on a tripod with feet well spread. It should be placed under the bench where it can be readily seen, but where the clothes of a person passing by may not catch upon it and upset it.

The vapor of sulphur also proved effective in cases of Grape mildew and the leaf blight of Chrysanthemums. It routed, too, the red spider, one of the worst pests of the green-house.

Cattleya Lawrenceana.

SIR RICHARD SCHOMBURGK, while exploring British Guiana during the years 1840-1844, was the first to discover this handsome *Cattleya*, which he mistook for *C. Mossiæ*—a species which has only been found in Venezuela. For many years collectors of various firms undertook perilous journeys in search of this *Cattleya*, but all their efforts were unsuccessful until as recently as 1884, when it was rediscovered in the Roraima region of British Guiana, growing along the banks of the Kookenaam River among rocks and on the trunks of trees. Although the introduction to cultivation of this species is comparatively recent, it has nevertheless become already one of the greatest favorites with amateurs and horticulturists, who value it on account of the great beauty, richness and distinctness of its flowers. The spikes have generally from three to five flowers, and sometimes more, each about six inches across, with oblong sepals, and elliptic, wavy petals, varying in color from pale rose, to deep rosy-purple, the tips of the petals being usually darker. The funnel-shaped lip is usually of a very rich crimson-purple, the intensity of which renders it conspicuous at a great distance; the throat is creamy-white, lined with rose. The flowering season begins in April, just when *Cattleya Trianae* and its innumerable forms are finishing, and lasts until *C. Mossiæ* and *C. Mendelii* begin to bloom.

Growing as it does among rocks and trees in its native home, this species may be grown with equal advantage either in pots or baskets, as the cultivator thinks suitable, and placed in the usual compost of good, fibrous peat, with a layer of clean crocks underneath. It thrives best in a warm corner of the *Cattleya* house, where the pots or baskets, as the case may be, should be suspended from the roof in a position to allow as much sunlight as possible. During the growing season, that is, early in the year, plenty of water should be given, and only on certain occasions, when the rays of the sun may be considered exceptionally powerful, should any shading be given. During hot days air may also be freely given; but the instinct of the cultivator must guide him in all these things. When the flowering season is over, water should only be given sparingly, in fact, only just enough to enable the plants to retain their plumpness. Shifting the plants at this time into a slightly cooler house would be beneficial, so as to ripen the growths, and encourage them to flower freely when the season for doing so comes round again.

St. Albans, England.

John Weathers.

Roses for Out-door Planting.

IN making preparation for planting or re-planting out-door Rose-beds, deep cultivation, good drainage and the liberal application of manure well worked into the soil are essential. Well-rotted stable manure is usually found the most satisfactory fertilizer. In the planting of permanent beds of hardy Roses it is generally found that plants on their own roots are better than grafted ones, from the fact that the latter are more likely to be winter-killed, unless they are grafted very low down on the stock, so that the point of union may be entirely covered with earth in planting out. If this is done the plant will frequently send out roots from the base of the graft, and

thus become more or less independent of the stock. If the plants have been grown in a warm house they should be gradually hardened off for the change. When the plants are dormant, having been grown in a cold frame or some similar structure, or merely heeled-in for the winter, it is well to plant them out as early as possible, as plants in this condition require a little more time to become established than young plants in active growth.

To those who have not yet decided what varieties to plant, the following brief list of well-tested Roses is added. Among hybrid perpetuals are:

ALFRED COLOMB.—A bright crimson descendant of General Jacqueminot; very fragrant and most desirable in every way.

ANNA DE DIESBACH.—Yielding large flowers of a pleasing shade of carmine.

EUGENIE VERDIER.—Silvery-pink in color, large and of beautiful form. An improvement on Victor Verdier.

FISHER HOLMES.—Deep crimson, and of good form. Considered by many growers an improvement on General Jacqueminot.

GENERAL JACQUEMINOT.—Too well-known to need description, and still growing in popularity.

JOHN HOPPER.—A free grower and profuse bearer of bright, rose-colored flowers.

MARIE BAUMANN.—Carmine-crimson, a lovely shade of color, and also of fine form. Very fragrant, and altogether a charming Rose.

Among Tea Roses, Bon Silene, Souvenir d'un Ami and Marie Van Houtte are about the most satisfactory for out-door culture.

The best known Bengal variety, Souvenir de la Malmaison, though old, still retains a place in the front rank of popular sorts.

In the foregoing list, pure white varieties have been omitted, and this deficiency may be met by the addition of Madame Plantier (Hybrid China), for early flowering, and the Hybrid Noisette, Coquette des Blanches, for later blooms, the latter being a very useful variety for summer flowers.

A few Polyantha Roses will also prove a pleasing feature among out-door Roses, with their abundant miniature blossoms.

MIGNONETTE, with flowers of a delicate, light rose color, and Paquerette, pure white, are two of the best of this section. If a representative of the Hybrid Teas is desired, La France is decidedly the most satisfactory, but like most of its class, and also the pure Teas, it needs some protection in severe winters, at least if planted in an exposed position.

Holmesburg, Pa.

W. H. Taplin.

Tulipa Turkestanica.—This is perhaps the earliest-flowering species of this numerous family, coming in with the earliest of spring-flowering bulbs. *T. Turkestanica* has pretty, yellow flowers, which are produced as many as six on a stem. Our plants have been grown in the open ground for several years without any protection whatever, and flower annually. This plant, as the specific name implies, is a native of Turkestan. We are indebted to Dr. Regel, of St. Petersburg, for this and many other interesting plants.

Puschkinia scilloides, or Striped Squill, is a remarkably pretty little plant from Asia Minor, much resembling a Scilla in size and habit. The flowers are white, and are produced in dense racemes, each of the divisions of the perianth being prettily striped on both sides, with blue down the centre. When planted with *Scilla Sibirica*, *P. scilloides* has a charming effect.

Chionodoxa Luciliæ has been sufficiently catalogued to need no description, but too much cannot be said in its praise as a hardy spring-flowering bulb. We find the bulbs do not deteriorate, but come stronger year after year, and no matter what may happen the plant, even to being plowed under, the pretty, starry flowers are sure to appear at their appointed season. All the above thrive best in a sandy soil, where there is no fear of too much moisture during their resting season, and the best results are obtained when the bulbs are lifted every second or third year and re-planted, adding some well-decayed manure to the soil before doing so.

Anemone Pennsylvanica.—For naturalizing in semi-wild places there is no Anemone so suitable as this fine, native species, not excepting the cosmopolitan *A. nemorosa*. We remember to have seen *A. Pennsylvanica* holding its own among tall grass in an open, dry spot by the road-side. The flowers are of the purest white, rivalling the Japan Anemone in size and purity. Owing to the rapidity with which this plant spreads it is not to be recommended for the flower-border proper, but should be planted where it may have plenty of

room to occupy, as single plants the second year after planting will have taken possession of a square yard of ground, giving in return an abundance of bloom in June and July.

Passaic, N. J. *E. O. Orpet.*
Spring-Flowering Irises.—I am pleased to observe from a note in your paper that *Iris reticulata* is now also appreciated in America. I beg to state that the typical plant will soon be eclipsed by improved varieties having all parts of the flowers much larger. The color, too, begins to become more varied in seedlings, and very soon we shall have this plant in all shades, from blue and blackish-red to white. I was successful last year in producing a splendid novelty in the shape of the closely allied *I. Bakeriana*; this has standards and claws of sky-blue; falls, white, spotted with violet and the lamina of a blue-black color. This makes altogether a lovely combination, quite as hardy and early as *I. reticulata*, and also fragrant. *Iris rosenbachiana* in its striking coloration looks rather Orchid-like, and ranks among the earliest and most valuable spring flowers. It has a white ground, with shades and blotches of purple-red and slaty-blue. The flowers are rather large, and deliciously sweet-scented. It is a native of central Asia.
Max Leichtlin.

Baden-Baden.
About Peas.—There is no necessity for planting dwarf Peas now in a home-garden where neatness should prevail, and it is impossible to secure neatness where Pea-vines tumble about as they will. Even when such Peas are planted they should have some support, especially since galvanized wire-netting of any width can be had at three-quarters of a cent for a square foot. A trellis of netted wire is almost invisible when bare, and entirely so when covered with vines, and it is as good for Sweet Peas to flower upon as it is to support ordinary garden Peas. With this cheap trellis, which can be rolled up and kept for years in good condition the question of the height to which a Pea-vine grows assumes less importance, and since unsightly brush can be dispensed with it adds much to the neatness of a garden.

It is too late now for the very earliest planting of Peas, except in the most northern portions of the country. This should be made just as soon as the ground is in working condition. The early market Pea, sold under a different name by every dealer, should never be planted in the home-garden. What the market-gardener wants is a Pea which is early and matures its crop all at once, so that he can clear away the ground and prepare for a succession. For the home-table an early Pea is wanted, and one that will continue to supply the table for some time. Fine flavor, too, is essential, and productiveness of less importance. Of late years wrinkled varieties of the richest quality have been produced, which are scarcely behind the hardy little Daniel O'Rourke in earliness. All things considered, Alpha is as good as any for first crop. Then it is well for a second planting to put in four varieties on the same day—Alpha, Premium Gem, McLean's Advancer or Stratagem and Champion of England. These will be fit for use one after the other, and keep up a succession for three or four weeks. A second and third planting of Champions, at intervals of ten days, will furnish the table with green Peas until their flavor begins to decline in the hot, dry weather.

A late crop of Peas can be had about the time of early frost by sowing Premium Gems in early September. It is always best to sow these late Peas in deep furrows, cover them lightly, and gradually draw the earth to them as they grow. If the weather is favorable a fair crop may be had, but mildew is an enemy to autumn Peas, which it is difficult to prevent entirely.
Crozet, Va. *W. F. Massey.*

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XVII.—THE FRUIT AND SEED.

THE ovary of the flower contains the ovules, and when ripened the whole becomes the fruit, enclosing the seeds. For instance, the ripening pea-pod consists of a parchment-like ovary filled with maturing ovules. Each pea-pod remains distinct from all others, and is free from union with any other parts. Many ovaries, on the other hand, are composed of what we may regard as two or more fruit-leaves united. Again, many ovaries during their formation and ripening become conjoined to some neighboring parts which undergo processes of change simultaneously with them. The ovary of the apple and pear is compound, and, furthermore, comprises certain parts of the flower-stalk (or receptacle) and the outer row of modified leaves of the flower, all of which form at maturity the fruit as we know it. But, strictly speaking, only the apple-core is the fruit, in the sense of its being

the ripened ovary with its ripe seeds. The instances of the combinations of neighboring parts with the ovary are innumerable, and the modifications are extremely diversified. In the ripening of the fruit changes take place in the whole structure and texture; in fact, we may range from the most juicy pulp to the most flinty stone.

In these changes during ripening there is a remarkable accumulation of food materials such as starch, sugar, oil and the like in the fruit and seed, and between the two parts there exists an interesting compensatory relation. Thus, in the peach, the greatest accumulation of food is found in the pulp surrounding the peach-stone, while in its nearest of kin, the almond, the food is collected in largest amount in the seed itself. The two well-known allied fruits of the Tropics, the Coconut and the Date, furnish another case of the same sort.

The treasuring up of food in the fruit and seed is accompanied by more or less oxidation. This is to be expected, for we have here a case of rapid growth, and as we have seen, oxidation is one of the principal phenomena of growth in general. Now the rate at which the process of growth proceeds in the fruit and seed is measurably under our control. If we detach a fruit from the parent plant when yet unripe, and keep it under conditions where it can obtain a moderate amount of oxygen sufficient for its needs, it will continue to ripen. There is one well-known condition necessary to this continuance of the process—the surroundings must reach a certain temperature. If there is not sufficient warmth, the process is arrested, and the fruit can be kept for a long time without marked change. This is the principle on which the cold-storage warehouses are now conducted with success. Another important advantage is gained by keeping the fruits in a cold place—they are far less liable to be attacked by the organisms which cause decay.

The seed contains a ready-formed plant in miniature, with an adequate supply of food for its earliest period of germination. The parts of this miniature plant are: (1) Root, foreshadowed by the cone at the extremity of the stem. (2) The stemlet. (3) Seed-leaves. (4) First bud. During the process of germination, to be described in the next paper of this series, these parts increase in size at the expense of the food stored within the seed, the supply being sufficient to help the plantlet through its early days until its expanding green leaves have the opportunity of manufacturing food out of the inorganic materials taken from the air and the soil. The food is generally an admixture of oils with other matters, but there are a good many seeds in which the amount of starch far exceeds the amount of oil. If the food is plainly distinct from the germ it is known as the albumen; if the whole store of food is in the embryo itself, the seed is said to be ex-albuminous.

Perhaps the most comprehensive view of the food in a seed, can, for our purpose, be gained by a brief examination of that which is treasured in a grain of wheat. (1) The presence of mineral matters in the seed is shown by the ash left after combustion in the open air; this ash consists essentially of the inorganic constituents shown in a former paper to be absolutely necessary to the healthy growth of the plant. (2) Starch, sugar and oil in the seed are easily demonstrable by simple processes of separation. (3) Nitrogenous substances, forming the viscid mass left when moistened flour is washed with water. These latter matters are complex, but, as we have seen before, they may be roughly classified together as the substances which are akin to the flesh of animals, namely, the albuminoids of various kinds. Part of the latter represents, of course, the very flesh of the plantlet itself, to wit: the protoplasm of living matter in which its activities are manifested.

The length of time which can elapse before a seed loses its vitality is very different for different plants. The periods have been determined with great accuracy by Vilmorin for a good many of our cultivated plants, especially those of our vegetables, a few of which data, including also weights and numbers are given in the table below. It must be understood that these figures represent only the average of merchantable seeds.

Name of Plant.	Weight, in grammes, of one Litre	Number of seeds in one gramme	Duration of germinative power.	
			Average.	Extreme.
Beet,	250	50	6 years.	10 years.
Carrot,	240	700	4 to 5 "	10 "
Celery,	480	2,500	8 "	10 "
Cucumber, . . .	500	35	10 "	10 "
Beans,	625 to 850	75 to 800	3 "	8 "
Maize (Sugar-corn)	640	4 or 5	2 "	4 "
Peas,	700 to 800	2 to 5	3 "	8 "
Turnip,	670	450	5 "	10 "

These figures are considerably lower than those which were given by a committee in its report to the British Association for the Advancement of Science, in 1850. They found that the seeds of plants from twenty genera germinated after from twenty to twenty-nine years' separation from the parent plant. It should be stated in connection with the vitality of seeds that there is no positive evidence that wheat-grains from the wrappings of mummies have been made to germinate. All trustworthy evidence is to the contrary.

The degree of ripeness of seeds has some influence upon their power of germinating readily. One observer has shown that certain seeds which are not perfectly ripe germinate somewhat sooner than those which are mature, and he has also pointed out the interesting fact that seeds separated from the plant, but still enclosed in the fruit-vessel ripen.*

Seeds can be seriously injured by cutting or other mutilation without losing their germinating power. The repair is prompt in some instances, even to the extent of restoring one-half of the seedling plants. Van Teighem's experiments, in which seeds of the Sunflower were divided in halves, each half yielding a good plant, show how patient plants in their youngest stage can be under very untoward conditions. This power of repair in germs and seedlings has been compared to that observed among some of the lower animals.

Lastly, it should be noticed that in most seeds the supply of food is more than sufficient for the needs of the young plant, so that in case of any accident by which the seedling is injured, a fresh demand can be made upon the remainder of the store of food.

The manner in which the food is used by the seedling is to be examined in the next paper of the series.

Cambridge, Mass.

George Lincoln Goodale.

Correspondence.

To the Editor of GARDEN AND FOREST:

Sir.—In the report of the U. S. Commissioners of Inquiry to Santo Domingo, 1871, on page 79, line 5, I read: "A great highway, about one hundred feet wide, lined on either side with a Sabea hedge, the trees now averaging more than a foot in diameter, by fifty or sixty feet high, and extending nearly the whole distance from Guerra to Santo Domingo City."

Will you oblige me by saying what "Sabea" is, and where I can learn of it?

Cambridgeport, Mass.

Chas. H. Hall.

["Sabea" is evidently a mis-print from Ceiba, one of the names of the Cotton-tree of the West Indies and Central America (*Ceiba viticis foliis cudice aculeato vel glabro*, Plumier, *Pl. Am.* 42), now the *Eriodendron anfractuosum* of botanists. It is related to the Bombax of the Old World and is the largest of the West Indian trees. Enormous buttresses strengthen the tall, straight stems which support broad masses of foliage high above all the surrounding vegetation, and add to the majestic appearance of this noble tree. The leaves are palmately digitate, the flowers rose-colored and abundant, and the seeds, contained in large capsules, are each enveloped in copious light-colored wool, to which it owes its popular name. This tree is propagated by sticking large-sized branches into the ground, which root and grow with great rapidity. The wood is light and very soft, and the large trunks, hollowed out, furnished the Caribs with canoes; the wool from the seeds is sometimes used for stuffing mattresses. The specific designation, anfractuosum, is derived from *amb* and *frango*, and means the winding or bending of a road or path, in and out or backwards and forwards—a name bestowed on the tree (according to Macfadyen, "Flora of Jamaica," 93) on account of its size, which caused the deflection of roads, it being easier to change the course of a road than to cut through the buttresses of one of these giants; and perhaps a superstition of the negroes may have played its part in preserving these trees; for, according to Macfadyen, "even the untutored children of Africa are so struck with the majesty of its appearance that they designate it the 'God-tree,' and account it sacrilege to injure it with the axe, so that, not unfrequently, not even the fear of punishment will induce them to cut it down. Even in a state of decay, it is an object of their superstitious fears;

they regard it as consecrated to evil spirits, whose favor they seek to conciliate by offerings placed at its base." There is much curious information about the Cotton-tree in Sir Hans Sloane's "Voyage to Jamaica," ii., 72, published in 1725, and no tree is so often alluded to in the accounts of early voyages to the West Indies and the Spanish Main. —Ed.]

Ornamental Trees in California.

To the Editor of GARDEN AND FOREST:

Sir.—There are many fine specimens of rare trees in the grounds about the summer residences of the wealthy Californians in this lovely valley, which is now at its best, covered with a carpet of richest green and dotted over with Live-Oak trees. Beautifully rounded green hills two miles distant, are backed by the Coast range on the side toward the ocean, while on the opposite side is the bay, hemmed in by another range on the further shore. The mildness of the climate may be inferred by noting the vegetation. Callas and Heliotropes showed the effect of light frosts a week or two ago, but are now beginning to flower freely.

I took special notice of two Almond-trees in full bloom a fortnight ago, and since then we have had several frosty mornings that would certainly have destroyed fruit blossoms in the east. The fruit on these trees is now set fully, and with not one sign of an injured blossom.

Araucaria Bidwillii, *A. Brasiliensis* and *A. imbricata*, are perfectly hardy here, as shown by perfect specimens twenty feet high, with no sign of ever having been injured in the winter, and as much at home here as in southern California, although the Norfolk Island Pine, the Grevillia, the Rubber-tree and a few others that are hardy in the south will not stand here.

The variety of tender and half-hardy trees and shrubs is wonderful when compared with the number that will grow in the east. There are here Acacias, apparently without number, Palms, Yuccas, Dracenas, Agaves, all the Magnolias, evergreen and deciduous, many now in full bloom, Camellias and Rhododendrons, with the brightest of foliage and covered with flowers.

Most interesting to me were the magnificent conifers, *Sequoia gigantea* and *S. sempervirens*, perfect specimens quite at home, and forty to sixty feet high. *Cedrus Deodara* and *C. Libani*, *Cryptomeria Japonica*, *Pseudotsuga Douglasii*, *Picea Sitchensis*, *Cupressus Lawsoniana* and many others, forty to sixty feet high. I was disappointed in not finding good specimens of *Abies concolor*, *A. nobilis* and *A. grandis*, etc., but fine specimens are rare compared with the number planted, for overcrowding here is the rule as far as I have seen. It is only in rare instances, and then apparently by accident, that a fine tree of the largest size has had an opportunity to develop fully. Fortunately among these are many fine Araucarias, Deodar Cedars, Douglas Spruce, Lawson's Cypress and Sitka Spruce. The last-named tree hardly met my expectations, as I had been led to believe that it resembled *Picea pungens*, which went for some time under the same name (*Abies Menziesii*).

It is a fine tree, however, a compact grower, well-filled in, and a broad pyramid in form. Many of the specimens show the peculiar shade of light blue on the new growth, resembling the darker blue tint in *Picea Ajanensis*. Indeed, this tree has a closer resemblance to *P. Ajanensis* than to *P. pungens*, as the branches incline upwards, as in *P. Engelmanni*, while *P. pungens* grows in whorls, one tier of branches rarely, if ever, running into and mixing with the tier above it. In the cone, also, and in the consistency of the leaf it resembles *P. Engelmanni* more closely than *P. pungens*.

I have only seen two specimens of *P. pungens* in this state. These are on the grounds of Senator Stanford, and they are fine specimens of the lightest shade. On the same grounds are a few fine specimens of *A. concolor*, four to eight feet high, and the only good ones I have seen. Other specimens of the tree and of the other California Silver Firs which have come under my notice, have been ruined by close planting.

The Douglas Spruce is a grand tree hereabouts, indigenous in the mountains a few miles distant. Under cultivation it can be used freely without producing sameness, as it varies very much in both form and color. But the one tree of all others which I admired most, and which can be used in greater quantity than any other native spiral-topped tree, from the variation of form and color in the individual specimens, is Lawson's Cypress. Specimens sixty feet high, perfect in form, with foliage of deep green, shaded with deep blue, are common. Others are so light in color that they would compare favorably with some of the so-called "golden" trees in cultiva-

* Gray's Text-book, Vol. II., p. 460.

tion. In form the trees vary greatly, some being broad and flat-headed, and others extremely slender, with drooping branches hanging close to the trunk.

It was a pleasure to see among all these new faces a few old friends, which seemed perfectly at home. The Norway Spruce, so common in the east, does remarkably well, and occasionally I see a specimen with a peculiarly graceful sweep of the lateral branches, which is equalled only by the Himalayan Spruce (*Picea Morinda*). I have only seen two of these trees here, both on the Flood estate. In contour they resemble those Norway Spruces, which throw out their arms a little below the horizontal. But beyond this there is no comparison between the trees. The leaves of the Himalayan Spruce are twice as long as those of the other, much stronger, set evenly around the branches, and in color are an indescribably lovely green on both sides. The dark-colored buds are remarkably large, and the male flowers much larger than those of the Norway Spruce. The cones, too, are much larger, with scales over half an inch wide, rounder, thicker, of a warm cinnamon color, and looking like a fine piece of cabinet-work, with an oil finish.

In place of the native Firs, which I missed, I find *Abies Nordmanniana*, doing wonderfully well, and making a perfect tree when standing alone.

Palo Alto, Cal., March 10th.

Robert Douglas.

Recent Publications.

The Folk-Lore of Plants. By T. F. Thistelton Dyer. D. Appleton & Co.: New York. 1889.

No more charming book as a gift for the lover of flowers could be found than this one of Mr. Thistelton Dyer's, which recently appeared in England, and has been re-issued here, in attractive shape. The author says, in his preface: "Much has already been written on the folk-lore of plants, a fact which has induced me to give in the present volume a brief summary—with a few illustrations in each case—of the many branches into which the subject naturally subdivides itself." Perhaps the best-known book of its class is Friend's "Flower-lore." But this consists of two large, thick volumes filled with a mass of information and anecdote that, valuable in itself, is badly arranged, confused by frequent repetitions, and too voluminous to attract any but the most enthusiastic student. Other writers, who have taken up the entire subject or have devoted themselves to some single branch, have usually published their essays in periodicals which are difficult to obtain, and sometimes have written in a rather dry way from a strictly scientific point of view. There was a real need, therefore, for a small book which should cull the most interesting facts and fancies from previous publications and present them in a clear and readable form. This book Mr. Thistelton Dyer has given us. The information it contains will satisfy almost all readers, while its copious foot-notes will lead more inquiring minds to other reservoirs of knowledge.

The first chapters deal with primitive and savage notions concerning plants and with the plant-worship of ancient peoples. Plants in demonology, in fairy-lore, in folk-medicine, in religious ceremonials and in the calendar are severally discussed; and chapters are given to plant-names, to children's games, to dream-plants, love-charms and a number of similar subjects. Of course a book which consists of a mass of anecdotes, brief bits of information, quotations and illustrations cannot be systematically reviewed. All one can say of it in a general way is that it covers a wide field, all parts of which are equally well filled, and offers many interesting and curious facts, not only to the lover of flowers, but to the student of myths, traditions and ethnographic relationships. Yet, as it is a book to be sincerely recommended, we may try to prove the interest and variety of its contents by extracting a few passages at random here and there.

"Briefly noticing the antecedent history of plant-worship," says the author, "it would seem to have lain at the foundation of the old Celtic creed, although few records on this point have come down to us. At any rate we have abundant evidence that this form of belief held a prominent place in the religion of these people, allusions to which are given by many of the early classical writers. Thus the very name of Druidism is a proof of the Celtic addiction to tree-worship, and De Brosses, as a further evidence that this was so, would derive the word kirk, now softened into church, from *Quercus*, an Oak, that species having been peculiarly sacred. . . . One of the last and best-known examples of the veneration of groves and trees by the Germans after their conversion to Christianity is that of the 'Stock am Eisen,' in Vienna," which, as Fergusson explains, is "the sacred tree into which every apprentice, down to recent times, before setting out on his *Wander-*

jahre, drove a nail for luck. It now stands in the centre of that great capital, the last remaining vestige of the sacred grove round which the city has grown up, and in sight of the proud cathedral which has superseded and replaced its more venerable shade."

The Rowan-tree, or Mountain Ash, "has long been considered one of the most powerful antidotes against works of darkness of every kind, probably from its sacred associations with the worship of the Druids. Hence it is much valued in Scotland, and the following couplet, of which there are several versions, still embodies the popular faith:

'Rowan-tree and red thread,
Put the witches to their speed.'

But its fame has not been confined to any one locality, and as far south as Cornwall the peasant, when he suspects that his cow has been 'overlooked,' twists an ashen twig round its horns.

"In Brittany young people prove the good faith of their lovers by a pretty ceremony. On St. John's Eve, the men, wearing bunches of green Wheat ears, and the women, decorated with Flax blossoms, assemble around an old historic stone and place upon it their wreaths. Should these remain fresh for some time after, the lovers represented by them are to be united; but should they wither and die away, it is a certain proof that the love will rapidly disappear."

Many flower-lovers must have wondered why an humble, graceful little herb (*Galium*) is called Bed-straw. This book will tell them. It was formerly "Our Lady's bed-straw," because it had filled the manger in which she laid the infant Jesus. Ribbon-grass is called in rural England "Our Lady's Garters," and the Dodder her "Laces." The Lilies-of-the-Valley are her "Tears," and the Maidenhair-Fern is "Virgin's hair." A curious fact is that while at the dawning of Christianity numerous plants which had been consecrated to heathen goddesses were re-dedicated to the Virgin; in Puritan times they were christened afresh under the name of Venus—the bitter hatreds of the time making even a pagan deity seem a less dangerous person to invoke or reverence than the Mother of God.

"The St. John's Wort gets its name from the belief that its blood-like little spots made their first appearance on the day when the saint was beheaded. A German legend informs us that as the Holy Family took its flight 'they came into a thickly-wooded forest, when, on their approach, all the trees, with the exception of the Aspen, paid them reverential homage.' The disrespectful arrogance of the Aspen, however, did not escape the notice of the Holy Child, who thereupon pronounced a curse against it, whereupon its leaves began to tremble, and have done so ever since. . . . The mournful tree which formed the wood of the cross has always been a disputed question. . . . According to Sir John Maundeville it was composed of Cedar, Cypress, Palm and Olive . . . the notion being that those four woods represented the four quarters of the globe. Foremost among the other trees to which this distinction has been assigned are the Aspen, Poplar, Oak, Elder and Mistletoe. Hence, is explained the gloomy shivering of the Aspen leaf, the trembling of the Poplar, and the popular antipathy to utilizing Elder twigs for fagots. But it is probable that the respect paid to the Elder has its roots in the old heathenism of the north, and to this day in Denmark it is said to be protected by 'a being called the elder-mother,' so that it is not safe to damage it in any way. The Mistletoe, which exists now as a mere parasite, was, before the crucifixion, a fine forest tree; 'its present condition,' says Baring-Gould, in his 'Myths of the Middle Ages,' 'being a lasting monument of the disgrace it incurred through its ignominious use.'"

Here, finally, are a few old rhymed proverbs with regard to the weather:

"If the Oak is out before the Ash,
'Twill be a summer of wet and splash;
But if the Ash is out before the Oak,
'Twill be a summer of fire and smoke."

"When the Hawthorn bloom too early shows,
We shall have still many snows."

"Onion's skin very thin,
Mild winter's coming in;
Onion's skin thick and tough,
Coming winter cold and rough."

"When the Oak puts on his goslings grey
'Tis time to sow Barley night or day."

"When Elm leaves are big as a shilling,
Plant Kidney beans if you are willing;
When Elm leaves are as big as a penny,
You *must* plant Kidney beans if you wish to have any."

Notes.

Dr. Peyritsch, well-known for his studies of the morphology of plants, died recently at Botzen.

The National Society of Horticulture of France has decided to give in Paris, in November, an exhibition of Chrysanthemums.

The death of C. F. Martin, a veteran French botanist, and for many years director of the Botanic Garden of Montpellier, over which the great De Candolle once presided, is announced.

Marsh Marigolds from New Jersey swamps and meadows were in great abundance on the street flower-stands on Saturday, and no brighter yellow was seen among all the Easter flowers.

The Spring Meeting of the Pennsylvania Forestry Association will be held in the Chapel of the Normal School, Westchester, on Friday the 26th inst., at 7.30 P. M. Mr. B. G. Northrop will address the Association upon the subject of Arbor Day. All persons interested in the preservation of our trees and forests are invited to be present.

Easter Lilies, in large quantities, from Bermuda, were on sale in this city last week. They do not endure transportation well, and are much inferior to home-grown flowers, the prices of which were but slightly affected by the imported Lilies. The demand for all kinds of flowers seemed greater than ever, but owing to the lateness of the season the market was well supplied, and prices were not exorbitant. Roses and Daffodils were in greatest demand. In the decoration of churches branches of Japan Quince, Forsythias, Genista and other shrubs in flower were used very generally, and with good effect.

In Philadelphia the Bermuda Lily and *L. longiflorum* were both unusually abundant in the Easter flower-markets, and prices declined twenty per cent. The highest retail price for these was forty cents each for every open flower and unexpanded bud upon the plant. Azaleas were abundant and sold at profitable prices. Tulips, as cut flowers, except the lighter varieties, were in slight demand. Roses were sought for more than any other flower, and brought good prices. There seemed to be no notable preference for any particular flower. Flowering plants of Hydrangea of various kinds were sold in great numbers, but they are always popular as gifts at this season.

The Swiss Alpine Club and a newly-formed society for the protection of native plants have recently joined in establishing a garden in which Alpine plants are to be grown and the directors of which will endeavor to spread among the people a knowledge of the great necessity which exists for preserving them from extermination. Not only the famous "Edelweiss" but numberless other Swiss plants are in danger of being swept from the face of the earth by reckless tourists and by native collectors, who pick them in large quantities to press and sell to foreigners. The garden is to be called "Linnaea," and the place chosen for it is near the town of Fionnay, in the commune of Bagnes, Valais, at a height of some 1,500 metres above the sea-level.

The leading article in the *Gardeners' Chronicle* for March 30th was a reprint of the one on Mr. Hunnewell's "Italian Garden" at Wellesley, which was recently published in these columns. The full-page picture which formed the supplement of the same issue was not, however, a duplicate of ours, but a different view of the gardens, taken last year from the lake. Its label inaccurately gave the site of the garden as "Boston, Massachusetts." Wellesley lies, in fact, some dozen miles from Boston, in the town which derives its name from Mr. Hunnewell's estate, and of which the chief feature, as is well known in this country, is Wellesley College, one of the largest establishments of the sort in the world devoted exclusively to the education of women.

A correspondent of an English horticultural journal wrote as follows with regard to the Orchid Exhibition held not long ago in the Eden Musée in this city: "Being the first horticultural show that I had ever witnessed in the United States I was somewhat desirous of observing in what points it would vary from one in the old country. It was astonishing to note so great a difference in the methods and manner of exhibiting the plants, there being none of that stiff formality so characteristic of the English flower-show, but all was grace and elegance, even to the tables, which were not overcrowded or in straight lines, showing off the exhibits to advantage. . . . The largest and most meritorious exhibit was that of the firm of Siebrecht & Wadley." Mr. W. S. Kimball was mentioned as chief among the amateur exhibitors, although the collections of others were named with praise.

The death was recently announced of Ernst Rudolph von Trautvetter, who was born in Germany in 1809, but spent most of his life in Russia. In 1835 he was appointed assistant to the director of the Imperial Botanical Garden in St. Petersburg, and a little later professor of botany at the University of Kiev, where he founded a botanical garden. In 1850 he became rector of this university, and in 1866 was made director of the St. Petersburg garden. More than eighty botanical treatises were published by Trautvetter, most of which relate to the flora of the far northern parts of Russia and Siberia, and of the Caucasus, and the most southerly parts of European Russia. He was recognized as an authority on the plants of the empire, and his chief works—"Flora Rossica Fontes" and "Incrementa Florae Phanogamæ Rossicae"—are indispensable to all botanists who desire to carry his investigations further.

The Rev. Dr. R. S. Storrs has retired from the Board of Park Commissioners of Brooklyn. In his letter of resignation he explains that this step has been rendered necessary by a recent interpretation of the law by which the functions of the Board are regulated. Under this interpretation the Board has no authority to expend, according to its own judgment, and under its responsibility to the city, the moneys specifically appropriated for its use in the care and maintenance of the parks. Dr. Storrs says: "It is quite impossible for me to devote time and labor to the work of making suggestions which, after they shall have been discussed, matured and adopted by the Board, may or may not prove acceptable to others having the real authority in the premises. My time and thought are too much engaged upon other things to allow them to be given to such ineffective skirmishing in the air; and it is painful to me to see the Park already suffering, and destined to suffer more and more for want of work which the Board has no power to order to be done, yet for which the feeling of the city holds it responsible."

The windows of the flower-shops in Boston have never been so well filled as they are this year. They have not before displayed such a variety of flowers, or such well-grown specimens. Not even in Paris can displays of this sort be seen so tastefully arranged. Roses, in very great variety and of surprising excellence, are the great feature in these windows; but there is a marked increase of comparatively rare flowers—Orchids, Lilies, Amaryllis with forced Rhododendrons and Gladioli, besides the usual forced bulbs in great variety, Azaleas, Violets, Pansies, Carnations and other familiar flowers. There is no other city where such displays can be seen, or where such free object-lessons are offered to every passer-by. The number and the excellence of the flowers sold in the streets by itinerant dealers, at prices which can hardly make much return to the growers, is simply astonishing. Boston is more than holding its own as a great centre in the world of horticultural development and horticultural taste, and the labors of the men who founded and maintained the Massachusetts Horticultural Society is now bearing its legitimate fruits.

Continuing his articles on the cultivation of Roses for the production of attar, to which we have already referred as an interesting feature in recent numbers of the *Gartenflora*, Dr. Dieck gives the following account of planting operations in Roumelia: "In the autumn, sections of ripened wood, about one foot in length, are laid in trenches at the distance of two or three feet apart, and covered with two or three inches of soil. The sprouts, which spring from the eyes in the wood, take root without difficulty and grow into hedges, which often bear as early as the second year, although it is only in the fourth year that complete development is reached and a full harvest can be gathered. The hedges are formed one or two metres apart, according as it is desired or not to grow vegetables between them. In the autumn, and in the spring until harvesting time, the ground is diligently hoed and loosened, and, in certain places, the bushes are covered at the advent of winter, as in the higher districts harmful frosts are not uncommon." The methods of culture pursued in Asia Minor are similar. But the planting is carried on in a "truly Turkish way," which reveals the fatalistic Mohammedan belief that if Allah wills a tree to grow the help of man is superfluous. "The worthy Turk of Bithynia simply makes a hole about two feet deep in the place where he wishes a new Oil-rose to grow. Then he cuts off from a Rose-tree a bundle of twigs, throws them in the hole, with a pile of horse-dung on top of them, fills up the hole, and leaves the rest to Allah. The only remarkable thing is that almost invariably some one of the buried buds manages to sprout, pushes up through the dung and the heavy layer of earth, and justifies the faith of its planter."

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School Grounds.

FOR several months in the year a large proportion of the children of this country spend at least half of the hours of daylight, for five days of the week, in or about the school-house. At the most susceptible period of life the influence of these surroundings must in the aggregate be considerable. A neat and tidy room, with simple and cheerful decorations, will be a constant object-lesson to every eye. A room with decrepit furniture upon an unclean floor, and with walls and ceiling broken and stained, will teach its lesson, too, in taste and morals, but it will be quite a different one. It is due to the health of children that they be supplied with abundant light and air. This means a detached building, with ample, open space about it, even in the city. Exercise is also essential to the healthful development, as well as to the happiness of children, and play is the natural and spontaneous exercise and refreshment for both their minds and bodies. A playground may, therefore, be considered a necessary adjunct to every school. Children will play wherever they have room, but it will hardly be argued that a bare space of earth, which will be dusty or muddy as the weather changes, offers every advantage that children should be able to derive from their school-grounds. If the school-room can be made to give lessons in cleanliness and order and taste, the surroundings of the building should be arranged to enforce the same lessons.

That properly ordered school-grounds can aid in this direction, and, besides this, be made an important educational auxiliary in some branches of natural science, was the thesis of an interesting paper read two months ago before the Massachusetts Horticultural Society by Mr. Leverett M. Chase, Master of the Dudley School, in Roxbury. Mr. Chase argued that the ideal school-ground should be separated into two distinct portions—one devoted to the purposes of an out-door gymnasium, and the other an area of green sward, properly planted with trees, shrubs, vines—in short, a pleasure-garden for the children. They should be taught that the garden is theirs, and a feeling of responsibility for it should

be encouraged. That this sense of ownership will engender such a personal interest that the exuberant destructiveness, so often manifested by school-boys, will give place to a sentiment of affection, and a desire to protect their shrubs and flowers has been proved in many instances. If the plants are all carefully labelled and catalogued; if the children are invited to aid in cultivating them, under proper direction, they will gain much practical information as to the laws of plant-growth, and if a serious attempt at systematic instruction in certain branches of botany is connected with the care of the grounds, many lessons which it would be an irksome task to acquire otherwise, will be learned without effort, and even with positive delight. From the knowledge thus gained, and the interest aroused in the school-garden, we may reasonably look for a growing love of Nature—an increasing appreciation of the beauty of trees and their value. If this generation of children were reared under such influences ours would be a land of fair gardens in a quarter of a century, and there would be no difficulty in securing proper legislation for the preservation of our forests. Indeed, it is to be feared that a distinctively American forest-policy which shall embrace in its scope the wisest administration of the nation's forests, and the most intelligent care of the farmer's wood-lot, will never be adopted until the interest and sympathy of the children are enlisted, so that they will grow up with sound views and generous sentiments as to the importance of trees and forests as an element of the national welfare.

Of course, grounds sufficiently spacious for a garden cannot now be found connected with every school-building, and in crowded cities large school-gardens will not be practicable. But there is room for a beginning everywhere. A narrow border along the foundation of the school-house may be made beautiful with flowers from the time when Snow-drops appear until frost kills the latest Aster. There are few school-yards where a place cannot be found for some tree or shrub, or where a vine cannot be trained so as to show its own beauty and hide some unsightly object. At all events, some house-plants can be used to brighten up the school-room and to illustrate by living examples the elementary facts in botany and horticulture. One disadvantage will be that the teachers and trustees who must take the lead in this enterprise know so little themselves of the subjects in which it is proposed to interest the children. The beginnings of this reform—for a genuine reform it will be—will be feeble and much honest effort will be misdirected. Unsuitable trees and shrubs will be often selected and they will be badly planted in improper places. But the very fact that the lack of knowledge on these points is so lamentable is the strongest reason that a beginning should be made. The attempt will excite inquiry and criticism, and knowledge will come from the study and discussion thus aroused. Fortunate are those places already provided with teachers like Mr. Chase, and Mr. Endicott, master of the Gibson School in Dorchester, who at the meeting above-mentioned added some valuable testimony to the soundness of the positions taken in Mr. Chase's paper.

A final suggestion made by Mr. Chase is worth considering in other States as well as in Massachusetts. It was that prizes be offered for the best-kept and most tastefully-embellished school-grounds.

Innumerable fires are, or a few weeks ago were, common sights in the suburbs of all our cities. These fires are set year after year to burn up the dead grass from lawns and fields and to get rid of dead leaves and other refuse. Such fires are dangerous and expensive. Where fires are used to clear up a piece of ground compost heaps are small, and year by year the land is robbed of its fertility; and such fires often get beyond control and injure shrubs and trees, or damage or destroy fences and hedges. The same practice prevails to a very large extent upon farms all over the country; and brush-fires set to get rubbish out of the way are the cause of nine-tenths of all the forest

conflagrations which occur in the farming-regions of the United States, and which every year sweep over tens of thousands of acres during the few weeks of dry weather, which follow the melting of the snow in spring before the appearance of the new leaves, which generally put a stop to these early fires. Rarely does a spring pass without the atmosphere over Long Island and New Jersey being filled with the smoke of forest-fires, which can be traced to this wasteful and careless method of farming; and what occurs in this neighborhood occurs pretty generally all over the territory of the United States wherever farms are cultivated. Such fires are set without much attention to the state of the weather or the direction of the wind; they are carelessly watched, or not watched at all, and soon reach leafless shrubs and trees, and a forest-fire which may sweep over thousands of acres is started.

Dead grass and leaves should never be burned. It is an expensive and wasteful custom, and a sure indication of extravagant and therefore bad management. Where it is desirable to make the ground about a house neat, or to prepare it for the lawn-cutter, the dead leaves and grass should be raked up into piles and carried away to the compost heap, or to be used for the bedding of animals. Such refuse material is well suited for this purpose, and should be freely used. The manure pile can be greatly increased in this way; or, if dead leaves and grass are piled up and turned over occasionally they will be converted into leaf-mould at the end of a couple of years, and so furnish the very best material possible in which to plant many trees and shrubs. A pile of leaf-mould is essential in every good garden, and the bigger it is made and the more freely this vegetable-mould is used, the better the garden will be. In the case of larger fields which cannot be raked over every spring, the dead grass and leaves should be allowed to remain on the ground, which they serve to mulch and enrich. It is a poor policy and thriftless management which burns up plant-food in large or in small quantities, and sooner or later it will make the best land sterile.

Very interesting is Bulletin No. 45, lately issued by Professor Beal, who is at the head of the Department of Botany and Forestry at the experiment station connected with the Agricultural College of Michigan, as well as one of the Directors of the State Forestry Commission. In an imaginary conversation a farmer in one of the older settled counties of the State is made to say:

"Generally, of late years, when there is a heavy fall of snow, it is soon so unevenly distributed that we have little idea of how much has fallen. It piles up along the north and south roads, and blows from some parts of the east and west roads. The wheat-field has many bare spots, while in other places the drifts are deep. Since I cut off that piece of timber down there and brought to view the farms over west for a couple of miles, the wind has frequently swept over my fields with a great deal of force, sometimes making things fairly jingle, and when cold, the air seems to penetrate the smallest cracks in my pens, sheds and barns. The pigs squeal, the cows give less milk, the horses shiver and even the hen-coop is too freely ventilated. I believe the animals at such times eat more grain and fodder than they do when there is less cold air in motion. The house, too, gets colder in the night than it used to when there were few strong winds. I am sure I have to lay in a larger supply of fire-wood than I used to. When I came to this neighborhood much of the land was still covered with a dense, virgin forest, and as one block of woods after another disappeared, I noticed the winds became more frequent and penetrating."

As a partial remedy against these winds which drift the snows and freeze out the wheat in winter, and shake off the fruit and lodge the grain in summer, the Bulletin suggests the planting of a grove to the west of the farm buildings. Professor Beal shows how little it will cost to plow a strip a rod wide and ten or fifteen rods long, to harrow it as if fitting the field for corn, and to plant in it small trees which can be bought in quantity at considerably less than a cent apiece. If the furrows are cut four feet apart,

and a tree set every four feet in the row, they can be cultivated by horse-power for a few years, and will then furnish a screen as protection against the wind, a stick for a sled-tongue or vine-trellis now and then, and every autumn hickory nuts, walnuts and chestnuts in abundance for the children. Admirable directions for selecting trees for planting and caring for them afterwards are given, and the Bulletin will prove of value to many people besides those of Michigan, to whom it is particularly addressed.

The Gardens of Levens Hall.

THERE appeared in a recent issue of GARDEN AND FOREST a view of the terraced garden at Wellesley, Massachusetts—the finest example of topiary gardening in America. The illustration upon page 211 represents one of the best examples of work of this sort which exists in England—the old gardens of Levens Hall, near Milnthorpe, in Lancashire, a mansion which, it is said, dates in part from the eleventh century, and which is famous for its splendid old oak carvings. The gardens contain seven acres of clipped trees, planted and first brought into shape by the gardener of James I. A large part of these trees and of the grand old hedges which serve to divide the garden into different compartments are Yew and Box, although there are closely-clipped Hollies often more than thirty feet in height. Here are still preserved examples of the old pleached alleys of Shakespeare's time, and green paths laid down two hundred and fifty years ago on slate slabs, placed eight inches below the surface, once used for bowling-greens, and still as level as a billiard-table.

The Art of Gardening—An Historical Sketch.—IV. Mesopotamia and Judea.

THE building of pyramidal hills for one purpose or another has not been confined to Mesopotamia, whence, of course, Jewish writers must have drawn such ideas as they expressed in the tale of the Tower of Babel. Nor has Babylon been the only place where these terraced hills have been laid out as gardens. The sides of the mausoleum of Hadrian, in Rome, now called the Castle of St. Angelo, were originally planted, in part at least; a garden similar to Nebuchadnezzar's is indicated, perhaps, in a vast temple inclosure which now stands in a ruinous condition on the island of Java; and—allowing for radical differences in vegetation—we may get from the terraced sides of Isola Bella in Lake Maggiore some idea of the effects which so delighted Alexander when he sought repose in the hanging gardens of Babylon.

Diodorus says that two other great gardens were ascribed to Semiramis. In approaching Chaone, a city of Media, he reports, she "took notice of an exceeding great and high rock, where she made another very great garden in the very middle of the rock, and built upon it stately houses of pleasure, whence she might both have a delightful prospect into the garden and view the army as they lay encamped below in the plain." And near Mt. Bagistan—on the high-road which led eastward from Babylon through what are now called the Koordish defiles—she laid out a garden "twelve furlongs in compass. . . . It was in a plain champaign country, and had a great fountain in it, which watered the whole garden." The flank of the mountain "towards one side of the garden has steep rocks" seventeen furlongs in height; and on this wall she caused to be cut a great relief depicting herself surrounded by one hundred of her guards, with an inscription recording the fact that she had ordered all the harness of her innumerable beasts of burden to be piled up and had used it as a stairway to mount to the summit of the rock. The latter part of this account is, of course, the purest fantasy. The great reliefs which may still be seen in a crumbling state at Behistan are of Persian origin, represent Darius Hystaspes triumphing over the "false Smerdis," and date, therefore, from about B. C. 500.* And the great gardens themselves, including one in Armenia, which was likewise attributed to Semiramis, may confidently be assumed of Persian origin.

Of Assyrian gardens we know even less than of Babylonian. Trees and vines are represented on the bas-reliefs in such a way that we must believe the king was accustomed to repose

* See Mrs. Mitchell, *History of Ancient Sculpture*.

beneath their shade.† The "sacred tree," which, in a conventionalized design, constantly recurs in scenes of sacrifice, doubtless indicates those sacred groves—used for religious rites by many Oriental nations, as well as by the Druids of the north of Europe—which had had their first origin in the tree-worship of primitive races. Royal lion-hunts are portrayed with landscape backgrounds, and may have taken place in parks especially prepared for the purpose, as we see the beasts being freed from cages, and as such hunting-parks are described in the annals of the later neighboring kingdom of Persia. Moreover, it is impossible to doubt that the vast open courts which formed such a conspicuous feature in Assyrian palaces, and even the flat roofs, were adorned with a multitude of trees, shrubs and flowers. No pleasure-loving Oriental would dispense with their presence if they could possibly be had; house-top and court-yard gardening is still a familiar practice everywhere in the East, and nowhere could it have been elaborated on so magnificent a scale as in these vast royal residences, set on their high artificial hills. But with regard to the character of Assyrian gardens we know nothing except that they must have been formal, architectural in arrangement; nor can we say much more of the plants that filled them than that the Palm, the Cypress, the Vine and the Pine were prominent.‡

Dwelling amid more varied and picturesque surroundings than the Egyptians and Mesopotamians, the Jews can have felt, no such imperious desire to create large parks and gardens. Nor were they a people given to sumptuous forms of private life, nor did their religious ritual sanction a systematic use of flowers in its ceremonies. As we might expect from these facts, there is little evidence to show that gardening art was largely practiced in Judea. Like all other races the Hebrews did, indeed, imagine that the first man lived in a garden, but its charms are not dwelt upon as, for example, Homer dwells upon the charms of the gardens he mentions. We can but divine that the Garden of Eden was thought to have been formally disposed with the Tree of Life in the centre, four great rivers flowing in four different directions, barriers all about it, and a gate which could be closed. The idea we have to-day of Eden comes not from the Bible's, but from Milton's pages.

When the riches and happiness of Job are declared we read nothing of natural beauties or of works of art—his treasures seem to have been flocks and herds and the mere consciousness of great wealth. When the building of Solomon's temple is described in Chronicles and in Kings there is no word about gardens or plants; nor is there in the elaborate account which Josephus gives of this temple and the monarch's palace. We are told that Solomon wrote about plants "from the Cedar tree which is in Lebanon to the Hyssop that springeth out of the wall;" but he wrote also "of beasts and of fowls and of creeping things and of fishes," and we must imagine a scientific, not an æsthetic or horticultural treatise. When it is said, again, that "Cedars made he to be as the Sycamore trees that are in the vale for abundance," not growing trees are denoted but materials for building.§ Unlike the sacred tanks of the Egyptians, Solomon's was a great lifted basin, and we cannot fancy that plants grew in it or around it.

Of course these omissions do not indicate that gardens were unknown in Judea. Casual references to them are not infrequent in Holy Writ, and "the gate between two walls which is by the king's garden" is more than once mentioned—for example, in the account in II. Kings of Nebuchadnezzar's attack upon Jerusalem. This royal garden seems to have been near the pool of Siloam, where the valleys of Jehoshaphat and Ben Hinnon meet, and to have been approached (Neh. iii. 15) by stairs that went "down from the city of David." Josephus tells us "there was a certain place, about fifty furlongs distant from Jerusalem, which is called Etiam; very pleasant in fine gardens, and abounding in rivulets of water." Thither did King Solomon "use to go out in the morning, sitting on high in his chariot." The commentary, called the Mishna, says there was a

Rose-garden westward of the temple mount which had existed from the time of the prophets within the city walls—an exception to the usual Jewish practice of constructing gardens in the suburbs. In the Book of Esther the king comes "into the palace garden," and a great feast is held "in the court of the garden of the king's palace;" but the scene of this story is laid in Persia, not Judea. The Garden of Gethsamane seems to have been but an Olive-orchard.

New York.

M. G. Van Rensselaer.

Chrysanthemums in the Imperial Garden at Akasaka, Tokyo.

THE following is a translation from *Hochi Shinbun*, the *Tokyo Post*, of an account of the latest of the famous annual Chrysanthemum shows in that city. The translation was made by Mr. K. Miyabe, the Japanese botanist now in Cambridge, Massachusetts.

According to the yearly practice, the gardeners in Tokyo and Saikyo raised many rare and splendid varieties of Chrysanthemums for the Imperial Garden by the special order. On the 8th of November the members of the cabinet, the foreign ministers and a few others were invited by the court to the "Chrysanthemum Banquet." On the day following, the higher officers of the government and nobles were allowed to see the show.

The following accounts are written from what we have heard from one who enjoyed this special privilege: The first bed, eighteen by 120 feet, was placed just behind the Senkin-kaku (arbor). The entire bed was roofed with screen mats made of reeds, in order to protect the flowers from frost and sun. From post to post on three sides of the bed a curtain or screen, made of purple silk, with the imperial badge, the Chrysanthemum, relieved in white, was tied round with crimson tasseled ribbon. The flowers were at their prime. They were of different colors, and their diameters seemed to be about three to four inches. Several hundred of these plants were arranged without any regular order in the bed. Among them, one called the Sugawara, with petals red inside, and yellow on the outer sides, and the Kagaribi, with its crimson flowers, attracted a great deal of attention.

The next bed to the left was roofed with oiled-paper screens, the rest of the surrounding structures being just the same as the first. In this bed all those varieties having the filiform petals were arranged. A white flower called the "Aunobiki" is worthy of note; the petals were fine as threads, drooping down in tassels like a water-fall. One variety with crimson petals tipped with yellow was very conspicuous.

To the right of Shuhotei there was one bed twelve by sixty feet, planted with thirteen different root-stocks, each supporting numerous grafted branches rising from the stem a little above the ground, and crowned with flowers of different colors and shapes.

Next, to the right, was a bed (eighteen by sixty feet) for large-flowered varieties.

Parallel to this was a bed in which only three plants were set out. The first one, called the Golden Dew (*Ogonno Tsuyu*), was decked with 338 blossoms, all golden-yellow. The next named, the Hanakai, had 253 blossoms of red color. The last, the Sanono Watari, was covered with 173 white blossoms, and impressed one as the best of the three. The flowers were all about one and one-fifth of an inch in diameter.

The next bed contained about 420 plants of about sixty different varieties. Each plant was allowed to bear only one flower, and the diameter of the flowers was mostly about fifteen or sixteen inches. This bed seemed to be the crowning show of the day. The banquet was held in an arbor set up on the lawn just in front of this bed.

Foreign Correspondence.

The Kew Arboretum.—V.

IN England the words Pine and Fir are very frequently used without any definite idea of their meaning; indeed, some people make them apply to almost any Coniferous plant. Even nurserymen and foresters use the word Fir indiscriminately for both the Spruces (*Piceas*) and the Silver Firs (*Abies*). Cobbett, in "The Woodlands," published by him more than sixty years ago, includes Pines in his sweeping condemnation of the "villanous race of Firs." That energetic writer expresses himself in terms as vigorous when occupying him-

† As an instance of the inaccuracy of classic writers it may be noted that Strabo says the Vine did not grow in Susia "before the Macedonians planted it, both there and in Babylon." Yet Vines with their leaves and clusters of grapes accurately displayed may be seen on reliefs from Kouyundjik, now in the British Museum, which date from the period of Assyrian supremacy; and whatever was known in Ninevah must have been known in Babylon and all adjacent Asiatic countries, especially so all-important a plant as this.

‡ The Pine cone appears as an adjunct to sacred rites in Assyria, as the Lotus-flower does both there and in Egypt, held in the hand of priest or king.

§ It would be interesting to know just what trees are meant by Josephus when he speaks of the Pine trees which were brought to Solomon from Aurea Chersonesus. "Let no one imagine that these Pine trees were like those which are now so named, and which take their denomination from the merchants, who so call them that they may procure them to be admired by those who purchase them. For those we speak of were to the sight like the wood of the Fig tree, but were whiter and more shining. Now we have said thus much that nobody may be ignorant of the difference between these sorts of wood, nor unacquainted with the nature of the genuine Pine tree."

self with trees as he does when, in his "Weekly Register" or "Twopenny Trash," he baits the government which prosecuted, fined and imprisoned him. The subject of these notes will be the Pines in the Kew Arboretum, of which it will be impossible to do more than give a few hasty sketches. Independently of isolated examples of many species scattered over the whole of the Kew domain, the Pine collection proper is arranged along the side and end of a fine stretch of ornamental water almost in a line between the great Palm Stove and Sion House, the residence of the Duke of Northumberland, on the other side of the river Thames. Probably the largest number of species and varieties of the genus *Pinus* are to be found here—represented, as a rule, by a good group of each species, and a few plants of each form—than in any other garden in existence. The only conspicuous absentees are many of the long-leaved Mexican species which, unfortunately, are too tender to withstand the cold of the Kew winters. They, however, thrive in the extreme south-west of England, and especially near some of the lakes of northern Italy.

The Scotch or Wild Pine (*P. sylvestris*) is a very widely-distributed plant, and stretches from northern and central Europe through the Siberian forest-region as far as the Amoor River. Practical Scotch foresters seem to agree that in a given time this Pine produces more timber than any other tree known to them. I do not know whether any experiments on a sufficiently large scale have been made to test the value of Cobbett's statements about the "worthless and villanous Scotch Fir." He says: "I will show that the country would have been worth a hundred million of pounds sterling more than it now is, if this sort of tree (the Locust) had, during the last forty years, been cultivated instead of the villanous race of Firs." In any case the Scotch Fir is a handsome tree, with its tall, erect trunk clothed with bark of a warm, red tint. Several curious varieties are growing well at Kew, notably the variety *Aurea*, which, at the present time, is most conspicuous on account of the bright golden color of its leaves; when growth commences the yellow disappears, and during the summer and autumn months—indeed, until the winter again arrives—the trees of this variety are hardly distinguishable from the ordinary type. In *P. sylvestris argentea* the upper halves of the young shoots are creamy white. A form called *Globosa* is a compact-growing bush with short, glaucous leaves, and so like the New Mexican *P. edulis* in general aspect that the two have frequently been mistaken for each other by Conifer-loving visitors.

The Austrian Pine (*P. Austriaca*) is a fast-growing tree with rigid, sharp-pointed, blackish-green leaves densely clothing the branches. As a nurse or shelter-tree or for forming screens it is an excellent Pine, but the timber is inferior to that of *P. sylvestris*. Of this there is a golden form, which is very effective on some soils. Some authorities make *P. Austriaca* a variety of the Corsican Pine, *P. Laricio*, of which a remarkably fine specimen—interesting, also, from an historical standpoint—grows near the principal entrance to the gardens on Kew Green. The Corsican Pine is a very fast grower, and has attracted the attention of foresters of late years, and where the Larch has failed on account of disease, it has been recommended as the best substitute. It is often, however, difficult to transplant. *P. Laricio pygmaea* is a dense, compact, dwarf form, apparently never exceeding a man's height.

The Aleppo Pine (*P. Halepensis*), a native of the Mediterranean region is not a handsome tree, but is interesting as having claims—according to some commentators—to be the Pine or Fir of Scripture. Amongst rocks on the Mediterranean shores it thrives where scarcely any other tree can grow, and often forms highly picturesque objects. In Britain it is useless either for timber or landscape purposes.

Of the Stone Pine (*Pinus Pinea*) many fine specimens exist at Kew. Those who have learned of the quite recent disappearance of "Ravenna's immemorial wood," a forest of Stone Pines whose praises were sung by the classical Latin poets, may well feel surprised that the succession of cold winters which destroyed the famous Ravenna forest spared the Kew plants, so much further north. Not many years ago the eatable seeds yielded a large revenue to the Italian province.

Pinus Cembra, the Arole of the high Swiss regions, is a handsome, slow-growing Pine, with deep-green leaves and elongated pyramidal outline. According to Dr. Christ, in his "Flore de la Suisse et ses Origines," the Arole will ere long disappear from Switzerland unless specially protected and planted. Self-sown seedlings, except in one or two of the almost impenetrable forests of central Valais, are very rarely seen; the mountain black squirrels eat the cones before they ripen, and what escape the squirrels are eagerly collected by the peasants for food. The cones ripen the third year, and

the large seeds take a year or more to germinate. In the Swiss nurseries, to protect the seed-beds from mice, it is necessary to drive stout planks about fifteen inches into the ground, leaving as much above the surface; a fine wire-net is then fastened across. In gardens the Siberian form has a distinctive name, but neither in habit nor in cone is there—as far as the fine series of trees at Kew enables one to judge—any difference between plants from that and other outlying regions and those raised from Swiss seed.

The Mountain Pine (*P. montana*) embraces a large series of slightly varying forms, differing widely in habit and general aspect according to the conditions under which it finds itself. It is a native of sub-alpine regions of central Europe, and is also found in the Pyrenees on both the Spanish and French sides. On rocky, bare ground this Pine lends itself to good purpose for the landscape-gardener. As a rule the species makes a dwarf, densely-branched, more or less procumbent, bush, but the form *Uncinata* has a tendency to make a neat pyramid. In the bottom of the *Cirque de Gavarnie*, in the Pyrenees, along the stream fed by the Cascade, I noted some years ago a number of trees of this variety, varying from three to ten feet or more, imitating in habit very markedly the Arole of Switzerland. The same habit is also to be seen in the Kew specimens of *P. uncinata*.

Certainly one of the most important of all the European Pines is *P. Pinaster* of the Mediterranean region. It is a handsome pyramidal tree, with light green leaves, from eight to twelve inches in length, and yellowish cones densely clustered around the base of the current year's shoots. Perhaps no other Pine has become more widely distributed over the earth's surface. It is very common in South Africa, and has become naturalized in many countries. The previously almost worthless Landes of western France have, by the agency of this tree, been totally changed; the continuous invasion of the sand dunes has been arrested, and almost the whole population of a considerable district kept employed in collecting the valuable, resinous products. The tree thrives well enough at Kew; and it is useful as a sea-side tree, as it will thrive in shifting sands. The timber, however, is of little value; it is soft and soon decays. *P. Pyrenaica* is a somewhat rare species, not interesting except from a botanical standpoint. A figure and full synonymy are given by Dr. Masters in the *Gardeners' Chronicle* for September 8th, 1888.

All the previous species belong to the group with two leaves in a sheath; the only European Pine which has five leaves to a sheath is *P. Peuce*, from Macedonia. This last-named tree is a handsome, symmetrical species, evidently allied to the Himalayan *P. excelsa*, but with shorter, differently-formed leaves, and almost sessile (not very long-stalked) cones. Both fruit freely enough at Kew, but *P. Peuce* has not been long enough in the country to allow of any statements being made as to its full size under cultivation. By some botanists it is regarded as a geographical form of *P. excelsa*, the nearest habitat of which is in Afghanistan, a distance of more than 2,200 miles from the Macedonian forests of *P. Peuce*.

Kew.

George Nicholson.

New or Little Known Plants.

Portlandia pterosperma.*

AMONG the many novelties collected by Dr. Edward Palmer, during the last season, in the region about Guaymas upon the eastern side of the Gulf of California, is a *Portlandia* which promises to be a valuable acquisition if it can be secured for cultivation. This genus belongs to the *Rubiaceæ*, an order which supplies such ornamental shrubs as the Gardenias, Bouvardias, Rondeletias, etc., and received its name in honor of the Duchess of Portland, who in the last century was a friend and patron of Botany and made a fine collection of rare and valuable trees and shrubs for the adornment of her grounds at Bulstrode.

The first species described, *P. grandiflora*, is a native of Jamaica; was introduced into England in 1775, and was figured in the *Botanical Magazine* (t. 286) in 1795. It is there spoken of as a beautiful stove plant, not of difficult growth, and readily disposed to flower, blooming when not more than a foot high, its flowers uncommonly large, showy and fragrant. Seven other species have since been added, from the West Indies and Mexico, of which the *P. platantha* was also figured in the *Botanical Magazine* (t. 4534) in 1850. This is a similar shrub, with dark-green

*PORTLANDIA PTEROSPERMA, Watson, *Proc. Amer. Acad.* xxiv, 52.

and glossy evergreen leaves, and very large funnel-shaped white flowers, "flowering in a very dwarf state and almost always in blossom."

The present species, as it is found growing in the deep cañons of the mountains about Guaymas, is a shrub or small tree, from two feet to ten feet in height. The foliage differs from that of other species in being rather thin and deciduous, instead of leathery and evergreen. The flowers are numerous upon the young, slender branches, a pair appearing at nearly every node. They are pure white and exceedingly fragrant, funnelform in shape, and nearly three inches in length. The triangular lobes of the limb are

beauty and fragrance of the flowers, and the free-blooming habit of the plant make it very desirable as an addition to our green-houses, and it will probably prove to be hardy in the Gulf States or even farther north. S. W.

Cultural Department.

Notes on Primulas.

THE result of the special Primula Exhibition and Conference held in London in 1887 has been to bring under the notice of horticulturists generally a large number of pretty and interesting alpine species which previously were almost unknown, except to botanists. It also roused an interest in



Fig. 105.—*Portlandia pterosperma*.—See page 208.

folded edge to edge in the bud so that it is strongly angled before opening.

Normally, as in most of the allied genera, the parts of the flower should be in fives, but most of the flowers in the specimens examined have them all in sixes, which may be a constant character of the species. In not a few of the related genera, however, the number of the corolla-lobes, stamens, etc., varies from five to six and sometimes to four, so that the variation in this case cannot be considered of any very special importance.

The plant fruits freely, and seeds were obtained, but these have failed to germinate. The surest and quickest mode of propagation would doubtless be by cuttings. The size,

many of the commoner species and races, especially in the Polyanthus section and in the Auriculas. The origin of the last-named race has, since then, been the subject of several very interesting papers. Dr. Kerner, whose investigations on this point are based on personal observation, and who, therefore, is entitled to be heard with respect on the origin of the Auricula, has arrived at views something like the following:

About the year 1570 Clusius left Vienna to settle in Frankfort-on-the-Main; he began an active correspondence with noblemen and others upon botanical matters, and in this way was continually receiving living specimens from the Tyrol, Styria, Corinthia, Bavaria, etc.; a few years later he bewails his want of success in taming these alpine Primulas, especially the "Blanc Speik" (*P. glutinosa*), and the only two he really succeeded with were *P. Auricula* and *P. pubescens*. With this

latter plant Dr. Kerner experimented, and found it to be a hybrid between *P. Auricula* and *P. hirsuta*—exactly what one would expect to find on a study of the plant as we know it at the present time. About 1582 Clusius began to distribute these two plants to his friends, and in the year 1664 several forms of *P. pubescens* were known with different colored flowers, and these spread shortly after to England, Germany, Holland, etc. The true *P. Auricula*, as is well known, is not prolific in varieties, and as the other is known to succeed in almost any position, it was naturally much sought after until the varieties increased to something like a thousand or more. This *P. pubescens* will, no doubt, do very well for the origin of the alpine Auricula, but it does not account for the abundance of meal and the abnormally large bracts of the show kinds now in cultivation. We must look somewhere else for indications of this characteristic form, and *P. Palinuri* is the only species that is likely to help us. Just lately, however, another plant has been found wild in upper Styria, namely, *P. Göblii*. It was described by Kerner in 1875, and is said to be a hybrid between *P. Auricula* and *P. villosa*, which is very likely. Here we get meal in profusion, the large bracts and the dark-colored, pasty flowers of an inferior show Auricula. The perfection of the present times has been the result of selection to a large extent, and it will be many years before the investigations now proceeding will give us any real clue, and this only, on the one hand, by reversions and, on the other, by working with *P. pubescens*, about the parentage of which we are now quite certain.

To show what the conference has done for this genus one has only to glance at the number of species and varieties recently introduced, and the number of people interesting themselves in their cultivation. Hardly an English garden nowadays but is rich in Primulas of some kind, and not the least beautiful and interesting are the gold-laced Polyanthus, which are once more coming into favor with us. Including species, hybrids and varieties there are, exclusive of Auriculas and the Polyanthus forms, no less than 150 different kinds of Primrose in cultivation. A few years ago it would have been hard to find a third of these in this country.

America has helped to swell the number, and few species introduced of late years equal the charming *P. Rusbyi* found by Greene on the summit of Mount Wrightson, and described in the *Bulletin Torrey Club*, viii, 122. *P. suffrutescens*, *P. Parryi*, *P. mistassinica*, *P. angustifolia* and *P. Cusickiana* are all in cultivation now, adding much to the beauty and interest of our rock-gardens and marsh-beds. The greatest number in flower at present are, of course, European species and hybrids, to which *P. Auricula*, in some way or other, has contributed largely. Amongst the most distinct are *P. Christii*, *P. venusta*, *P. Escheri*, *P. Kerneri*, *P. discolor*, *P. Alpina*, etc., some have the flower of one and some of the other parent, but all are worth including in a collection and are easily managed with ordinary care. *P. Balbisii* deserves special notice. It is somewhat like *P. Auricula*, but the leaves are smaller, rounder and less mealy, and the flowers deep-golden yellow. The Marginata varieties are now at their best; they add immensely to the interest of the rock garden and never fail to produce their flowers in the greatest profusion. It is characteristically called the silver-edged Primrose, from the margins being covered with meal, giving quite a character to the leaves. The plants have been likened to miniature, stunted, stone Pines, to which their long, bare stems have really a resemblance. The varieties are Grandiflora, Densiflora, Cœrulea, etc., varying in color from clear lilac to purple. They are quite hardy, and affect exposed rather than sheltered spots. *P. minima* is one of the little gems, but a most difficult plant to manage even when under full control in pots. It is found on the highest mountains of Switzerland, almost to the limits of perpetual snow, forming large sheets of rose and white flowers. It also has given rise to numerous hybrids, most of which are in cultivation, many far exceeding it in beauty, notably *P. Forsteri* and *P. Pseudo-Forsteri*, which produce larger flowers and usually bloom twice a year, namely, in spring and again in autumn. They both are more robust and easier to manage than the type. To this class also belong *P. glutinosa*, *P. Huteri*, *P. biflora*, and others of equal beauty. *P. Allionii* and *P. Ayrolensis* are two dwarf species with large, pretty, pink flowers, also quite hardy and amenable to ordinary treatment.

The Himalayas, give us a great wealth of beauty in this class of plants, amongst the most notable being: *P. Sikkinensis*, *P. Stuartii*, *P. purpurea*, *P. obtusifolia*, *P. Reidii*, *P. rosea*, *P. involucrata*, *P. prolifera*, *P. petiolaris* and others, varying in color from yellow to rose and purple and all perfectly hardy in our climate. *P. denticulata*, *P. erosa* and *P. capitata*

are among the most beautiful of our spring flowers, the former especially, with its large, lilac balls, is very interesting. They stand our rough weather very well, continuing in flower for a considerable time. Some of these, however, like *P. Sikkinensis*, *P. capitata*, etc., are best treated as biennials, and, as they ripen seed freely, no difficulty will be experienced in keeping the stock up. The best of the Himalayan species have yet to be introduced, namely, *P. Elwesii*, *P. Gambelliana*, *P. Kingii*, etc. These are said to be the cream of Indian Primroses and although we have already had seeds we have failed to raise the plants. The most interesting discovery of recent years, however, has been made by Delavay in the mountains of Yun-nan, western China. He discovered no less than sixteen new species, and, although some few were closely allied to Himalayan types, they are distinct enough for specific rank, and will, undoubtedly, add much interest to this class of plants when they can be introduced to our gardens.

Kew, April 6th.

D. Dewar.

The Muskmelon.

IN its delicious and refreshing qualities, the Muskmelon at its best is scarcely surpassed by any fruit of any clime. Though essentially a tropical fruit, its development is so rapid that it may be successfully grown in comparatively northern latitudes, provided the summer's sun shines for a few weeks with something like tropical intensity. But its foliage is injured by very slight frosts, and it cannot even endure the chilly winds of autumn if these are long continued.

The Muskmelon is emphatically a fruit for the home garden. It does not endure long transportation well, and its flavor deteriorates soon after being picked. Indeed, in quality it is quite capricious. If pickled a little before ripe, or if left a little too long before using, it is quite unpalatable, and sometimes even nauseous, and if the foliage of the plant is not in a healthy condition, the flavor of the fruit will usually be quite inferior.

A light, somewhat sandy, fertile soil, and a sunny exposure, sheltered from north winds, best suits this Melon. It may be grown well on a naturally heavy soil that is well drained, and that has been lightened somewhat by sand or coal ashes, and which contains abundance of humus from decayed barnyard manure. But it is useless to attempt Melon culture on a poorly-drained, clayey soil, without a favorable exposure. In the climate of the Northern States it is essential that the plants be started quite early, in order that the fruiting season may be prolonged as much as possible. As they cannot, however, endure the slightest frost in spring, it is well to plant the seeds on inverted sods in the cold frame the latter part of April. Cover the soil in the frame with sods, neatly fitted together, the grass side down. Then with a sharp lawn-edger or sod-cutter, cut these sods into pieces about four inches square, and on each of these place about five seeds. Now cover with about three-fourths of an inch of fine loam, and give a good watering. Keep the sash on, except on bright, warm days, watering as often as is needed. In about a month the plants will have formed their first rough leaves, and may be transplanted to the garden. If the weather is dry, give one very thorough watering at the time of transplanting. It is understood that the little pots are to be taken out of the frame and planted out without disturbing the roots of the plants more than is necessary. When the plants are started in this way, they are not apt to be troubled much by insects, but if the seed is planted in the open ground, the hills must be protected with boxes covered with mosquito netting.

The varieties of the Muskmelon are readily divisible into two classes, namely, the green-fleshed and orange-fleshed. The former have softer, sweeter and more juicy flesh, while the latter are firmer and more highly flavored. Each class has its advocates, but I think the latter are generally preferred. As a rule, the smaller the fruits produced by a variety the higher the quality, and when the seed of any variety is pure, its quality can be fairly judged by the color of the flesh and the size of the fruit, without much regard to the particular name the seedsman has seen fit to give it. And yet we cannot get along without the name. In my own experience, the Emerald Gem, Miller's Cream Nutmeg, Casaba, Surprise and Christiana rank very high in quality among the orange-fleshed Muskmelons. Among the green-fleshed, the New Orange Cream, Queen and Baltimore Nutmeg have proved very good. Livingston's Perfection, which I first tested last season, is a happy combination of the orange and green-fleshed Muskmelon, a union seldom met with. The rich, yellow flesh unites to a very considerable extent the juiciness and sweetness of the one class with the high flavor of the other, and in quality it is very difficult to surpass.

The finest Muskmelon I have ever tasted, quality alone considered, is the Algiers Cantaloupe of the French catalogues. The fruit is of large size, with flesh of remarkable thickness, very firm in texture and of surpassing flavor. Unfortunately it ripens so late that it is not certain of maturing in the Northern States. I am now experimenting with this variety as a parent for crossing with our best early sorts, from which I hope to be able to increase the firmness and thickness of the flesh, and to heighten its flavor.

The suggestions offered in relation to the culture of the Muskmelon apply as well to the Watermelon.

Experiment Station, Madison, Wis.

E. S. Goff.

A Few Early Cucumbers.

CUCUMBERS are acceptable to most people, and those grown on the vines in the home garden have a special excellence of flavor. To obtain them earlier than can be

May. I find a box eighteen inches square the best protection; this has a glass cover to be kept on in cool weather, and removed as the sun-heat is more or less strong. In this way a few hills, say ten or a dozen, can be brought forward in advance of the crop planted in the ground.

There is nothing that gives more satisfaction for an early cucumber than the White Spine, under some of its names. This is large enough, early, tender, and of good shape. For a later crop the Para is excellent; it is a profuse bearer and is fully equal to any of the cucumbers for the table, though it cannot be called early; neither can the Green Pickling. Cucumbers need manure under the plant in the hill and a rich soil besides to do their best.

The White Spine can be grown in a space of one yard for a hill, if cramped for room, leaving five plants in a hill. I put wood-ashes and bone-dust in the hill, mixed with the soil. A pint in each hill will hurry them on rapidly. In my



The Gardens of Levens Hall.—See page 206.

done from seeds planted in the open ground, plant now in boxes containing about three inches of earth, lay six or eight seeds in a group three inches apart, over them sift enough fine dirt to cover one-half inch deep. I use soil from the hot-beds for this purpose. This being used continually from year to year, and mixed with the manure in the bed each year, becomes, in time, specially adapted to such work, being full of plant-food, and does not pack under repeated waterings, as ordinary soil will.

In the absence of such a source of supply, sand and loam, mixed, and having some chemical plant-food in it, will do. Set the box in a sunny window and when the seeds break ground, let the windows down from the top, or carry the box outside, in a sunny, warm, sheltered spot for a while each day. Return them early in the afternoon to the house. After they are well up transfer them to hills in the garden placing some protection over them. This can be done in the early part of

locality the first of July is early for the first specimen grown with this treatment, and this is about two weeks ahead of planting in open ground. When sliced, kept in cold water for an hour, and dropped into sharp vinegar, they will not disturb the weakest digestion. A cucumber kept a while on ice is much better than one fresh from the vine.

W. H. Bull.

West Springfield, Mass.

Orchid Notes.

Oncidium ampliatum majus was first discovered about fifty years ago in Costa Rica, and afterwards in other localities in Central America, where it enjoys a maximum temperature of about 85° Fahr. It is still often to be met with in collections, though not so frequently as formerly, owing to the introduction of larger-flowered and, according to some, prettier species. *Oncidium ampliatum majus* may, even in these days, be reckoned among the very finest representatives of

the genus. It is similar in character to the type, but has much larger flowers, and presents a finer appearance in every way. There are several fine specimens here which have been in flower for over a month, and they will last until the middle of May. There is no other *Oncidium* flowering at the present time which can compete with it in attractiveness, and this fact renders it particularly valuable for decoration and also for exhibition purposes at this time of the year. Before this *Oncidium* came in flower the Orchid-houses were made resplendent by the gorgeous-flowered *O. tigrinum*, a native of Mexico, and *O. splendidum*—which is, botanically speaking, only a fine variety of *O. tigrinum*, but which comes from Guatemala instead of Mexico, where it was first discovered about 1862. The subject of the present note possesses an advantage which can hardly fail to be appreciated by cultivators, namely, that of being easily managed. Large plants generally do well when grown in either pans or baskets, which must, however, be well drained with clean crocks. A compost of good, fibrous loam with a little sphagnum mixed is most suitable for it. Most Orchids like plenty of water during the growing season, but this is an exception. This distinction is due to the large pseudo-bulbs which are well provided with moisture absorbed by the roots from the atmosphere. At no time should much water be given, except in very hot weather, when evaporation goes on rapidly, and then more than usual may be given with advantage. This species, having large, leathery, dark green leaves—like some *Cattleyas* or *Lælias*, but much handsomer—will bear a greater amount of sun-heat than could, with safety, be allowed to thinner-leaved kinds. Small plants should be grown in baskets or pans and suspended near the roof, so as to obtain as much light as possible.

In general appearance this is a very handsome *Oncidium*. Its large, ovoid, compressed bulbs are of a bright green when young, and heavily spotted and blotched with purple. As they become older the skin becomes shrivelled and blackish-purple. The leaves are large and very beautiful—indeed, they form one of the chief beauties of the plant, with their dark-green, glossy surfaces. From the base of the pseudo-bulbs, a panicle of bright golden flowers arises for a length of eighteen inches or more. One plant now in flower here has six such panicles, each bearing from forty to fifty large flowers, which present a solid yellow mass, the monotony of which is most agreeably broken by means of the numerous reddish-brown spots and blotches on the sepals and the base of the petals, as well as on the crest of the lip. The under surface of the flowers—especially the lip—is covered with a peculiar white bloom, which is quite characteristic. Sprays of flowers will remain in good condition for a long time in a room, if placed in fresh water. The base of the stem should be occasionally cut, so as to let fresh cells absorb the water.

St. Albans, England, March 30th, 1889.

J. Weathers.

Cattleya Lawrenceana.—A splendid example of this lovely *Cattleya* now forms a very conspicuous object in the collection of Mr. Hicks Arnold, of New York. Though a comparative small plant with but thirteen bulbs, three of these have borne, in the aggregate, eighteen rich and very striking rosy-purple blossoms, and on one spike alone nine flowers were counted. Its appearance at this season will make it a great favorite with all lovers of this gorgeous family; but it is to be regretted that such a fine *Cattleya* is not more plentiful. But as it comes from the Roraima Mountains, in British Guiana, and can only be collected at the cost of great hardship, it will probably remain a rarity for some time. In habit *C. Lawrenceana* is most distinct, having pseudo-bulbs of a reddish hue and foliage of a stout and very leathery texture. In its native home it has been seen with eleven flowers on one spike, and we hope this number will be soon attained on cultivated plants. They enjoy a few degrees warmer temperature than most of this genus, and the atmosphere should be kept charged with moisture while they are growing. Baskets have been found preferable for this species, and if suspended in a position close to the light, in a mixture of fibrous peat with a little sphagnum, it will produce its handsome blossoms freely. Among other noteworthy plants seen in this collection was the curious green and black flowered *Calogyne pandurata*, a beautiful specimen carrying a spike with a dozen flowers; a *Cypripedium grande*, remarkable for its vigorous growth and striking blooms; an *Oncidium Marshallianum* with a many-flowered panicle of bright yellow and rich brown blossoms, and an *Odontoglossum citrosimum album* bearing a dense cluster of large, pure white flowers. The *Cypripediums* in this collection are growing very rapidly, and a fine show of them is shortly expected.

Summit, N. J.

A. Dimmock.

Rose "Souvenir de Wootton."—This is a hybrid Tea Rose, and was named after the country-seat of Geo. W. Childs, Esq., at Bryn Mawr, Pennsylvania. It is a seedling from the well-known Tea Rose, *Bon Silene*, fertilized by the hybrid Rose, *Louis Van Houtte*. It was raised by John Cook, of Baltimore, and was sent out in the spring of 1888, but its merits as a winter-blooming rose were but little known until this season, when it has proved to be a very free and continuous bloomer and of rank, vigorous growth. The color is crimson, flushed with carmine, and the blooms are very large, frequently measuring six inches across. The petals are short, which gives it a somewhat flat appearance; but, while it lacks something in gracefulness, it is a very showy rose and of exquisite fragrance. The foliage is large and beautiful. It will doubtless prove to be a very useful and popular winter-flowering rose. Of its qualities as an out-door bedding variety very little is known; the coming summer will afford opportunity to test it.

Philadelphia.

Robt. Craig.

This latest American addition to the hybrid Teas seems to be a Rose of much promise, combining the colors of both parents in a very pleasing shade, somewhat similar to that of *Papa Gontier*. As exhibited at the recent show of the Pennsylvania Horticultural Society in Philadelphia, the flowers were of fair size and substance, and in form somewhat like "*American Beauty*," though apparently not quite so double. The color appears to good advantage under artificial light, and this will help it to win a place in popular favor. The foliage of *Wootton* is large, handsome and of good texture, and, what is very important to the grower, is said to be proof against the attacks of "black spot." The plant is of vigorous habit, and also very floriferous, and it is expected by the introducer to prove so valuable an acquisition as to displace *American Beauty* in popularity. Of course, a more extended trial will be necessary to justify these hopes, though many prominent growers have already expressed favorable opinions in regard to this Rose; and, for the credit of a variety of distinctly American origin, it is to be hoped that their confidence may not be misplaced.

Holmesburg, Pa.

W. H. Taplin.

The Spring-Garden.

THE man who plants a spring-garden, even in this New England climate, where the springs are proverbially and almost unexceptionally cold, uncertain and unsatisfactory, provides a richer store of pleasure for himself and his friends than can be obtained from a garden of any other sort. There is no delight to be derived from flowers which equals that which the earliest harbingers of spring afford when they open amidst melting snows, after a long, cold, northern winter. The humblest *Crocus* or *Squill* or *Snow-drop* is more and means more than all the splendors which the suns of summer call into existence. The person who has not a spring-garden, or who does not cultivate at least a few of the hardy plants which flower in the very early spring, knows but little yet of the true pleasures of gardening. These thoughts come to me year after year. Every year the pleasure is keener, as every year the familiar faces of these humble flowers rise up to remind us that the long winter has ended. As I write the earliest flowers have already passed away—the *Snow-drops*, the dwarf, reticulated *Iris* and the early *Crocuses*. But many more plants are already in flower, and the long procession which may be made to grace our northern gardens has hardly commenced to move yet. The most beautiful flower by far just now is that humble plant which the great Swiss botanist, Boissier, brought back from the western Tmolus, in Asia Minor, and dedicated to the companion of many of his journeys, the *Chionodoxa Lucilia*. The generic name derived from Greek words, meaning the glory of the snow, indicates its vernal habits. It is, perhaps, the most beautiful plant of its class of recent introduction, with its compact habit and short racemes of large, intensely blue flowers shaded into white towards the centre. This charming plant is perfectly hardy and in habit it resembles some of the early *Squills*. These, too, are at their best, and whether they are planted in beds or as edgings in the grass, they are always among the brightest and most attractive of the hardy, spring flowers. Their small size adapts them for planting singly among the crevices of the rockery, and when they are freely used in this way the effect which they produce is excellent.

The spring *Snowflake* (*Leucoium vernum*) is also at its best just now, and its nodding white bells, handsomely marked with green at the ends of the perianth-segments, are among the most attractive features of the spring-garden. But this plant, although a native of central Europe, is not entirely hardy here, or rather, perhaps, the bulbs do not last many years, so

that unless new plantations are made they gradually disappear. But the plant well repays the trouble and expense of occasional renewal. Some of the early varieties of the single Daffodil (*Narcissus Pseudo-Narcissus*) are already out, in the warmest pockets of the rockery, and show what the family will do after another week or two of warmer suns. The lovely Bloodroot (*Sanguinaria*) has sent up its one-flowered scapes, and the white star-shaped flowers are just opening in advance of the large heart-shaped and deeply-lobed leaves, which make a fine show all summer long. This is one of the most satisfactory of all our native flowers to bring into the garden. The round-leaved Violet (*Viola rotundifolia*) has just opened its yellow flowers here for the first time. It is a rare northern plant, with stem-leaves of the shape indicated by its name, an interesting species to botanists, and one which, should it take kindly to captivity, will prove a good addition to garden plants. The various Hepaticas, double blue, double purple and double white, are in full bloom, as are the less showy, but not less attractive, single varieties. The Hepatica lends itself to doubling better than most flowers, and some of the intensely double, deep-colored sorts are among the most beautiful objects imaginable in the rock-garden in April.

A few early-blooming shrubs harmonize just now with these humbler plants. The most conspicuous of these is the ever-green Japanese Andromeda (*A. Japonica*), near relative of our Allegheny *A. floribunda*, but of looser habit, with broader and looser panicles of handsome white flowers. These are rarely seen to advantage in this climate, as they appear before the cold weather is over, and so are generally destroyed just as they are opening. This year the exceptionally mild winter has favored them, and they are just now in great beauty. Much better, too, this year, than I remember it here is *Daphne mezereum* its leafless branches being completely smothered with its fragrant rose-colored flowers. It is an excellent hardy shrub, of neat and compact habit. The flowers are always abundant and always early, and they are succeeded by handsome scarlet berries. The Cornelian Cherry, the *Cornus mascula* of Europe, is at its best, too, covered with sheets of golden bloom. It is an admirable hardy shrub or shrub-like tree not too often seen in this country, although it should find a place wherever spring flowers are valued. It never fails to bloom profusely, and is beautiful, too, later in the season, when its ample foliage appears, and when its branches are covered with the scarlet, cherry-like fruit.

Boston, April 18th.

C.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

VIII.—GERMINATION.

THE sprouting of the seed is a special example of growth under favorable conditions. The supply of building materials is of precisely the right kind and of sufficient amount to insure rapid development. Under the head of "Growth" the principal facts have been already considered by us, so that we can now confine ourselves to those features which are peculiar to the seed itself.

The food in the seed, whether it exists as oil or as starch, is in a form adapted to preservation. Hence this food remains of good quality long after the vitality of the germ may have been lost.

The conversion of this solid food into forms which can be utilized by the germ, is effected by one or more of the nitrogenous, inorganic ferments, which we have already examined briefly in a preceding paper. The most important part is played by that which is known as diastase, an enzyme or ferment, which changes starch into a substance which readily goes over into the form of sugar. In oily seeds there is apparently a complete change in a good portion of the oil, by which starch is produced, and this is then consumed as the food of the germ. In the newer parts of such seeds, and in the paths of transfer, starch can usually be detected by appropriate tests without any difficulty.

In all these changes during germination, there is an absorption of water. Without enough water to insure perfect solubility of the solid food, the process of germination goes on only slowly and irregularly. But in point of fact, the amount of water furnished to a seed must (except in the case of aquatics) be so given to it as not to exclude free access of air; that is, the oxygen of the air must have free access to the soaked seed. But, even with these absolutely necessary conditions, the seed will fail to germinate unless another is afforded—namely, a certain temperature. This is very different for different seeds, as might be expected from what we have already seen as regards growth in general. A few sorts will

begin to sprout at the temperature of thawing ice, but for all of our ordinary plants in general cultivation (except certain members of the Cress family) the temperature must be not far from 60° to 90° Fahrenheit.

The three conditions are, therefore, water, oxygen and warmth. Can we hasten germination by modifying the favorable conditions in any way—that is, by making them more favorable? Various chemical agents have been employed for this purpose, notably those which can yield to the seeds oxygen in its active form, as ozone, but the experiments have not been practically successful.

Attention should be called to the interesting fact that some seeds appear to take their own time for beginning to sprout. While many seeds germinate speedily, and whenever favorable conditions are present, there are many which do not start until definite periods of rest have elapsed. The seeds of many of our forest-trees are of this sort, and in their case it is not difficult to see that the refusal to start at once, even when all the necessary conditions are afforded, has something to do with the protection of the plantlet against beginning its development at an unpropitious season. It is, in short, a conservative faculty.

Whether light affects germination to any appreciable extent is a question which has been attacked in an experimental manner, but as yet with inconclusive results. There are some seeds whose sprouting appears to be plainly hindered by exposure to bright light, while there are many others which are as plainly indifferent. Much can be learned by an attentive examination of the manner in which seeds are self-sown in nature. Some seeds are scattered by nature on the surface of good soil, and there remain uncovered. Here, on the very surface, they will germinate freely and produce good plants. The practical side of this and allied questions is presented in a trustworthy manner by a competent authority* on the raising of plants from seed in a paper wherein directions are plainly given for treating seeds from the period of their ripening to the time of sowing, and the proper conditions are insisted upon in a clear manner. In that interesting paper the directions follow almost exactly the teachings of nature, so far, at least, as it would seem possible they could be adapted to the exigencies of tree-planting on a large scale.

When the germ develops, there is speedily seen a definite assumption of form and direction of parts; the stem rights itself, and the root descends in search of moisture and mineral matters. At this earliest period of growth the seedling requires great care at the hand of the cultivator. Proper conditions of light must be afforded, in order that the work of assimilation may be adequate to the needs of the young plant; but, on the other hand, care must be taken to avoid exposure to too intense a light under artificial conditions. Other conditions, such as temperature, moisture, require the greatest attention.

The practical solution of these difficult questions must be sought in horticultural and arboricultural treatises, but the underlying principles of successful practice are to be found in the accepted statements of modern physiological botany.

There are also certain other practical difficulties which follow the cultivator from the moment he places the seed in the soil. The plants under his care are liable to fall a prey to disease. The study of plant-diseases belongs to what is termed vegetable pathology, a subject which can be alluded to here only in the most general terms. We refer to the matter only that our examinations of the functions of healthy plants may be supplemented by a glance at the same functions when they are disturbed by disease. Many of these diseases are caused by the invasion of other organisms, which may be collectively termed fungi (including under that term all the so-called microbes or bacteria in the widest sense). The discussion in this journal of these invasions as applied to special cases has been entrusted to one who has made very extensive contributions to many parts of the field, and therefore only the briefest general statement is necessary at present.

With respect to attacks of fungi on ripening and germinating seeds, it is merely requisite to say at this point that these fungal organisms are unable to exist unless they find food which has been prepared by other organisms. They can take this prepared food, even from the very tissues of the organisms which they attack, destroying not merely the supply of nutriment, but the organisms themselves. Reserving for the next paper a fuller treatment of this subject, we may turn for a moment to a consideration of a single question, namely, as to whether it is possible to kill the fungi which invade seeds, without killing the germs of the seeds. Attempts have been

*The Propagation of Trees and Shrubs from Seed. By Jackson Dawson, of the Arnold Arboretum of Harvard University.

made to destroy such fungi by subjecting the dry seeds to high temperatures, and to the action of strong solutions of poisons. Among the many liquids which have been employed with partial success in a few cases may be mentioned solutions of blue vitriol or sulphate of copper.

Cambridge, Mass.

George Lincoln Goodale.

Correspondence.

Our Forestry Exhibit at Paris.

To the Editor of GARDEN AND FOREST:

Sir.—Some account of the Forestry Exhibit lately sent to the Paris Exposition by the Forestry Division of the Department of Agriculture may be of interest to your readers.

It is the first ever prepared in this country for such a purpose, in so far as it is confined to forestry as an art, and leaves out the display of manufactures which depend on forest-products. The main object in view in preparing this exhibit has been to be instructive to European students of American forest-conditions, forest-growth, forest-products and forest-utilization, and many novel features in the method of arrangement of the exhibit have been introduced to attain this object.

To give an idea of the forest-areas still existing a large wall-map, twelve by seventeen feet, has been prepared, showing for each state the ratio of forest-land to total area by different shades of green color. This is all the knowledge we can really claim to have in regard to our forest area, since the statistics gathered by the census are no longer true, and a stamp in the shape of a tree has been used to indicate on the map the localities of densest growth.

Great care has been bestowed on the forest botanical exhibit. Out of the 420 or 430 arborescent species forming our forest-wealth, 120 species have been selected which appear to form more or less the important staples of our timber supply, or which for some special reason seem desirable objects for our future forestry. The wood specimens are about nine inches in height and two inches in breadth, representing a cut from centre to periphery of varying width, with a slanting cut at the top of centre, and showing the bark, the upper third oiled and varnished, the lower dressed in the raw. The woods that belong to the same genus, or to several genera closely connected, are mounted together on one panel, and the panel is surrounded by glass-covered boxes containing specimens of branch and fruit of the species contained in the group. By the side of each block of wood is a label showing the botanical name of the species with English and French equivalent, a small map showing its field of distribution, and below it the description of the tree and its wood as given in Professor Sargent's account of the Jessup collection of woods.

There are thirteen such groups or panels. The Pines are represented by twenty-two species—fifty-four northern, six southern, eleven Rocky Mountain and Pacific species. The other conifers fill two panels with twenty-four numbers. The ten most important Oaks fill another panel, and Hickory, with Walnut, Chestnut, Beach and Hornbeam, another.

The Massachusetts Society for the Promotion of Agriculture, which is the trustee of a fund bequeathed by the younger Michaux, a French botanist, for the purpose of encouraging the study of trees in the United States, placed one hundred dollars at the disposal of Mr. Fernow for the purpose of acknowledging by an exhibit their recognition of the generosity of this man. A most fitting exhibit seemed to be the work of this botanist in 240 colored plates illustrating the American forest-flora, grouped twelve in a swinging frame, headed by a steel engraving of Michaux and a French inscription relating the circumstance of the appearance of this exhibit.

Professor Rothrock, lecturer under the Michaux fund, of which one-half was contributed by the American Philosophical Society, obtained permission to loan for photographic enlargement, some of the many fine lantern slides of characteristic tree-growth which he has collected. These were supplemented by photographs from Mr. Henry Brooks, of Boston, and from other sources. Especially noteworthy are the contributions of Mr. Taber, of San Francisco. His California trees, on plates fourteen by twenty inches, are magnificent representations. Altogether some fifty characteristic photographs are in this collection.

A frame of veneer sections shows the gross anatomy of some of our important woods, and a series of magnificent photo-micrographs in swinging frames, executed by Mr. Thomas W. Smillie, photographer of the National Museum, from sections of Mr. Z. L. Zabriskie, illustrates the anatomical structure of twenty species enlarged 100 times in radial, tangential and

transverse section. This is a kind of exhibit probably never before presented to the public, and highly interesting.

The sub-section of Forest-culture contains first, a collection of tree seeds of 100 species in glass bottles. These will convey to the European forester, who is accustomed to handle not more than twenty species, an idea of the variety and also the difficulty in the selection, proper identification and handling of our wealth of valuable trees and their products.

The second number is the model of a tree-planting machine invented by Thomas A. Stratton and lately patented, although it has been tested for two years in western Nebraska. The machine is drawn by five horses, or by a locomotive, and is capable, in one motion, of plowing the ground and planting from 20,000 to 30,000 seedlings in a day. One man to drive and one man to feed have set 15,272 Ash seedlings in nine hours.

The third number represents a collection of sections of fifty trees, planted and grown in different localities of the country, five sections from each tree—a small forest reduced to shipping dimensions. The sections came from the Arnold Arboretum, of Massachusetts, the Agricultural Colleges of Michigan and Illinois and the well-known Farlington Plantation, in Kansas. The sections were taken from the base and every three feet of each tree up to twelve feet, and mounted in frames, so that the five sections in the frame represent a twelve-foot pole, showing on their face the rate of growth in the different parts of the tree. The annual rings are marked with the year of their growth, and a centimeter measure is pasted across the face of each section for ready reference. The amount of information which may be readily read from these living books on tree-growth is remarkable, and would fill many pages.

In the section of Forest-utilization attention is first claimed by the huge slab of Redwood, framed in a frame seven by twelve feet. A series of photographic views, in a Redwood frame, shows the different stages in lumbering these giant trees. A collection of the tools used in lumbering, arranged as a frame surrounding photographic methods of lumbering as practiced in the northwest and in the south, will give to the Europeans an idea of the art of lumbering, which is truly and specifically an American development. The model of a lumbering sleigh, and of a steam logger, which makes its own ice-road, getting into every corner of the woods, completes this phase of our working of the forest.

Numerous large-sized slabs of our economically important woods show the result of the lumbering; especially a fine plank of the White Pine, a monster plank of Cypress, a slab of the Tulip Poplar six feet wide, Black Walnut, Birch, Cherry, Oak, and panels of curled woods of the southern Pines, Maples, etc., give some idea of our wood material.

It is unfortunate that Mr. Fernow had so little time and such a scanty supply of money at his disposal. But when it is considered that the collection had to be made in four months and for \$600, and that it is to be displayed in the limited space of sixteen by twenty-two feet, it will be admitted that the collection is remarkably well fitted for to give instruction to the European forester.

New York.

E. T. Lander.

The Home of Shortia.

To the EDITOR OF GARDEN AND FOREST:

Sir.—I lately made a collecting trip to the region of Shortia, and found the route from Highlands, North Carolina, an interesting one. It passes through quite extensive thickets of *Rhododendron Vaseyi*, easily distinguished, even at this early season (March 25th) by their very large flower-buds, with black-tipped scales. A fine group of Carolina Hemlocks was also passed. We camped the first night at the White Water Falls, which alone are worth a considerable journey to see. The Jocassee Valley, our destination, is at the mouth of White Water Creek, or rather at the junction of White Water and Devil Fork. I wished to see if Shortia was growing as high up in the mountains as these Falls, which are at least 1,000 feet above Jocassee. No Shortia was found, however, until we reached the valley, which has an altitude of about 1,200 feet, and here it grows by the acre. Every little brooklet is lined with it. Most of these little water-courses are in deep, narrow gorges, where the sun hardly penetrates, except during the middle of the day. All of these steep banks are literally covered with Shortia. What is comforting to the botanist is that it can hardly be exterminated. It is on land too steep to be cultivated, and there in such abundance that no amount of collecting can ever affect it very seriously. Our party took away bushels of it, and no one could tell that a plant had been disturbed, so thickly is it growing. No idea of the beauty of

this plant can be formed until it has been seen in its native home. The mass of glossy green and white once seen can never be forgotten.

The home of *Shortia* is a strange mixture of north and south. As a rule it grows under the shade of tall Kalmias and Rhododendrons. Hemlock Spruce and White Pine, of splendid dimensions, are very common, while just a few rods distant grows *Pinus mitis*, *Pinus pungens* and *Pinus rigida*. The old cotton stalks in neighboring fields show that the valley is warm enough for so tender a plant.

I found *Stuartia pentagyna* quite common, and recognized it by the remains of last year's fruit, which were still clinging to it.

Vaccinium arboreum is common in the valley; some plants, true to their name, being quite little trees. In some specimens the leaves were still persistent and quite green.

The list of plants found in flower is not large. Of course, *Epigaea repens* was in full bloom. In one place *Polygala paucifolia* showed its bright purple blossoms, contrasting beautifully with the white ones of *Shortia*. *Trillium sessile* is common, but was hardly open. *Stellaria pubera* was very common and well out, and so were *Tiarella cordifolia*, *Saxifraga leucanthemifolia*, and several species of *Viola*, including *V. rotundifolia* and *V. pedata*. On the Pine ridges we found *Chrysogonum Virginianum* and *Erigeron bellidifolium*, and the Amelanchier was covered with bloom. One of the prettiest things was *Smilax laurifolia*, which is common here, its mass of glossy evergreen leaves and abundant dark fruit making it very ornamental. I wondered if it had ever been cultivated.

Jocassee has been settled many years, and contains some good farms. There are no hotels nor stores, and the visitor must either go prepared to camp out or find quarters at farm houses. The nearest railroad station is Seneca, South Carolina, distant about twenty-five miles. There are good roads to Seneca, also fair mountain roads between Highlands and Jocassee. To see *Shortia* in blossom and in its glory one must get there about the 20th of March, usually, not later than March 25th.

After leaving Jocassee we crossed over into Georgia, hoping to find *Shortia* on the Chatuga River and its branches, but were disappointed. It seems to be confined to the one locality, the head waters of Keowee.

Highlands, N. C.

Frank E. Boynton.

The Newtown Pippin.

To the Editor of GARDEN AND FOREST:

Sir.—I had just eaten a Newtown Pippin when I sat down to read GARDEN AND FOREST, in which you quote a writer in the *Saturday Review* who says:

"We cannot admit that the very best American apple ever possesses a title of the flavor of good English fruit."

A man writes confidently about what he knows, and here I find many people judge a fruit more by its appearance than its flavor; but let at least one who puts flavor first say that an American Newtown Pippin is the best apple in the world.

If your people can only grow enough of it, and grow it well, the rest of the world will have to be very active, indeed, to beat you in apples. They have first to raise a kind to equal it. We have good apples here, and there are good apples in France (though not quite equal to ours, I think). But there is nothing with the splendid high flavor and lasting quality of the Newtown Pippin. I am writing this on the 6th of March, and there are Newtown Pippins here in London, still, after their long voyage and long keeping, of high quality. Our own eating apples have disappeared long ago. There may be a few, often flavorless, in private collections, but in Covent Garden one sees nothing of them. I often wonder when reading your excellent rural journals that I do not find anything about the Newtown, and, so far as I have been able to judge, Americans generally do not value it fairly. They tell me they have better apples, but better would be too good for this poor world.

Garden Office, London.

W. Robinson.

A Nursery of Hardy Perennial Plants.

To the Editor of GARDEN AND FOREST:

Sir.—Even at this early season a visit to the nurseries built up and conducted for many years near Passaic, New Jersey, by Woolson & Co., and now in charge of H. Meyers, is instructive as well as interesting. Many of the Christmas Roses are still in bloom. Some of the rarer Tulips are now open, and near them are at least fifty varieties of the choice hybrid Narcissus. Under the trees are colonies of Dog-tooth Violets, *Erythronium albidum* and *E. Americanum*, with Trilliums, Hepaticas,

English Primroses and Cowslips in great masses on every side; while if rarer flowers are sought, one can find the wonderfully deep blue of *Gentiana excisa*, which appears a little earlier than the better known *G. acaulis*, the almost equally intense blue of *Lithospermum prostratum*, or the rich yellow of *Potentilla Pyrenaica*. Another plant to be seen now, not new, but rare in gardens, is *Isopyrum biternatum*, which resembles its relative, *Thalictrum anemonoides*, in foliage, while the smaller pinkish-white flowers are much more abundant. Among the early Phloxes in bloom are *P. bifida*, from the cliffs of the Missouri River, and Douglas' Phlox, from the Cascade Mountains. But I did not set out to make a catalogue of the plants in flower. The collection numbers more than 2,000 species and varieties of hardy, herbaceous plants, and among them are most of the meritorious plants of this class which are now known to succeed well in cultivation. The spring-garden has not been overlooked in making this selection, and the display of bloom in April and May is always attractive.

What I do wish to say is, that this establishment illustrates in a striking way the growth of the interest in hardy perennials as garden-plants in this country. Many years ago a catalogue of hardy perennials was added to their nursery list, by Hoopes Brothers & Thomas, but here was established the first nursery in the country devoted to these plants alone. Mr. Woolson was for many years engaged with Dr. Thurber on *The American Agriculturist*, and both of them took delight in examining and identifying the specimens sent to the office from all parts of the country, and by a system of exchanges they gathered in time a considerable collection. At last the exchanges reached such proportions that two small green-houses were erected to help propagate the plants demanded, and in 1878 the sale of plants began, and the first catalogue was issued. This catalogue, like those which have followed, had the benefit of Dr. Thurber's revision, and they have been distinguished for botanical accuracy as well as for neatness, compactness and instructive comment. From this modest beginning the business has grown, as the taste for hardy flowers has become more general, until now landscape-gardeners and others, having large places to provide for, send orders here for plants by the thousand. But this is no longer the only place where hardy perennial plants are grown in quantity. Other nurserymen have felt the need of adding a department of this kind to their business, so that it will hardly be denied that the development of this demand for hardy plants is one of the most striking incidents in the current history of ornamental gardening in this country.

The soil and exposure of this place is admirably adapted to the class of plants grown. From a plateau of light, sandy loam the ground slopes gradually to a low, marshy hollow, in which aquatic plants will flourish. Beyond this rises a wooded slope, in which have been naturalized many shy or shade-loving plants like Trailing Arbutus, *Pixidantha* and Twin-flower. Almost any variety of soil—sand, clay or peat—can be found somewhere on the eight acres now devoted to the business, and almost any plant that will live in this climate can be made at home here. It is safe to say that a great proportion of the hardy perennials which have been introduced to American planters during the last ten years have been put on the market through the medium of this house. Among these, besides many foreign plants, have been a large number of native plants which are sufficiently showy or interesting to commend themselves to planters. Indeed, some of our native plants which but a few years ago were rarely seen in cultivation are now propagated here in large quantities. Of the lance-leaved *Coreopsis*, for instance, and the Missouri Evening Primrose the sales were last year as large as of any other plants. Many American plants, however, can be gathered wild more cheaply than they can be grown, which is the case with the Dog-tooth Violets, the *Cypripediums* and, indeed, all the native Orchids and Ferns, and collectors send such plants here from all parts of the country.

There are many native plants well worth a place in gardens which have never yet been introduced. No doubt numbers of the alpine and sub-alpine plants of the Rocky Mountains of Colorado and of the Blue Mountains of Oregon, for example, which are likely to prove hardy, will be interesting additions to our rock-gardens. The growing desire for such plants will stimulate the zeal of collectors, and it is gratifying to know that the material needed for all soils and situations is increasing every year. Certain it is that of herbaceous perennials, of perennials partly woody, of low shrubs and woody climbers, the available selection in this country is much richer than it was when Dr. Thurber and Mr. Woolson began to make a specialty of these plants.

Passaic, N. J.

S.

Notes.

The great gold medal of the Royal Horticultural Society was recently bestowed upon Baron Ferdinand von Müller in recognition of his services in the investigation of the flora of Australia.

Mr. E. W. Reasoner states, in the *Florida Dispatch*, that *Exochorda grandiflora* does remarkably well in that State, as does *Spiræa Cantoniensis* and some other *Spiræas* which are not quite hardy in the Middle States.

A correspondent of *The Garden* (London) recently spoke of a spot in Dunrobin Castle Gardens, Scotland, where, about the first of March, two acres of the common Snow-drop could be seen in full bloom under the ancient trees.

Our readers will remember that the first issue of GARDEN AND FOREST contained a photographic picture of the new Chrysanthemum, Mrs. Alpheus Hardy. The first illustration that we have seen of it in a foreign journal appears in *The Garden* for April 6th, a fine wood-cut of a single flower.

Mr. Baker describes in a recent issue of the *Gardeners' Chronicle* a new species of Snowdrop, *Galanthus Fosteri*, brought from the neighborhood of Amasia, in Asia Minor. "So far as the flowers go," Mr. Baker remarks, "it looks most like the larger forms of *G. Elwesii*, but the leaves are broad and bright green, like those of *G. latifolius*."

Le Moniteur d'Horticulture reproduces from *Hygiène Pratique* this simple method of testing the quality of a pear: Write a name with pen and ink upon the dry skin of the fruit. If the ink is quickly absorbed, leaving clear, sharp lines, the quality of the fruit is good; if the skin does not absorb the ink quickly, and the lines are blotted, the quality is inferior.

Mr. D. Dewar, whose interesting notes on Primulas appear on another page of this issue, is now in charge of the herbaceous and alpine plant department at Kew. It will be remembered that the list of cultivated Primulas, which formed the most important part of the printed report of the Primula Conference, held by the Royal Horticultural Society in 1887, was prepared by Mr. Dewar.

Mr. John N. Gerard, of Elizabeth, New Jersey, sends us a blooming plant of *Androsace coronopifolia*, a hardy Russian biennial, its small white flowers, with a yellow centre, borne on slender scapes. A colony of this little plant is an attractive feature in the rocky or on the margin of the herbaceous border. It will come up from seed year after year if it finds itself in a congenial position, so that there are new plants to bloom every spring.

A healthy, well-flowered example of *Shortia galacifolia* was shown by Mr. H. J. Elwes at a recent exhibition of the Royal Horticultural Society, and, as a matter of course, was awarded a first-class certificate. An English correspondent writes that "The interesting account of this plant which appeared in GARDEN AND FOREST in December last has called the attention of English growers of alpinists to it, and consequently living plants of it are already in several collections here. It does not appear to have ever been in English gardens until now, and Mr. Elwes' plant is the first flowering example of it ever seen alive in Europe.

We have heard with much pain of the untimely death of Mr. J. A. McKenzie, who was associated with Messrs. David Yates & Co., of Philadelphia, in charge of the department of landscape-gardening in their business. Mr. McKenzie was the eldest son of Major Alexander McKenzie, the eminent landscape-gardener, of England, and during his brief sojourn of a single year in this country he gained a wide reputation for ability in his profession, and made a friend of everyone he met by his modest and manly bearing. Of an article from his pen which appeared in a recent number of *Building* we shall take occasion to speak hereafter.

Hideous floral designs are produced in every country, but only in our own, perhaps, could one be created which should reveal so grotesque an attempt at humor with so utter a disregard for the claims of art on the one hand and of proper reverence for death on the other. It was designed, according to the *American Florist*, for the funeral of a railroad employee and represented a limited coupon ticket. The ticket, which was five or six feet in length, rested against a column on which was placed a ticket-stamp, and behind stood the Angel of Death in the act of stamping in the date of limit. The coupons bore the names of the different roads upon which the dead man had been employed, with corresponding dates, and at the top were the words "Limited to October 9th, 1888"—the day of his demise.

At the Massachusetts Agricultural College Experiment Station pollen was taken from a Carnation flower of a magenta color, and after being kept in a dry place for five days, was applied to the stigmatic surfaces of a yellow flower. From twenty-seven seeds obtained by this crossing, nineteen plants were grown, all but one of which produced double flowers. Five of them bore yellow flowers of various lighter and deeper shades, eight bore magenta flowers, four bore scarlet flowers, and two white-striped flowers. In another trial the pollen used was taken from a flower of the same variety—in this case a yellow-striped one—and the seedlings all showed yellow-striped flowers, although they varied somewhat in shade. This seems to indicate that for the production of varieties distinct in color, cross-fertilization is a necessity.

The excessive accumulation of garden varieties of favorite plants is illustrated by the fact that a recently-published German catalogue, devoted entirely to Zonal and Ivy-leaved Geraniums, contains 291 entries. It likewise gives amusing proof of the difficulty of finding names for so many varieties. In addition to the many "Glorias" and "Queens" and "Marvels" of one thing and another, we find plants named for a multitude of botanists, horticulturists and lady clients; then the names of living artists are lavishly drawn upon; celebrities of all kinds follow in curious conjunction, such as General Gordon, Tausaint L'Ouverture, Walter Scott, Count Herbert Bismarck, Leonidas, The Cid, De Lesseps, M. Eiffel and Horace Greeley—General Boulanger, by the way, being unaccountably absent; and at last the tradesman's ingenuity has been driven to such expedients as Nemesis, Electric Light, Divine Comedy, Walküre, Red Sea and Centaur.

The first flower-show ever held in Detroit was opened on April 2d, and continued for three days. The display is said to have been most excellent, and it is pleasing to know that the enterprise was commercially most successful. It was organized by Mr. Brearley, proprietor of the *Detroit Journal*, assisted by twenty ladies connected with as many charitable institutions. As a result of this novel yet sensible plan, 4,000 tickets of admission were sold the first day at a price of twenty-five cents each, and more than 19,000 on the succeeding days. The exhibition was held in a large rink, and each of the charities represented had its own booth for the sale of flowers. Most of the plants were effectively grouped in large masses of allied sorts, and the florists who signified their intention of showing decorative arrangements were consulted with regard to the prevailing color they would select, and rooms were furnished for them in a harmonious way.

Thousands of people are now visiting every day the Public Garden in Boston to enjoy the spring flowers which are lavishly displayed there. The great show will come a little later, when the Tulips are blooming. At present the feature is the Hyacinths, which have been brought forward under glass and are now plunged in full bloom into beds previously carpeted with Daisies or with Pansies. Thousands of Hyacinths are used in this way, and this fact will serve to illustrate the expensive manner in which this garden is carried on. The flowers last a few days only, and then the plants, which were first imported from Europe, then potted, then stored away for the winter, then brought forward under glass, then carted to the garden and plunged into beds, are to be thrown away. The sight of all these masses of Hyacinths is a beautiful one no doubt, but the result is hardly commensurate with the expenditure of labor and money. There are certain beds in which very dark blue Hyacinths are alternated with *Narcissus Pseudo-Narcissus*. The combination of colors in these beds is admirable, and the effect which these flowers together produce is as fine as anything of the kind which can be seen. A bed in which the same yellow-flowered *Narcissus* is mingled with a pale pink-flowered Hyacinth is almost as unsuccessful as the others are successful. It is pleasant to note that some of the superfluous flower-beds have quietly disappeared from the garden, that there are fewer of the horticultural curiosities scattered about, and that the garden generally gives promise of greater simplicity of decoration. There is a pile of rocks in a conspicuous place, however, thickly planted with garden Tulips (the garden Tulip is a flower of the parterre, if it is anything), which is calculated to give a shock to the stoutest heart. But perhaps it is an object lesson, intended to illustrate how not to make a rockery, and how not to plant Tulips. That Mr. Doogue knows how to plant Tulips the beds near the Commonwealth Avenue entrance and along the central walk will, if they are as good as they have been in recent years, abundantly demonstrate. Bostonians will have much to enjoy in the garden during the next two or three weeks.

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The Artistic Aspect of Trees.—VII.

WE spoke not long ago of the Lombardy Poplar and the Weeping Willow as trees which, on account of their peculiar form, are exceptionally conspicuous, and therefore must be placed with care if a good general effect is to be heightened by their presence. The Purple Beech is a tree of normal shape and texture, but its eccentric color puts it in the same category with trees of eccentric shape. Rightly used, it may be a feature of extreme beauty; wrongly used, it may deform an otherwise beautiful landscape. It should never look as though mere chance had determined its position, for everyone knows that it is not a natural species but a mere variety, originally produced, indeed, by one of Nature's spontaneous accidents, but carefully perpetuated by the hand of man. It should never be planted in a wood, on a rough hill-side, in a picturesque glen, or in any other place in which it is desired to simulate a purely natural effect. Its place is in ornamental grounds near a house or in the more carefully tended portions of a public park or pleasure-garden. Here it may stand in isolation or be grouped with other trees of an appropriate character. Nothing, of course, groups so well with it as Beeches of the normal hue—either the European Beech, with its beautiful dark green, glossy foliage or the American Beech, with its lighter foliage, paler bark and more graceful ramifications. Failing these, its associates should be trees which will repeat its own lines in a general way, like the Horse-chestnut or the Scarlet Maple, or which will gently contrast with those lines, like the Sugar Maple with its more elliptically-shaped head. To group it with the broken, picturesque outline of a White Pine, or the hard, conical shape of a Spruce, would be to ruin its effect. And, as a general rule, it looks better standing apart from all other trees, for a well-grown specimen is as beautifully symmetrical in form as it is peculiar in color. If, however, it is grouped with other trees as much attention should be paid to the shades of green as to the forms of its neighbors. In shape the Negundo, for example, would be a good tree to group with the Purple Beech; but the light green

of its leaves contrasts unpleasantly with the vivid tint that this Beech sometimes assumes. It may be added that it varies much in tint, as may be read in the fact that it is sometimes called the Purple and sometimes the Copper Beech. Those shades which approach most nearly to brown are the most desirable as being less eccentric and conspicuous than the brighter purples; but in our climate, fortunately, the hot sun of summer often turns a tree that has been too vivid in the spring months to a beautifully modulated coppery color. The Purple Beech has sometimes been recommended as a street-tree, and has more than once been planted as an avenue-tree in American country-places. But it is not well adapted for either of these purposes. What we want in the city is as much of Nature's verdure as can be obtained; and to line a street with purple trees is to defeat this object. Not eccentric but normal color is the thing to be secured in systematic street-planting, although, of course, in a small park or the grounds of a villa a well-placed Purple Beech is an interesting object, and if the arrangement of such a spot is formal or semi-architectural, its presence is doubly appropriate. In a country avenue the Purple Beech is likewise out of place. Here we have, indeed, an abundance of green tones in the surrounding landscape, but a whole avenue of a purple color cannot but disturb the restfulness and harmony of even the widest and most varied park. Anything that is eccentric, whether in color or in form, should be sparingly used—should merely accent and enliven a scene, not be so often repeated as to dominate or confuse the general effect. A vast bed of purple *Coleus* could not agreeably take the place of a lawn, nor can a long double row of purple trees agreeably form an avenue.

The common White Birch of Europe, like the Paper or Canoe Birch, which is less frequently planted, is a peculiar tree in both form and color. The color of its leaves, indeed, is green, but the brilliant whitish hue of its bark which, as its foliage is not dense, appears even in the head, added to its slender outline and drooping habit, makes it extremely conspicuous. No tree is more generally seen in our parks and country-places, and none, perhaps, has been such a source of sorrow to the landscape-gardener. Early associations have made our little Gray Birch dear to all lovers of Nature in our Eastern and Middle States, where it grows abundantly in the woods and copses, and, combined with the White Pine, often gives the landscape a distinctive look. The fact that it is peculiar, and is graceful and pretty rather than beautiful in a more serious sense, has tended to make the similar and more easily-procured European Birch very popular. It is easily grown and flourishes in a variety of situations. No tree, therefore, has been more frequently introduced into private grounds by proprietors who think they can improve upon an artist's first arrangement. But, charming though the Gray Birch is when growing wild, and when judiciously planted, a single Birch of this character unwisely placed can work the greatest injury to a landscape. Its weakly pliant form and shining trunk make the smallest specimen conspicuous against a background of other trees, and may disturb the majestic repose and dignity of a dozen great Oaks or Beeches. Nor, as most generally placed by the amateur—especially when the cut-leaved garden variety is chosen—in isolation on a lawn, can it often have a good effect. It is too delicate, fragile, nerveless a tree to look well by itself, and its outline, although graceful, is seldom really beautiful. This, unlike the Purple Beech, is a tree for the edge of a natural-looking wood, for a rocky glen, or a tangled hill-side. A familiar wild tree in many countries, it looks out of place if posed as a garden specimen by itself, while its form shows to the best advantage when several individuals grow near together in association with such trees as Nature herself commonly groups about it. With Pines, Hemlocks, Tupelos and Scrub Oaks in the woods along the Massachusetts coast, the Gray Birch composes most beautiful pictures; and it is pictures such as these that the

landscape-gardener should study when striving to make the best use of the material at his disposal.

A new edition of the "Manual of the Botany of the Northern United States" is in press, and will appear early in the autumn. It has been prepared by Mr. Sereno Watson, with the assistance of Professor John M. Coulter. The Willows have been elaborated by Mr. M. S. Bebb; the Carices by Professor Bailey, and the Ferns by Professor Eaton—the best authorities in the United States upon these difficult plants. The field covered by the new edition is enlarged to embrace the territory as far west as the one-hundredth meridian, older editions having covered the Northern States east of the Mississippi River only; and the *Hepaticæ* from the pen of Professor Underwood are to be added. "Gray's Manual" is one of the best books of its class that was ever written, and for forty years it has been the constant guide and companion of every man and woman who have successfully studied the flora of eastern North America. No popular flora was ever cast in a better mould, or has had a more widespread and lasting influence. Twenty years have passed, however, since the last edition appeared, and a new one to include all the additions which have been made in recent years to our flora, and all the changes in nomenclature and grouping made necessary by recent investigations has long been greatly needed. Professor Gray, up to the very end, expected to publish a new edition of the Manual, but the time never came when he could turn his hand to it without neglecting more important duties, and the task has fallen upon his associate and successor.

The following is the substance of a dispatch dated April 21st, from Holyoke, Massachusetts, and published in the Boston *Herald* on the following morning: A fire which destroyed a large amount of valuable woodland property started from some embers emptied among the brush on the outskirts of this city at four o'clock this afternoon. The wind was blowing a furious gale, and fanned the embers into flames, which were communicated to the woods near by. The wind carried the fire from tree to tree. Farmers turned out to fight the flames, but for hours their efforts were unavailing. Thousands of acres of valuable timber were burned before the fire was got under control. It had laid waste a territory four miles long and 100 to 400 yards wide.

A dispatch in the same issue of the *Herald* from Pittsfield, Massachusetts, states that "two forest-fires are now raging, one in the west part of the town, north of the Valentine summer place, which is doing considerable damage and threatening several dwellings. Another great forest-fire is burning furiously in the north part of the town. This covers a very large area of territory, and is sweeping on toward the east with great fury, taking the timber in its course and threatening a whole settlement with destruction." A dispatch from North Adams of the same date, states that "extensive forest-fires have been raging in this vicinity for the past few days, destroying large quantities of valuable timber, also thousands of cords of wood which had been cut and piled during the winter."

Announcements similar to these appear almost daily at this season of the year in the press of the country. They emphasize what we have so often insisted upon—that it is in the early spring, before the appearance of the new leaves, that there is the greatest danger from forest-fires, and that it is useless to expect that such fires will diminish in number and in violence until the time and the method of setting brush-fires upon farms are regulated by law, and some responsible officer is appointed in each town to decide when such fires can be set with safety to the community. It seems preposterous that any man should be allowed to set a fire on his land without restriction and without regard to the lives and property of his neighbors.

Many lives and many millions of property are sacrificed

every year in the United States in this way, but the men who set the fires and allow them to escape to the land of other people are not responsible or cannot be made responsible for the damage they cause. The number of such fires can, however, be greatly restricted, and the Forestry Associations, Forestry Commissioners and similar bodies who are looking about for some object upon which to centre their efforts will find here a good cause. Prevention is the only cure for forest-fires, and the most efficient way to prevent them will be found in limiting the right of individuals to set brush-fires. A brush-fire in a wooded district on a dry spring day, with a high wind blowing, is a much more dangerous thing to the community than a nitro-glycerine factory. Yet no farmer would ever claim the right to manufacture nitro-glycerine on his premises, or consider that his liberties were invaded if the community in which he lived objected to his making it. It is through the establishment of some supervision over the setting of brush-fires more than by any other one thing that the interests of forestry can be advanced and the protection of rural property increased in the Eastern and Northern States.

Some Old American Country-Seats.

II.—THE LYMAN PLACE IN WALTHAM.

BEYOND Cambridge and Somerville and about seven miles from Boston Common rises a range of irregular and sometimes rocky hills, from whose summits one may see on the west Wachusett and on the east the ocean. At the southern end of this highland two considerable brooks issue from the hills and, joining their waters, flow as one stream across about a mile of smoother country to Charles River. Between the western brook and the foot of the rocks is a warm slope having a southern exposure, and here one of the colonists of 1634, by name John Livermore, built his house and cleared the land for a farm. Other Livermores—namely, Nathaniel, Samuel and Elijah—in turn succeeded to the property; of whom Samuel came to most honor, for he married four times, and served his fellow-townsmen as their clerk, assessor and captain of the company, and also as deacon of the church, which was built about 1722 "within twenty rods of Nathaniel Livermore's dwelling." Elijah Livermore became the founder of a town in Maine, and sold the farm to Mr. Jonas Dix, of the class of 1769 at Harvard College, who brought his bride to the Livermore homestead, and there lived the quiet life of a schoolmaster and selectman until his death in 1796.

It would be very interesting to know what was the condition of the neighborhood at this time, whether the sheltering hills behind the farm were wooded or no, and what sort of a channel the Chester brook ran in. The place must have been decidedly attractive in some way, for its next owner, Theodore Lyman, a merchant of Boston, bought it with the express intention of making it a country-seat, and forthwith built a mansion which was valued by the assessors of 1798 at the vast sum of eight thousand dollars! This substantial house he placed not upon the highland, where the popular taste of to-day would set it, but upon the flat, and from one to two hundred feet south of the southernmost rocks. Here it was sufficiently high above the brook, which flowed in front about 400 feet away, while behind it space was obtained for a well-sheltered garden. The east wing was built close to a little knoll, which, with the trees upon it, helped to make the house appear firmly and comfortably planted. The west wing also had its supporting trees. The smooth lawn before the house was made with material dug from beside the brook, which was then induced, by the help of a low dam, to flow more quietly and broadly. Plainly, English books on landscape-gardening, like Repton's or Whately's, had made part of this American gentleman's reading—the low setting of the house and the serpentine curves given to the grass-edged shore of the stream furnish proof of this.

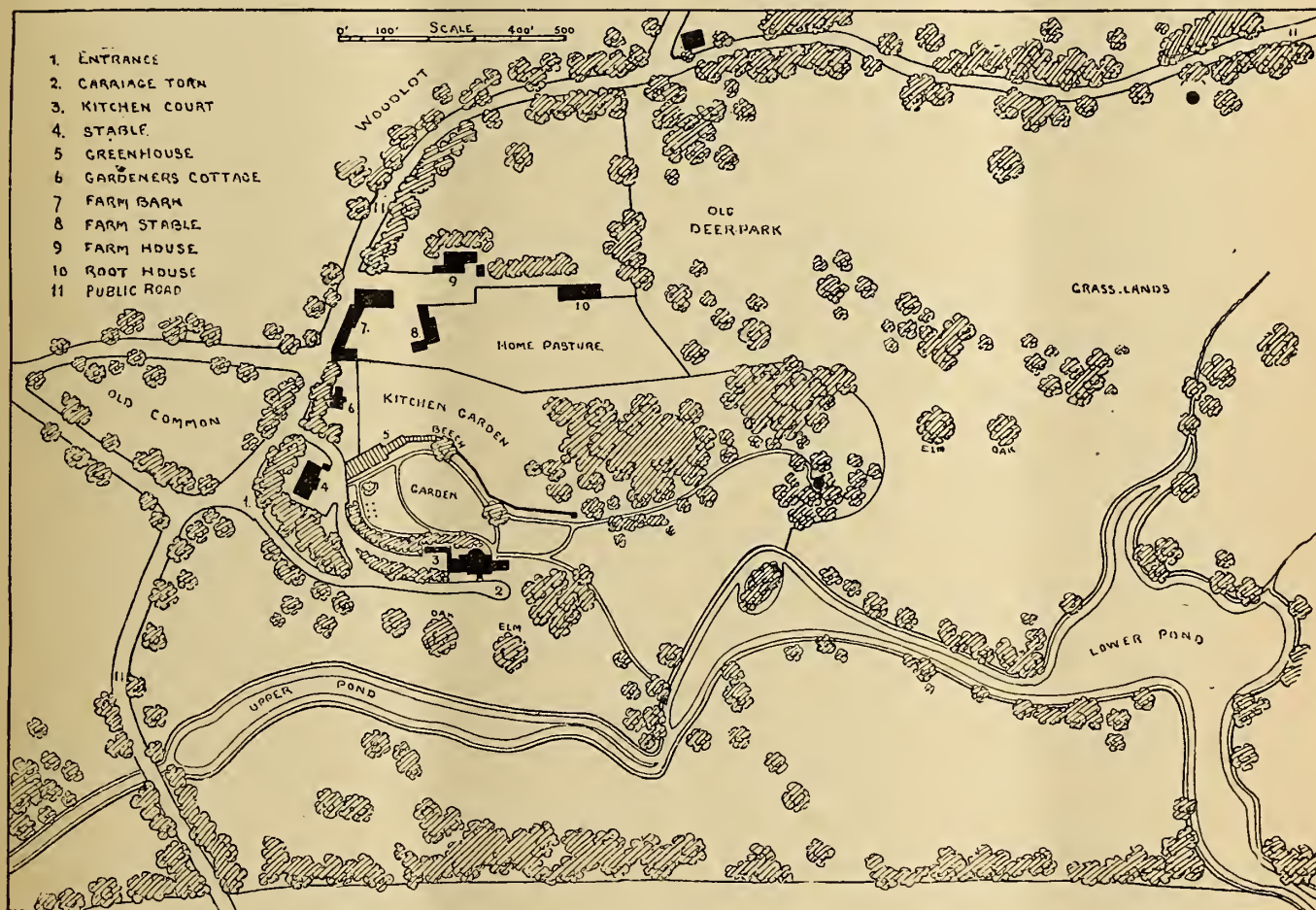
At first, the approach road entered the estate from the south-east and crossed the brook on a stone bridge of three arches, but in after years a new entrance was made in the position shown upon our plan, and then the older way was discontinued, with the unfortunate effect of bringing the driveway to a sudden ending at the house-door. No other important alterations of the original plan have been attempted since the designer himself made this change. To be sure, the second Lyman, probably in haste to provide shade in certain parts, planted many Norway Spruces, but these his son is now

gradually removing, to the great improvement of the general scene; for the deciduous forest trees which these quick-growing conifers hid from sight have now attained a handsome stature and, leaning forward or hanging from the steep banks behind the house and from the knolls, compose a harmonious and striking scene, which the cone-shaped Spruces at present confuse and obscure. A few of the native trees are uncommonly large; for instance, an Oak and an Elm, which stand alone in the grass-field east of the pleasure-ground; and, just before the house, a fine swamp White Oak, which was, doubtless, an aboriginal inhabitant of the Chester Brook Valley—its horizontal branches spread 100 feet. Here, too, is an English Elm of uncommonly wide-spread habit, its many large limbs supported by a trunk which measures fifteen and a quarter feet in circumference.

scenery of the estate—the gentle slopes of grass-land, in the hollow of which lie the ponds, the wide stretches of moist meadow, the occasional passages along the stream where Elms or Willows overhang the water, the sheltering banks and knolls clothed with dense woods or dotted, as in the remote parts, with dark Junipers and outcrops of rock. The landscape is more appropriate to human use and occupation, and at the same time it is more beautiful than was the original natural scene. The meadows are more meadow-like than they were, the stream reflects more sky, the trees are nobler trees, and they stand in ordered masses, not in uniformly dense array. Here is abundant proof that if Nature is helped and not forced she will make for us scenery which shall grow to more and more loveliness and character as the years pass.

Boston.

Charles Eliot.



Sketch Plan of the Lyman Place.

But the most remarkable tree upon the place—a Purple Beech (see page 221)—stands in the garden behind the house. This little level space is curiously irregular in ground-plan. It is bounded on the north by a short range of glass-houses and by a high brick wall, which curves in and out in order to avoid the ledges of the rocky bank behind it. This old wall is trained all over with Peach and Pear trees, an ancient hedge of Box accompanies it at some six feet from its base, and many forest trees rise behind it. The garden-ground is all one slightly varied level of soft grass, with a few trees of chosen kinds near the edges, a few Rhododendrons and Roses, and one giant White Pine, which seems to guard the open end of the ground where the simple but picturesque enclosure expands into the still simpler ground outside. With its soft shadows at all hours of the day, its sheltered quietness, its intricacy in one part and its open network in another part, this is a charming spot—a scene which would be lovely enough without its crowning glory, the guarded Purple Beech. The tree stands close against the brick wall; the circumference of its embossed and tortuous trunk is more than thirteen feet, and its branches extend eighty-five feet. This is a large Beech to be only ninety years old, and it is just possible that Mr. Dix may have planted it and the great Elm before the house; but their stature is more probably to be accounted for by the good soil and shelter.

Many photographs, and we have room for but one, could only partially illustrate the beauty and variety of the larger

Native Shrubs of California.—I.

Nuttallia cerasiformis, belonging to the alliance of the Cherries and Plums, botanically something between the two, with strong points of divergence from both, is perhaps our earliest shrub to put forth leaves and flowers. Before the end of January, if the winter be mild, he who rambles by brooklets among the hills may catch a breath of fresh, delightful fragrance, and so be notified that *Nuttallia* is already coming into bloom. Its nodding clusters of green and white, partly concealed by half-grown leaves, make little show, and the shrub is commonly of humble growth, although occasionally appearing in the dimensions of a Hazel-bush. It must, nevertheless, be a favorite wherever it is known, on account of the sweet odor of its flowers—not heavy and surfeiting like that of the wild Plums and Cherries, but most agreeable and refreshing, something to be compared to the flavor of Almonds. No other flowers have such a smell; and I well remember how, in my earlier walks in California, botanizing one April day in the northern Sierra, at the base of Mount Shasta, where half the thickets were white and red with the bloom of Dogwood and Redbud, and the rocky margins of the noisy mountain-streams were set full of the broad leaves and pink corymbs of the great Saxifrage (*S. peltata*), all so attractive to the eye, I wondered and wondered which of the many new beauties it was that gave forth such unwonted and peculiar fragrance, until at length I

broke off a twig of the little Cherry-like bush, which was then new to me, and found that, in its modest reserve, to be the source of all the sweetness with which the air was laden.

In the Foreign Correspondence of GARDEN AND FOREST I have lately read with some interest the remark that while in France the handsome fruits of *Nuttallia* are its chief attraction, in England it bears no fruit. May not this possibly be explained by reference to the diœcious character of the shrub? Have they in England, perchance, only the staminate flowers? Much the same thing may be noted in some parts of California. About Berkeley, for example, I have never found the fruits, nor even any bushes with pistillate flowers; but on the opposite side of San Francisco Bay, in Marin and San Francisco Counties, there are plenty of pistillate-flowered specimens, and the fruits are produced in abundance. There is much more diœcism in California plants and shrubs of the Rosaceous and Pomaceous families than the authors of our books of botany have known.

Owing to inattention to this matter our common wild Blackberry, or Bramble, has been published by botanists under at least three different names, as if there were three species. The oldest of these is *Rubus vitifolius*. The type so named is merely the pistillate shrub, and its flowers are commonly but one-third as large as those of the staminate plants, and their petals are rounded. These, growing as they do among the staminate shrubs, the flowers of which latter are not only thrice as large, but have narrow and elongated petals, look as if they might indeed be of a distinct species. The fine figure in Hooker's "Flora Boreali-Americana," under the name of *Rubus macropetalus*, represents simply the staminate or sterile condition of what has commonly been called *Rubus ursinus*, of which the prior name, and the one to be retained, is *R. vitifolius*.

I ought here to add that in *Nuttallia*, also, the staminate plant produces rather larger flowers than the pistillate.

Oakland, Cal.

Edward L. Greene.

[*Nuttallia cerasiformis* was on the 22d of April in full bloom in the Arnold Arboretum, where it has been growing for several years with a slight protection in winter. It is a handsome and desirable shrub in cultivation, and the first in the Arboretum collection to put out its leaves. The strong perfume described by our correspondent is not noticed in the flowers of the cultivated plant, which are, however, delicately and faintly fragrant.—Ed.]

Foreign Correspondence.

London Letter.

THE most popular hardy flower in England now is the Daffodil. It is grown in every garden; thousands of bushels of its flowers are distributed daily by the costermonger and flower-dealer, and everyone admires it. And yet we are told by Mr. J. G. Baker, the botanist who has paid greatest attention to Narcissi, that twelve years ago these plants were unknown except by a few specialists and as wild flowers in the woods and fields. Mr. Burbidge, whose writings on the Daffodils have done so much to call attention to them as beautiful garden-plants, added yet another contribution to the literature of the Narcissi in the form of a paper which he read at the last meeting of the Royal Horticultural Society. He told us that the Daffodil was cultivated and valued for its medicinal properties a thousand years before Christ. Dean Herbert, the champion of the whole order *Amaryllidaceæ*, grew and crossed many species and varieties of Narcissi sixty years ago; in fact, he was the first breeder of these plants. After him came Leeds and Backhouse, both noted breeders of Daffodils, and the raisers of some of the best of those grown in gardens now. All the forms cultivated are varieties of or crosses from the following six species, the only true species recognized by botanists—namely, *N. poeticus*, *N. Pseudo-Narcissus*, *N. triandrus*, *N. Tazetta*, *N. Bulbocodium* and *N. Jonquilla*. Mr. Burbidge believes that any careful breeder could obtain from these six species all the many kinds of Daffodil now known in gardens. The life-cycle of a Narcissus is from two to five years. The seeds should be sown in boxes as soon as ripe, and they germinate in the November or December following. The one-year-old bulbs are the size of Wheat-grains, two-year-olds that of Marrow peas, three-year-olds either flower, or if of the large-bulbed kinds, are the size of Hazel-nuts. Others flower in the fourth year, others in the fifth, but they are not at their best till a year or two after this. Mr. Burbidge is of opinion that crude manure of any kind whatsoever is harmful to Daffodils, and recommends the use of burnt-earth, wood-ashes and road-scrappings instead of the strong manures generally used for these plants. Indeed, Mr. Burbidge went so far as to con-

demn the use of manure for all kinds of bulbous plants, but on what grounds he did not state. Certainly good manure, such as cow-dung or horse-droppings, has always proved a safe and vigor-giving help to many bulbs under cultivation. I have in my mind just now several large specimens of *Eucharis*, which have been under my eye ten years, and these have always been watered with liquid cow-manure when the flower-scapes begun to develop, which occurs usually about three times a year. These plants are perfectly healthy, and they bloom well. Of course there are many other cases, equally convincing of the fitness of good manure for bulb-culture. What would the Dutch growers of bulbs do without manure in their poor, sandy soil?

Mr. Englehart, who is well known as an amateur grower of the Daffodil, also read a paper on the breeding of these plants. He recommended certain crosses with a view to finally obtaining larger flowers of greater substance and earlier to expand than those we now have. He did not think that the scarlet Daffodil would ever be obtained, notwithstanding Mr. Burbidge's belief that by careful breeding it would come. We do not want a scarlet Daffodil no more than we want a blue Rose or a blue Chrysanthemum.

There was a grand display of all kinds of Daffodils to illustrate Mr. Burbidge's paper. There was also a charming exhibition of rare and beautiful Orchids. One of our oldest and most esteemed horticulturists said to me, as we stood in front of the superb collection sent by Baron Schrœder, "Can one wonder at what foolish people call the 'Orchid mania' when looking at plants like these? Orchids are Nature's richest gifts to the garden. They have no equals in form, in color, in fragrance and in variety." I disputed the claim of superiority in fragrance, for no Orchid surpasses, and only very few approach, the Violet and the Rose in sweetness. I am afraid, too, that a collection such as was shown by Baron Schrœder is quite beyond the reach of all save a very few. They were of the choicest and rarest, and they were perfect examples of good culture. The Dendrobiums comprised large specimens full of flower of the following: *D. nobile*, *D. nobile Cooksoni*, *D. nobile nobilitus*, *D. nobile album*, *D. micans*, *D. splendidissimum*, *D. Ainsworthii*, *D. Luchianum*, *D. euosmum*, *D. aggregatum* and *D. Brymerianum*. It would be impossible for me to convey any idea in words of the beauty of these plants. And this is true of *Cattleya Lawrenceana*, a richly-colored variety, with twenty-one expanded flowers; *C. speciosissima Schrœderiana*, a large-flowered variety, with pure white sepals and petals, and the broad lip rich crimson, with white veins and a tinge of yellow in the throat. Mr. Sander sent beautiful plants of the white variety of *Trichopilia suavis*, *Oncidium bifolium*, a graceful little Orchid, with arching spikes of bright yellow flowers not unlike those of *O. varicosum*; *Dendrobium marmoratum*, a mauve-tinted form of the old and beautiful *D. transparens*. A fine example of *Maxillaria Sanderiana*, whose large flowers are colored like the white Tigridia (*T. Pavonia alba*), was exhibited by Mr. Tautz, who also sent a plant in flower of a very dark-colored variety of *Miltonia vexillaria*, the flowers being a deep purplish-rose, with a white eye.

From Low & Co., of Clapton, came a spike of *Phalænopsis Schilleriana*, var. *alba*, in which the flowers are large and pure snow-white, save a few yellow dots on the lateral lobes of the labellum. Kew sent a collection of Indian *Arisæmas* in flower; *Godwinia gigas*, with an enormous, boat-shaped spathe, two feet long; *Epidendrum bicornutum*, with eight spikes of flowers; a collection of species of *Primula*; *Columnea Kalbreyeri*, with large, sickle-shaped leaves, olive-green above, purple beneath, and numerous large, tubular yellow flowers; *Rudgea macrophylla*, a large-leaved stove-plant with a large, round head of white fleshy flowers.

Forsythia suspensa (Fortunei) is the most beautiful hardy shrub in flower here now. It has very few equals among hardy, spring-flowering shrubs, its long, wand-like branches being thickly set with hanging, bright yellow, bell-like flowers. It is an excellent plant for training against a house-side, a specimen in such a position at Kew being now a large sheet of bright yellow which catches the eye a mile away. In the shrubberies it is equally at home. It may also be grown for early forcing for the conservatory. *F. viridissima*, the only other species, is a greatly inferior plant, but, unfortunately, it is sometimes sold by nurserymen as *F. Fortunei*. There are two forms of *F. suspensa*; one in which the flowers have the corolla-lobes twisted and the pistil twice as long as the stamens; the other in which the lobes are shorter, not twisted, and the pistil is hidden beneath the stamens. I read lately, in a book on Japan, that next to the "Mumè" (*Prunus Mumè*), which is the most universal favorite spring-flowering tree in Japan, is this *Forsythia*, called "Rengyo" by the Japanese, and



The Purple Beech of the Lyman Place.

cultivated by them in every available corner. It was introduced from Japan to Europe, but is really Chinese, as also is the Mumè and many other plants of supposed Japanese origin, but which were obtained originally by the Japanese from China.

The funeral of the late Duchess of Cambridge, which has taken place at Kew to-day, has been exceptional for the magnificence and variety of the floral wreaths and crosses sent. There must have been close upon two hundred of these, some of them of gigantic size, and mostly composed of the choicest white flowers. Of those which appeared to attract greatest attention were the following: A wreath five feet in diameter, and eighteen inches across the coil, was made up of rich masses of *Odontoglossum crispum*, *Stephanotis*, *Gardenia*, *Eucharis*, etc. This wreath alone contained ten guineas' worth of flowers. A heart three feet across, and made up of *Calla* Lilies, *Eucharis*, *Lilac* and *Gardenia*, with a miniature cross of *Mignonette* fixed in the centre and upon this a tiny wreath of *Forget-me-nots*. A small cross of *Violets* with single flowers of *Stephanotis* dotted all over it. A circle of *Beaumontia grandiflora*, the flowers of which remained fresh when most other flowers were more or less drooping. An

anchor, with cross composed entirely of rich yellow Tea-roses on a ground of *Violets* and *Ivy* leaves. A broad circle of pure white *Lilac*, with a knot composed of *Gardenia*. A large harp made up of rich white flowers, the strings formed of single lines of *Violets*. There were also many of the German style of wreath, in which the leaves of *Cycas* and similar plants form the principal feature. I never saw so wonderful a collection of beautiful flowers as were arranged in the chapel where the remains of the Duchess rested. Taking a rough estimate of their commercial value, I should say there were about \$3,500 worth of flowers there. It has been stated lately in so-called fashionable papers that flowers at funerals were not the fashion. There were evidences at this funeral that flowers are more used than ever. *W. Watson.*

April 18.

The Purple Beech.

THE large Purple Beech at Waltham, of which an illustration appears upon this page is no doubt one of the finest individuals of this variety planted in the United States. Downing, who was familiar with the Lyman Place, does not, however, mention it in his "Landscape Gardening," written forty or fifty years ago; and it is probable that the specimen which was growing at that time at Throgg's Neck, in Westchester County, and which Downing declared was the finest in the United States, is now, if still alive, much larger than the Waltham tree, which has lost a good deal from overcrowding and from the garden-wall built close to the trunk, which has destroyed the lower branches. There is no tree which demands more room for free development than the Beech; and a Beech, standing on a lawn or in a garden, on which there are no lower branches to sweep down to the turf has lost a large part of the characteristic beauty which makes it valuable. The stem of the Beech, it is true, especially of the American species, has great beauty and a charm peculiar to itself, but it is in the wood

or in the forest that this beauty should be seen and admired; and Beeches should not be planted in ornamental grounds where light and space cannot be afforded them for full and unchecked growth in every direction.

The Purple Beech is a tree of much interest, apart from its undoubted value for ornamental planting—a subject which has already been fully discussed on another page. It is one of the few examples among trees where an abnormal bud-variety has retained its character for more than a century, through hundreds of thousands of individuals, all sprung from a single branch* (discovered towards the

*Schübeler, in his *Viridarium Norvegicum*, contrary to the generally accepted theory of the origin of the Purple Beech, states that the parent tree from which all Purple Beeches have come was found between the years 1760 and 1770 near Sondershausen, in the Scandinavian peninsula; and that when he wrote a few years ago it was still in existence. The Beech nowhere occurs more commonly or grows to finer development than around the shores of the Baltic, which are often clothed with splendid Beech forests down to the water's edge. An example figured by Schübeler as standing in 1873 near Gradval was 22½ metres in height with a girth of over three metres, and showed a thick and almost perfectly symmetrical head, the branches diverging at about a metre and a half above the ground.

middle of the last century upon a tree in a German forest), either directly from grafts, and now sometimes by seeds; for the plants raised from the seed of a purple-leaved tree preserve more or less constantly this character to a greater or less degree. The seed from certain trees yield more purple-leaved seedlings than those from other trees, although the proportion of the purple-leaved seedlings from the same tree vary in different years, and among purple-leaved seedlings there is always a great variety of shades of color. In other words, a race of purple-leaved Beeches is gradually becoming "fixed;" and if it was not in practice more convenient and satisfactory to propagate the best varieties of this tree by grafting it would doubtless be perfectly possible, at the end of a few generations, to raise from seed Beeches with leaves of almost any shade of purple with as much certainty as different races of the Cabbage are obtained from seed. There is no reason to doubt, therefore, that the variety will be as permanent as the type from which it originated.

It would be interesting to know if there are large or very fine specimens of the Purple Beech in the neighborhood of this city or of Philadelphia.

Cultural Department.

Brussels Sprouts and Savoys.

MANY people object to Cabbage and even to Savoys—Cauliflower they have found uncertain in our climate, and hard to grow without the aid of glass. For a delicate form of Cabbage, Brussels Sprouts are to be commended. They require a rich soil, and if success is expected they must be abundantly fed. The seed should be started early, and the plants should receive the same treatment as Cabbages, but the Sprouts last all summer, and should be placed where they can have the whole ground for the season. The plants grow with a large, loose, Cabbage-like top and a tall stalk below, over which little Cabbage-like heads form, which can be gathered all summer and until the hard frost of the north may destroy them. In Virginia they usually endure the winter, and furnish an abundance of greens when planted late in summer. Boiled in clean water and dressed with cream, the little heads make a good substitute for Cauliflower. The plants grow tall and top-heavy, and in small gardens it will pay well to stake and tie them up.

Most people who consider Cabbage an essentially coarse food are unacquainted with the Savoy class. Even the Savoys which have been crossed and increased in size and coarseness, like the Drumhead Savoy, are still far superior to the ordinary Flat Dutch and Drumheads. And now we have a variety known as the Netted Savoy, which combines fair size with the highest quality. We never miss Cauliflowers while we have good Netted Savoys. The difficulty in growing all late summer Cabbages is the ravenous green caterpillars which eat them so greedily. Pyrethrum powder will destroy the worms if constantly and thoroughly used, but the maulauders come so rapidly that if the application is not made almost daily it is useless, and with good pyrethrum at seventy-five cents per pound, it will not take long to spend the value of the Cabbages. I generally succeed in raising good crops of Cabbage without pyrethrum by stimulating the growth of the plants during summer with occasional top-dressings of nitrate of soda and frequent, shallow cultivation.

Crozet, Va.

W. F. Massey.

How We Rid Our Vines of the Mealy-Bug.

WITH the exception of Phylloxera this is the worst pest the Grape-grower has to contend with. When I took charge of these gardens I found that two vineries were badly infested, and the vines were also in very bad condition, and most of the bunches of grapes were full of the bug. I had been told it was impossible to clear vines of the bug, but I determined to try what could be done with those in one house. A few of the bunches were not affected, and by tying pieces of wadding around the stalks of these the fruit was kept clear until it was ripe. When the fruit had been consumed the laterals were shortened back, and the spurs, which were only nine inches apart on either side of the rods, were thinned out to about eighteen inches apart. The vines were then heavily syringed with warm water in which one ounce of soft-soap and one tablespoonful of paraffin per gallon were mixed, taking care to keep it well stirred. This operation was repeated several times until the leaves had fallen, and it reduced the numbers of the

insects considerably. As soon as possible after the fall of the leaf the vines were pruned, the loose bark pulled off, and the crevices and spurs scraped with a knife; the glass, woodwork and iron trellis thoroughly washed with hot water and soft-soap, and the wood and iron painted all over with paraffin. Finally the houses were filled with fumes of sulphur, and the walls were scraped and then dressed with hot lime-wash in which some sulphur and carbolic acid had been mixed. The top soil was taken off the border to the depth of three inches, the vines were scrubbed with hot water and soft-soap at the rate of nine ounces to the gallon, and were painted over with a mixture of gas-tar and stiff blue clay, the latter being dried and rubbed into a powder before being well mixed with the tar, the whole forming a stiff paste, with which the vines were coated all over, care being taken not to injure the buds. Some fresh loam was put on the border, and we thought that the last of the mealy-bugs was killed. Meanwhile steps were taken to assist the roots by renewing the outside border, which had got into a very bad state. The vines having started gently on January 5th, all went well, and no traces of bug were found, but as the sap began to rise the coating of clay and tar expanded, and on examining the vines, just as the buds were breaking, three or four young bugs were discovered—a proof that not as yet were all killed. As a last resource a gallon of boiling water was procured, and into which was put five wine-glasses full of paraffin, five of carbolic acid, and half a pound of soft-soap; this was carefully applied all over the rods, with the exception of the growing buds, and decided the fruit in our favor, as we have not had a bug on the vines since that time. This last application may appear to be too strong to be safely applied generally, and I have no doubt it would have injured the vines had they not have been partially protected by the previous application of clay and tar, which formed a hard coating all over them.—W. H. Divers, in *Gardeners' Chronicle*.

Orchid Notes.

Among the many select *Cypripediums* now in bloom at the United States Nurseries, *C. Wallisii superbum* deserves mention for its rarity and beauty. It belongs to the section *Selenipedia*, and is a variety of *C. caudatum Wallisii*. It is supposed to have been imported from Ecuador by the collector whose name it bears, and so far as known there are but three plants in existence. The flowers are somewhat larger than those of *C. caudatum*, of a soft lemon color, veined and marbled with delicate green. The dorsal sepal is hood-shaped, seven inches long by three inches wide at the base, and the lower sepal is similar, although slightly darker. The lip, which is of unusual size, is veined with a deeper color than the sepals—pure white within and mottled on the edge with crimson. The petals are more than twenty inches long, of a crimson tint, except at the base, where they are of a pale yellow. Two or three flowers are borne on a scape eighteen inches long and well above the long, deep green leaves.

C. Schraderea is another rare Orchid belonging to the same section of this genus, a hybrid between *C. caudatum* and *C. Sedeni*, and raised by the Messrs. Veitch & Sons. It inherits the "tails" of *C. caudatum*, while in color it approaches *C. Sedeni*, although superior to the latter plant in this respect. The dorsal sepal is whitish, suffused with rosy pink and slightly veined with green, while the lower sepals are of a pale rose color. The twisted petals are pink, with veins of deeper shade, while the lip is a pale carmine; the lobes white, spotted with purple.

C. bellatulum is another recent introduction, which has been already described in GARDEN AND FOREST. It belongs to the *Eucypripedia*; the flowers are three inches in diameter with brownish-purple spots showing to advantage on a ground of pale lemon-yellow. The scape is very short, scarcely holding the single flowers above the remarkably large and slightly mottled leaves.

C. Druryi superbum, *C. Rabellini*, *C. hirsutissimum*, *C. Day-anum*, choice varieties of *C. barbatum*, *C. Sedeni candidum*, a pure white variety of *C. niveum* and many other choice specimens of the genus are now in flower.

Short Hills, N. J.

H. A. Bunyard.

Orchid-growers in America will be interested in the fact that Mr. F. Sander has succeeded in getting from Madagascar "a splendid consignment of living plants of *Phajus tuberculatus* and *P. Humblotii*," two of the most beautiful of all Orchids. In England these two species are extremely rare, almost all the plants previously obtained and distributed by Mr. Sander and others having died. They are not easily kept in health, but when successfully managed and flowered they are really gorgeous Orchids. The genus *Catasetum* is getting a great

deal more attention from Orchid-growers here than formerly. This is due partly to the attractiveness of several of the most recently introduced species, and also to the extraordinary interest which attaches to the flower-structure of the whole genus. Mr. R. A. Rolfe, of Kew, recently read a paper before the Linnæan Society on the sexual forms of *Catasetum*, supplementing the researches of Schomburgk and Darwin on the same subject. Mr. Rolfe has succeeded in matching males and females of no less than fourteen species. Lindley appears to have suspected that not only would the so-called genera *Myanthus* and *Monacanthus* prove to be sexual forms of *Catasetum*, but that *Cynoches* also would ultimately prove to be another "sport" of that genus. A drawing of a *Catasetum* which flowered at Kew last year, and bore a spike of female flowers (*Monacanthus*) on one side, and a spike of male flowers ("true" *Catasetum*) on the other side of the same pseudo-bulb, was shown by Mr. Rolfe, and caused a little excitement among the Fellows of the Linnæan Society. He also exhibited a drawing of *C. Bungerothii*, showing one female and two male flowers on the same spike. This particular plant flowered with M. Linden, of Brussels, and is the only known instance of this *Catasetum* having produced other than male flowers.

Kew.

W. Watson.

three and a half to four inches across, the sepals and petals being pure white, the crest of the lip yellow and marked with a few crimson stripes. It is a deciduous species, and during its growing period should be placed where light and much moisture is available. After its bulbs are well matured it can be placed in temperature a few degrees cooler, to enable the newly-made bulbs to ripen well before commencing to bloom. A fine specimen of this plant is now flowering with Mr. J. Wallace, at Paterson, New Jersey.

Summit, N.J.

A. Dimmock.

The Common Primrose (*Primula acaulis*), which grows wild and abundantly in England and Scotland, has been a favorite with American planters for generations, and I have seen it taking care of itself in old-fashioned gardens for years as far north as Bangor, Maine. I never knew it, however, to establish itself outside of the rich soil and limited competition of the garden where it was given a place by man, until the past season, when I was shown a locality in Massachusetts where it had taken possession of a piece of pasture along the sides of a brook, and among scattered clumps of the Barberry and other shrubs. In this heavy, clayey soil it was perfectly at home, and thousands of vigorous plants were disputing successfully with grasses and weeds for a chance to live. This



The Lyman Place, Waltham, Massachusetts.—See page 218.

Dendrobium nobile, variety.—There is now in bloom in Sander & Co's Orchid Nursery at Summit, New Jersey, an extraordinary variety of this old and well-known species. The plant was imported last year, and is of robust habit, with pseudo-bulbs measuring nearly two feet in length, and from which a dozen large and very rich-colored blossoms have appeared. Each individual flower measures fully four inches in diameter and is well shaped, both sepals and petals being very broad and of a rich, amethyst-purple, the petals being one inch across. The most distinctive character of this variety is that the two lower sepals are furnished with a broad, deep maroon stripe extending their entire length. The lip, also, is very large and highly colored. The plant has bloomed for the first time in this country, and it proves to be a valuable addition to the already existing varieties now in cultivation. Its nearest ally is the variety known as *Dendrobium nobile Cooksonii*, the same rich maroon color appearing in that variety on the basilar half of the petals.

Chysis bractescens.—The lovely, wax-like blossoms of this fine Orchid have now made their appearance. It is an easy-growing species, and thrives well on blocks or in baskets. Its flowers are produced on short stems, four to six together, with the young growth, and they remain about four weeks in good condition on the plant. Each flower measures from

spot, in spring, when these beautiful blossoms are like a brilliant carpet of crimson and yellow, covering many square rods with their bloom, and peeping out of the half-shaded nooks among the wild undergrowth, is a sight to be long remembered by anyone who knows and loves this old Primrose. This is the only case, as far as I know, in which the English Primrose has become really established and capable of propagating itself permanently, so far north, and it is hoped that this hardy strain of these wholly delightful blossoms may hereafter provide us with a race of these Primroses which will be really hardy throughout a considerable part of the Northern States.

Cambridge, Mass.

F. L. Temple.

Tuberose.—Two years ago last fall we had an experience which, I believe, may prove as valuable to others as it did to us. Early in summer a fine lot of Tuberose bulbs were planted in an open frame in a warm, sunny situation. They grew splendidly, but, unfortunately, did not flower as early as expected. The cold, frosty nights of fall came on them just as they were beginning to expand a flower here and there. To allow them to perish by frost seemed a sin and a serious loss; and yet we could not house them for want of room. On each side of the frame, therefore, hot-bed sashes were stood on edge, and on top of them others were laid, which formed a

roof, thereby enclosing the plants in quite a respectable green-house. During the day, under the influence of the sun, the inside temperature of this improvised house generally ran up to about 80°, sometimes even higher, and although the nights were sometimes pretty cool, a nice temperature was maintained until next morning. Every plant perfected all its flowers—the most of them being as fine as could be desired. Those who have bulbs on hand need not be deterred from planting them out-doors because the season is getting late.

Milwaukee, Wis.

James Currie.

The Perpetual Carnation seems to have been overlooked as a bedding or border plant for the garden. Strong plants from cold-frames in five-inch or six-inch pots are preferable. They should be planted as early as the first of May in a sunny position, and in deep, rich soil. They should be firmly set in the ground, and a neat stake should be placed in each plant, to which the flower-stems should be loosely tied as they grow. In making a selection those varieties with long flower-stalks should be chosen, especially for cutting during the very hot weather. The following will be found among the most desirable: E. G. Hill and Portia, scarlet; Century, May Queen and Charles Henderson, carmine or rose; Hinzes' White and Silver Spray, white; Buttercup and Columbia, buff and yellow; Crimson King, Black Knight and Orient, crimson; Chester Pride, Petunia and Star of the West, variegated.

Pearl River, N. Y.

John Thorpe.

Notes from a Northern Spring-Garden.

NO plant, among those which have opened their blossoms during the present week, is more showy in flower than the very old-fashioned *Adonis vernalis*, which was seen more frequently in gardens a century ago than in those of the present day. This species of *Adonis* rises only a few inches above the surface of the ground; the leaves are produced mainly near the summit of the stems, and are finely cut into narrow, slender divisions. Each stem is now surmounted with a Ranunculus-like flower, two or three inches across, with ten to twenty narrow petals of a clear, yellow color. These flowers, when a great mass of the plants are grown together, make a display of color which in bright sunshine is almost indescribably brilliant. They close during the night and in dull weather. This *Adonis* grows best in deep, rich and rather moist soil. It is slow in establishing itself, and several years are required to obtain all the beauty it is capable of giving at this season of the year. It should never be disturbed when once fairly established, and should be allowed to spread and to obtain as strong a hold on the ground as possible.

The European Dog-tooth Violet (*Erythronium Dens-canis*), which is now in bloom, flowers here several days earlier than our common native species. The flowers are large, having been greatly improved by selection and by long cultivation, and they show considerable variety of color from almost red through rose and pink to white. It is an attractive and perfectly hardy plant, thriving in the shade of trees and in more exposed situations, and it is a capital subject to naturalize by a wild wood-walk or along the margins of shrubbery. The Dog-tooth Violet is grown in immense quantities by the Dutch bulb-farmers, and the bulbs, which should be planted in the autumn, can be imported very cheaply. In speaking of very old-fashioned flowers the Grape Hyacinth (*Muscari botryoides*) should not be forgotten. This, like most of the old familiar bulbous plants of gardens, is a native of Europe, and has been in cultivation for centuries. The short, compact racemes of dark blue, globular flowers, resembling, fancifully, miniature grapes (whence the popular name), are familiar sights at this season of the year in old country gardens, whence this plant has occasionally escaped into neighboring woods and fields, so that it may in time become fairly naturalized. There is a variety with pure white flowers, and others with flowers of pale blue and of flesh color, but none of these are equal to the old and more familiar type. This, like the Dog-tooth Violet, is an excellent plant to naturalize in our New England woods and fields.

Corydalis solida, or, as it is more generally known, *Corydalis bulbosa*, seems destined to become a troublesome weed in the rock-garden, springing up everywhere and spreading rapidly. It is now covered with its short racemes of rather dull purple flowers. It is the earliest of the genus to flower here, and certainly requires no care, except to keep it within reasonable bounds. More attractive is its American relative, *Dicentra Cucullaria*, with its finely-divided, pale green leaves and slender racemes of graceful, white flowers tipped with canary-yellow. It is well established here at last (for it is rather impatient of cultivation, and adapts itself slowly to changed con-

ditions), and is now beautifully in bloom. And so is the Pasque Flower (*Anemone Pulsatilla*), with its great, solitary flower, the mass of golden stamens making a fine contrast with the violet-purple sepals. The finely-divided, silky, glaucous foliage is attractive as well as the very showy flowers, and so are the large heads of fruit, which resemble those of a Clematis. It well deserves a place in every garden. *Primula rosea* (see page 141 of vol. i.) improves on longer acquaintance, and I can only say of it again what I said a year ago, that "it would not be easy to find among early flowering hardy plants a more striking and beautiful object than a mass of this Primrose." The Twin-leaf (*Jeffersonia diphylla*), so named from its curiously-divided leaves, is in flower fully two weeks earlier than usual. It is always attractive, even after its large, pure white, but very fugacious, petals have fallen. It is a native of western woods, is very easily cultivated, and may be increased by division or from seed, which is freely produced and germinates quickly. I wish that this and scores of other little-known North American wild flowers could be more often seen in American gardens. It is because they are American, I believe, that we see so little of them in this country, except in their native haunts.

Very showy now are the flowers of the European *Orobuchus vernus*. It is, as I wrote a year ago, "one of the hardiest and in every way most satisfactory of the early flowering, herbaceous plants." It forms a compact, bushy mass of foliage less than a foot high, now completely covered with nodding, pea-shaped flowers, purple and blue when they first open, but later turning deep blue. This little Veitch will thrive in any good garden soil, and will reappear year after year, but without spreading and without care beyond an occasional division of the roots, to insure vigorous growth—a practice which greatly benefits all herbaceous plants, especially those of vigorous growth and strong digestion.

I invite the attention of all persons interested in spring-gardening to *Magnolia stellata*, or, as it is sometimes known in American collections, *Magnolia Halleana*, so named by Parsons, who first cultivated it in this country, it having been one of Dr. Hall's early introductions from Japan. This *Magnolia* is suitable for the smallest garden or the tiniest lawn. Here in this country it is a low shrub, not yet more than three or four feet high, although in the forests of Japan it is said to become sometimes a small tree; it is perfectly hardy, and it is the earliest of all the *Magnolias* to flower, its pure white, deliciously-fragrant flowers appearing here fully a week earlier than those of *Magnolia conspicua*, formerly the earliest of the *Magnolias*. The flowers of *M. stellata* are pure white, three inches in diameter, with petals which are at first spreading, giving to the flowers a star-like appearance; but later becoming quite reflexed. It is a good plant for the door-yards of city houses, for the rock-garden, or for any situation where spring-flowers are esteemed.

The Allegheny *Andromeda floribunda* and its near relative from Japan, *A. Japonica*, are now flowering here side by side, and the plants afford a good opportunity for comparison from the garden point of view. The panicles on the American species are smaller, more rigid, and are upright; the flowers are whiter and more leathery, and are more than half the size of those of the Japanese species; the leaves are smaller, more rigid, and much darker green; the habit is more compact and less pleasing. On the whole, the Japanese plant, with its broad, drooping panicles of large flowers; its freer and more rapid growth and more graceful habit, is the more attractive garden ornament of the two species. Here at the north, however, it will never be as valuable as its American relative, as the flowers appear so early that it is only in an exceptional season like the present that they are seen to advantage. Did it appear every year as it does just now, *Andromeda Japonica* would be one of the best evergreen shrubs known. It is just now by far the most attractive shrub in this garden. Perhaps some of the readers of GARDEN AND FOREST who have had an opportunity to watch this plant in a better climate for it than that of New England, will make public the results of their observations.

It is interesting to read in an English journal that the "Glory of the Snow," as *Chionodoxa Lucilia* (mentioned in my last letter) is now called in England, is spreading in gardens in that country from self-sown seed, and that it can be naturalized in the grass. When this plant is more common and better known it will, I believe, be one of the most popular, as it is one of the most beautiful, of spring-flowering plants.

The difficulties of gardening in this climate and the variations of the New England climate in April may be well illustrated by the fact that on Saturday of last week the thermometer marked 84° in the shade. Easter Sunday was nearly as

hot, and buds of *Magnolia conspicua*, which were completely closed on the morning of that day, had, by the middle of the afternoon, burst into full bloom. Tuesday night ice was formed in tubs and pails more than half an inch thick. But, strange to say, the flowers of none of the herbaceous or bulbous plants have suffered. The flowers of the Forsythias, almost fully expanded, of the Magnolias and of the Sweet Almond are uninjured, while those of Rhododendron Early Gem, growing in a low, damp situation, which were fully out on Monday, were frozen stiff, and are, of course, entirely ruined.

Boston, April 24th.

C.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XIX.—DISTURBANCE OF FUNCTION. CERTAIN PLANT-DISEASES. INJURIES AND THEIR REPAIR.

AS stated in a previous paper, the diseases of plants belong to the province of vegetable pathology instead of vegetable physiology, and they are referred to in this series merely because we can sometimes learn something of the functions of a healthy organ by watching its behavior when it is affected by some disturbing cause. Even if we do not know what the disturbing cause may happen to be (much less remove it), we may still gain further insight into the action of an organ or an organism which has come under its influence.

Before considering this subject, attention should first be directed to what are called monstrosities. Everyone is familiar with the commonest forms of monstrosities, such as four and five-leaved Clover, consolidated shoots of Asparagus, green Roses, and the like. These variations of number, of union of parts, of accidental division, and changes in color, throw much light on the laws which govern structure, but they do not usually aid us in the examination of the office of organs which are abnormally developed. There are, however, some strange modifications of structure which follow the attacks of insects, for instance, in the case of the so-called gall-insects. The slight injury inflicted and the subsequent irritation caused by these insects give rise to variously-shaped excrescences, which are characterized in numerous instances by an increase in the amount of astringent matters, tannin, gallic acid, and the like, collected in the neighboring cells. In fact, as everyone knows, the amount of such astringent matter in the galls on a species of Oak is so great that they become a matter of commercial importance. The symmetrical outgrowths on the stems of some Willows are doubtless familiar to all.

For an interesting account of the relations which exist between certain insects and enlarged organs of some species of tropical plants, the reader is referred to the work mentioned in the foot-note.* From Mr. Belt's statements it appears that some of the Acacias of Nicaragua have enlarged appendages (stipules) at the bases of their leaves, which secrete large amounts of saccharine matter for the nourishment of ants. The insects are completely satisfied with this store of food which is provided by the plant, and they do not attack the leaves. These ants serve as a well-fed garrison to defend the plant from the attacks of leaf-cutting ants. Other cases quite as remarkable as this have been noted in the tropics. In all of them some organ is excited to the exercise of a function not commonly associated with it. But such cases are to be regarded as modifications which have probably arisen by slow adaptations through a series of generations, and hence are not to be properly regarded as disturbances of function.

Certain fungi, notably the so-called rusts, smuts and mildews, are exceedingly destructive to the cells and contents of cells of many plants. Besides being destructive to the contents of cells, certain fungi may give rise to extraordinary distortions of form of the host-plant. Among such may be mentioned the familiar cases of that which causes the outgrowths on our common Cedar, and that which produces the diseased state of the grain of Rye (known as "ergot"). But with these invasions of fungi we are now to deal only in the most general manner.

For the purpose of our present examination, these fungi of all grades may be regarded as parasitic, subsisting on living tissues and their living contents. Many of them act also on the same matters in dead plants, and some act only on non-living matter, but the latter may now be left out of account. A parasitic fungus is unable to utilize inorganic matter. It must have organic matter in some form, and this it obtains from the contents of the living cells of its victim. Throughout the organism the threads of the fungus make their way, frequently sending out invading filaments which grow but a short

distance from the path of the main threads. All of these are engaged in consuming and appropriating the organic matters accumulated by the host-plant. In some cases, the blight sweeps through a plant with great rapidity, while in others the invasion is insidious, and the progress through the attacked plant is, on the whole, rather gradual. In some manner, either by separated cells formed after the manner of buds, or by what are known as spores of sexual origin, these invading plants are disseminated in some instances with frightful rapidity. These spores are frequently very much more resistant to destructive agents than are the invading threads, and hence the problem of destroying the fungus, as one might say, of an herb, "root, and stem, and leaf, and seed," is very difficult and disheartening. But the arduous labors of the cryptogamic botanists have suggested some efficient remedies for a very few cases, and others will doubtless follow. To see what remedies against fungi can be expected to accomplish, a few words must be devoted to the conditions requisite to the growth of some of these fungi. They require precisely the conditions necessary to the rapid growth of vegetable cells in general, namely, moisture, food, plenty of oxygen, and a certain temperature.

When a fungus has fairly invaded the tissues of a plant, there is very little hope of resisting its further advance. In a few instances, experiments have shown that much may be done towards warding off invasion and preventing the fungus from getting a foot-hold. Thus, the fungus which is known as the "Downy Mildew" of the grape-vine, has been successfully combated in certain localities by the use of solutions of salts of copper sprinkled at intervals on the leaves. But it should be acknowledged that in some other instances the solutions have failed. In a few cases, also, the same remedies have been more or less efficacious when applied to the forming fruit of the Grape threatened by the fungus which produces the so-called "black rot." But it has been well said that the results in these instances are conflicting, and cannot be regarded as conclusive.†

In experiments in France, the solutions known as *Bordeaux mixture* (consisting of six kilograms of sulphate of copper in 100 litres of water and eight kilograms of lime in thirty litres of water) and *Eau celeste* (consisting of one kilogram of sulphate of copper and two litres of ammonia in 200 litres of water) have given excellent results in diminishing the ravages of mildew.

In some cases, such as that of the fungus causing the so-called "black-knot" of Plums, the only treatment suggested with confidence is the complete destruction of affected trees, thus lessening the spread of the malady.

Certain fungi are very destructive when they attack non-living wood, causing rapid decay. These invasions are frequent in the case of some of our cultivated trees, and forest trees which have their wood exposed by injury. In not a few cases the resinous matters which impregnate the wood or which are poured out after a mechanical injury, exert a true antiseptic and preservative power. As a general thing, Nature heals all wounds where this is possible by the formation of the tissue known as cork. Even when the leaves fall in autumn, it can be seen that by an anticipatory development of cork at the twig, the wound which would otherwise be an open one is already, at the fall of the leaf, a healed scar.

Cambridge, Mass.

George Lincoln Goodale.

Periodical Literature.

Mr. Frederick Boyle is an English author and amateur cultivator of Orchids, whose enthusiasm for the latter branch of his activity expressed itself last winter in two charming articles in *Longman's Magazine*, which were duly noted in these pages. Now he writes again on the same subject in the March number of the same periodical, the title of his chapter being "Cool Orchids." Nothing could be more desultory than his treatment, or more lively than his style. He passes at a bound from Orchids in their suburban glass-frames to Orchids in their native habitats, and lays a tribute of glowing words now on the far-off tomb of some fever-stricken collector and now on the head of some favorite *Odontoglossum* or *Cypripedium*. But all his paragraphs are entertaining, and some of them are instructive. His main object is to impress upon the impecunious amateur that Orchids of many sorts are easily within his reach. "I should like," he says, "to publish it in capitals—that nine in ten of those suburban householders who read this paper may grow the loveliest of Orchids if they can find courage to try;" and then he explains how little courage is really needed. "The plain truth is that no class of plants can be cultivated so easily, as none is so

* Belt's Naturalist in Nicaragua.

† Professor F. L. Scribner's Communication in Bulletin of the Commissioner of Agriculture, 1888.

certain to repay the trouble, as the Cool Orchids. . . . We have at least a hundred genera which will flourish anywhere, if the frost be excluded; and as for species, a list of two thousand would not exhaust them, probably. . . . But a reasonable man may content himself with the great classes of *Odontoglossum*, *Oncidium*, *Cypripedium* and *Lycaste*; among the varieties of these, which no one has ventured to calculate, perhaps, he may spend a happy existence." *Odontoglossum* stand first, Mr. Boyle declares, having the great merit of bursting into flower at any season as they may chance to ripen. "It is their instinct to flower in spring, but they are not pedantic about it in the least. Some tiny detail overlooked here and there, absolutely unimportant to health, will retard inflorescence. It might very well happen that the owner of a dozen pots had one blooming every month successively. And that would mean two spikes open, for, with care, most *Odontoglossum*s last above four weeks." *Lycaste* is likewise strongly recommended. Mr. Boyle speaks of that genus as he protests "without prejudice," and, as we think, very sensibly, saying that the flower of the most common species, *L. Skinneri* "is stiff, heavy and poor in color. But there are tremendous exceptions. In the first place, *L. Skinneri alba*, the pure white variety, begs all description. Its great flower seems to be sculptured in the snowiest of transparent marble. That stolid pretentious air which offends one—offends me, at least—in the colored examples, becomes virginal dignity in this case." How vast is the difference in the estimation which collectors put upon varieties of this plant is shown by the fact that "plants of the same size range from three shillings and six pence to thirty-five guineas."

With regard to *Cypripedium*s Mr. Boyle states a fact that will probably be new to American readers. *C. spectabile*, he says, grows "like any water-weed in the bogs of New Jersey where it is frozen hard, roots and all, for several months of the year." But transplanted to England, "very few survive the season . . . even if protected." The fine specimens seen at English flower shows in the spring "are imported in a dry state." It is the damp of the English winter that they cannot bear, and the same thing is true of Canadian and Siberian species. "I saw in Russia, and brought home a magnificent species, tall and stately, bearing a great golden flower which is not known in 'the trade'; but they all rotted gradually. Therefore I do not recommend these temperate varieties which the inexperienced are apt to think so easy. At the same cost others may be brought which, coming from the highlands of hot countries, are used to a moderate damp in winter." At the end of his article Mr. Boyle sums up the requisites for the cultivation of good Cool Orchids: "These plants ask nothing in return for the measureless enjoyment they give but light, shade from the summer sun, protection from the winter frost, moisture—and brains."

Turning now to those parts of his article which speak of the difficulties attendant upon the importation of South American Orchids, we find them bristling with striking anecdotes, familiar doubtless to the practiced amateur, but causing the novice to wonder, with Mr. Boyle himself, how Orchids can possibly be as cheap as they are. Accounts of the difficult and dangerous journeys of the collectors who are sent out by the great English Orchid firms read like paragraphs from Jules Verne's novels rather than sober statements of enterprises undertaken for commercial reasons; and the list of the men who have perished by accident or disease is long and pitiful reading. Even after the Orchids have been found, secured and brought down to the coast they must be transported by water to a port where a European steamer can be had, and the attendant dangers are then as great to the plants as to their guardian. And when the port is finally reached it may very well be that the collector "has to wait days in that sweltering atmosphere for the Royal Mail steamer; and when it comes in his troubles do not cease, for the stowage of the precious cargo is vastly important. On deck it will almost certainly be injured by salt water. In the hold it will ferment. Amidships it is apt to be baked by the engine-fire. Whilst writing I learn that Mr. Sander has lost 267 cases by this latter mishap, as is supposed. So utterly hopeless is their condition that he will not go to the expense of overhauling them." And in this case the charge for freight alone from South America had been £750. Mr. Roetzl, a famous and experienced collector, we are also told, once took special pains with a "unique shipment" of *Masdevallia Schlimii*. "It contained 27,000 plants of this species, representing at that time a fortune. Among the 27,000 two little bits survived when the cases were opened." As for the difficulties attendant upon actual collecting Mr. Boyle says that the Roraima Mountain is getting to be regarded as "quite easy travel for the Orchid-hunter nowadays. If I mention that

the canoe-work on this route demands thirty-two portages, thirty-two loadings and unloadings of the cargo, the reader can judge what a 'difficult' road must be." And to secure *Odontoglossum Hallii* alone the "ardent explorer must march in the bed of a torrent and on the face of a precipice alternately for an uncertain period of time, with a river to cross about every day; and he has to bring back his loaded mules or Indians over the same pathless waste."

Correspondence.

How a City Gained a Park.

To the Editor of GARDEN AND FOREST:

Sir.—The city of Bridgeport is spreading rapidly into the country, and fortunately the suburbs are in many cases provided with shaded streets and open gardens. But the distinctive name of "The Park City" has been given to it, not for its rural surroundings, but on account of the two parks of strikingly different characters which it now possesses.

The one, Seaside Park, secured by the wisdom and generosity of various citizens, lying along the Sound shore, where it curves with a particularly beautiful line, has long been enjoyed as a fashionable resort by the rich, and as a blessed breathing place by the poor; and it has before it a future hardly realized by those who do not know that it is but the starting-point of a system of seaside boulevards which will extend uninterruptedly from Bridgeport to South Norwalk, if the present design is carried out.

The other, Beardsley Park, lying several miles distant on the east side of the town, is the gift of one public-spirited man on the condition that the city improve it for the people, making yearly appropriations to that end.

The appropriations are comparatively small, and progress, therefore, necessarily slow, but already about fifty acres are improved to a degree that invites the attention of the public to this new possession. The gift comprises many acres more of charmingly undulating land, and as the work continues all these will be included.

There is a pretty story about the inspiration of this gift, which should be more widely known. It seems that the good man who gave this park to Bridgeport had been for some time impressed by the need of such a health-giving resort in that portion of the town, and for that class of people who could not drive to the delightful but remote "Seaside."

He had been vaguely intending to give such a park to the city as a sort of monument or memorial—at all events, to give it. But one hot summer day, a holiday, going into town from his farm, he saw a poor woman and some little children enter a field and establish themselves under a tree, apparently for a picnic. Knowing the owner of the field, and seeing him at that moment approach, the good man determined to remain and see the result of the owner's visit. As he anticipated, the little picnic party was ejected, though doing no harm at the time, and as they went sadly away the vaguely benevolent intentions of the spectator were instantly crystalized into a purpose which was acted upon at once. The result of that day's disappointment to the mother and her children was that the beautiful Beardsley Park is open freely and perpetually to them, and to all who, like them, long for the peace and pastoral beauty which "restore the soul" and give to the poor as well as to the rich the sense of sharing in the general beneficence of the bountiful seasons as they pass. All that can be done to make Beardsley Park comfortable and delightful for just this class is being done slowly and well, while here, also, the fine, solid roads will for ages invite those who ride or drive to enjoy this exquisite rural park which so happily places a wide barrier just here between the onward march of the city and one of the loveliest of inland views.

Elizabeth Bullard.

Bridgeport, Conn.

To the Editor of GARDEN AND FOREST:

Sir.—In Vol. I., page 107, of GARDEN AND FOREST, I gave the dates of the first appearance of *Hepatica triloba* in the same locality in the woods of Newton, Massachusetts, during the last twenty-six years; the first blossoms being, as it would seem, a fair criterion of the atmospheric conditions attending the early months of these different years. This year the first flowers were picked, on the same spot, on the 17th of March, and were fairly in blossom and were not forced into bloom by removal to a warm room. I again transcribe from my memorandum the dates for the last ten years:

March	2d,	1880.	April	15th,	1885.
April	3d,	1881.	March	18th,	1886.
March	5th,	1882.	March	21st,	1887.
April	1st,	1883.	March	23d,	1888.
April	13th,	1884.	March	17th,	1889.

The spring of 1880 was the earliest and warmest for the twenty-seven years.
Chestnut Hill, Mass.

D. D. Slade.

An Orchid Nursery.

To the EDITOR OF GARDEN AND FOREST:

Sir.—A few weeks ago your London correspondent wrote that the position held by the Orchid family would be the most remarkable feature in the history of English horticulture in the nineteenth century. It cannot be said that in this country "the cultivation of Orchids has developed into almost a passion," or that millions of pounds are invested in them here. It is true, however, that there are a few collections in the United States which take rank among the foremost in the world for size and completeness, and several more which, although not so large, would be noteworthy in any country for careful selection and skillful cultivation. That there is a growing interest in these plants is proved by the fact that the number of buyers has doubled in the past three years. This does not mean that the sales have been doubled in amount, for the new purchasers take plants in moderate quantities. But, after all, it means that more new collections are started every year, and there is good reason to believe that the demand for these plants is steadily increasing.

That this is the faith of enterprising dealers is proved by the fact that F. Sander & Co., whose great nurseries at St. Albans, England, are devoted to Orchids alone, have established a branch nursery at Summit, New Jersey, to meet the present and prospective requirements of their business in this country. Agents of this firm have been sent here for several years in the season of auction sales, and three years ago Mr. I. Forstermann came here as a resident representative of the house, and it is under his direction that the branch nurseries are now being built. These nurseries, as I learned on a visit to Summit last week, are finely located, and are planned to consist ultimately of eight growing-houses, each 150 feet long by twenty-one wide, with lean-tos attached, and all connected with a central show-house. One of these houses is already built in the most substantial manner, with heavy concrete walls and the best selected yellow pine throughout. The house stands on sloping ground, and the earth has been excavated from the alleys only and left three feet deep under the side and central stages. This earth under the staging is covered with forest-leaves, and it is expected that the evaporation of moisture from the damp earth and leaves will furnish an atmosphere which will approach in quality the air in the natural habitat of the plants. The water-pipes, are not placed below the staging, but under the walks which are made of yellow pine strips. One small pipe runs along the back of each side-table and above it, and behind this is a line of ventilators set so closely as to be almost continuous for the purpose of cooling the house in summer. There are many features in the construction and arrangement of this house which I have not observed before, and which seem to add much to its beauty, convenience and practical effectiveness, but the space you grant will not admit of further detail in this matter.

The principal purpose of this establishment will be to furnish a place for the reception of plants as they are imported, where they may be grown on until they become established and in flowering condition. When a buyer has a skillful gardener he will not hesitate to take Orchids from the case and to care for them from the time of their arrival. But a long sea-voyage is a strain upon the vitality of the plants, and some species always suffer seriously. Comparatively few gardeners in the United States have sufficient experience to warrant success in taking charge of Orchids when in an enfeebled condition; and when plants are lost dissatisfaction must follow. If, however, the plants are taken directly from the ship and placed under the expert treatment which they will receive at these nurseries, a large proportion of them can be safely carried over this period of danger, while under less favorable conditions they might perish. Beginners should never attempt to grow freshly-imported Orchids, and it will be found in every way more satisfactory for them to see the plants they buy in flower, or at least giving promise of flower. Another purpose of these nurseries will be to furnish something like a training-school where young men who wish to learn the niceties of Orchid culture can receive practical instruction, and the young gardeners who come here to assist will be prepared to supply the skilled labor which is now difficult to obtain in this country. Of course rare plants will be propagated here, and in time efforts will be made to produce new varieties by hybridizing.

Nearly all the Orchids in the nurseries at present are recent

importations, and are just as they came from the woods. There are a few specimen plants, however, that would be notable in any collection. One of these is a *Cattleya Skinneri* four feet across, with enormous bulbs and the promise of 500 flowers. Near it is one of the largest plants of *Saccolabium guttatum*, filling a basket three feet square, and a specimen of the white *Lalia anceps* nearly as large. Passing by a remarkable specimen of *Cypripedium grande atratum* and a good *Cattleya citrina*, one of the most interesting plants is a large *Calogyne Forstermanni*, which was discovered in Borneo by Mr. Forstermann. In its home, as many as thirty flowers are sometimes borne on a single erect spike, after the style of *Odontoglossum crispum*. They are of purest white, with a yellow throat. The plant, however, has never yet bloomed in cultivation. It does not bear transportation well, and no specimen has yet been brought up to a strength sufficient for the production of flowers, although the plant here shows promise of bloom.

Inasmuch as Messrs. Sander & Co. have as many as twenty collectors in the East Indies, in Africa, in South America and Mexico the nurseries can be filled with plants as quickly as they are built, and there is little doubt that the market will take them all. There is an erroneous notion that all Orchids are expensive, for many of the very best of them, when estimated for their beauty and ease of culture, are really cheap. Flowering plants of such admirable species as *Cattleya Trianae*, *C. Mossia*, *Dendrobium Wardianum*, *D. nobile*, *Cypripedium insigne*, *Oncidium varicosum*, and many more can be had for a dollar or two each, while there are varieties of the same species which would cost hundreds of dollars. This does not imply that the expensive ones are necessarily the most beautiful, but it illustrates the fact that there are two classes of Orchid-growers. The one class cultivates them for their beauty only, and such a taste can be gratified without any extravagant expenditure. But when one collects Orchids with a similar purpose to that which controls a collector of coins, or of rare books or prints, the diversion becomes a most expensive one. No one will find fault with a collector of the second class who has the means to indulge his fancy in this direction. But I wish there were more of the first class, who grow Orchids as they grow other plants, simply for their beauty and fragrance, and who do not find their highest value in the fact that no one else is able to get plants like them.

Summit, N. J.

S.

Recent Plant Portraits.

Botanical Magazine:

LILIU NEPALENSE, *t.* 7043; a well-marked species, discovered more than fifty years ago in the high mountains of Nepaul, but only very recently introduced into cultivation. The flowers, which appear either singly or in corymbs of three to five, are "four or five inches long, greenish-yellow outside, yellow within, flushed, except in the upper third, with purplish-black."

SARCOCHILUS LUNIFERUS, *t.* 7044.

STUARTIA PSEUDO-CAMELLIA, *t.* 7045; a handsome-flowered, hardy shrub, the Japanese representative of a genus quite widely distributed in our south Atlantic States, where ten species occur. The Japanese plant was introduced into the United States many years ago by Mr. Thomas Hogg, and is now not infrequently seen in American gardens.

OPUNTIA POLYCANTHA, *t.* 7046; this, it seems, is Haworth's (Suppl. Pl. Succulent, p. 82) earlier name for *O. Missouriensis*, the dwarf and horribly armed species familiar to all travelers over the northern plains towards the upper Missouri and the Saskatchewan.

CHIRONIA PEDUNCULARIS, *t.* 7047.

EREMOSTACHYS LACINIATA, *t.* 7048; a noble perennial Labiate from the Levant and the Caucasus, long known in gardens, having been introduced into England by Philip Miller as early as 1731.

DELPHINIUM ZALIL, *t.* 7049; a plant of economic value. This is one of the most interesting discoveries of the Afghan Delimitation Commission. The botanist of the Commission, Dr. Archibison, thus refers to it: "This plant forms a great portion of the herbage of the rolling downs of the Badghis; in the vicinity of Gubron it was in great abundance, and when in blossom gave a wondrous golden hue to the pastures. The flowers are collected largely for exportation, chiefly to Persia, for dyeing silk; they are also exported from Herat, through Afghanistan to northern India, to be employed as a dye as well as to be used in medicine." It is a showy plant when its bright yellow flowers, borne in spikes ten inches long, are expanded.

IRIS BARNUMI, *t.* 7050; a handsome, purple-flowered species, introduced into cultivation by Professor Foster, who

received it from Mrs. Barnum, of the American Mission at Kharput, in Armenia.

CALLANDRA OPPOSITIFOLIA, *f.* 7051; a native of the mountains of Oregon and northern California—a neat but not very showy-flowered species.

Notes.

The annual congress of the German Pomological Society will be held this year at Stuttgart, between the 22d and the 30th of September.

A horticultural and a botanical congress will both be held in Paris during the month of August, this year, in connection with the International Exhibition. An agricultural congress will be held during the month of July.

After the meeting of the Pennsylvania State Forestry Association, at Westchester, on the 26th of April, a Chester County Forestry Association was organized, with the Honorable Washington Townsend as President, and Professor J. P. Welsh as Secretary.

A new edition of Mr. Robinson's popular "English Flower Garden" has just been issued by Murray, of London. It contains more than 1,400 pictures, illustrating many beautiful English gardens, as well as nearly all the plants that are hardy in the kingdom.

The parasitic insects which have been imported from Australia to prey upon the cottony cushion-scale, the most serious enemy of the Orange in California, are already multiplying rapidly in Los Angeles, and sweep the scale before them, as has been the experience in Australia. Mr. Koebele, the agent of the government, has brought to California a large supply of these predaceous beetles, and will distribute them wherever the scale is troublesome.

The legend of St. Patrick and his expulsion of all vermin from the Emerald Isle probably gave rise to the ancient belief that Irish oak-wood was superior to all other kinds, having a sort of sacred character and being proof against the ravages of insects. The venerable Bede declared that this wood "hath a virtue against poison," and so great was its renown that even at the end of the last century it was imported by the King of Portugal after the great earthquake at Lisbon to share in the construction of his new church. The original rafters of Westminster Hall were of Irish oak.

An English horticultural journal states that a small box of Lilies-of-the-Valley was recently sent from England to Pietermaritzburg, in South Africa, the plants being packed in a tin box, and each root enveloped first in damp moss and then in tin-foil. "The roots were all tightly packed at one end of the box, the other end being left vacant to admit of growth being made. The crowns were just bursting their first foliar envelope, and by the time the parcel reached its destination—a journey of twenty-four days—the buds were just breaking into bloom, and the plants were in a perfectly healthy condition."

In 1887 a spot disease was observed on Cucumbers near Geneva, New York, which almost ruined the crop. Professor Arthur pronounces it a parasitic fungus similar to one which has been disfiguring Peaches in Indiana, detracting from their beauty and hindering their growth. The Cucumber spot did not appear at Geneva in 1888, although it seems an aggressive fungus. It has been named *Cladosporium cucumerium*. The fungus on Peaches has only been recorded before as occurring in southern Austria, where it was named *C. carpophilum*. No remedies for either disease have yet been tried so far as known, but both of them threaten to become dangerous pests.

The pea-weevil (*Bruchus pisi*) and the bean-weevil (*Bruchus fabæ*) can be destroyed by putting the Peas or Beans into a pail and covering them with water; if the water is warmed to about blood-heat all the better, but this is not necessary as cold water will answer. If the seed remain in the water from eight to twelve hours every weevil will be destroyed, as the cavity containing the insect is soon filled by the water absorbed by the seed and the weevil is drowned. This simple remedy, which is recommended by Professor J. W. Clark, of the Agricultural College of Missouri, is not only effective, but does no injury to the seed, and if the seed is not soaked until the day before planting it will germinate more readily than before.

Speaking of the great popularity of *Cobæa scandens*, the *Revue Horticole* says that it seems somewhat strange that until recently no variety of it had been raised. A novelty is, however, now offered in the shape of a white-flowered variety, which differs from the type not only in the color of the blossoms

but in the paler green of the leaves and the purplish hue of the stems, which passes into whitish in the young shoots. "Although these differences may not be considered very important, they are sufficiently so to be appreciated when the two forms are growing close together, as we recently saw them at Paris, planted alternately and entirely covering a wall with their abundant foliage, prettily relieved by the white and violet-colored flowers. The white-flowered *Cobæa* being as vigorous and hardy as the type, the same details of culture are applicable to both forms."

Few persons imagine how many different substances have been used of late years in the making of paper. Rags, of course, still furnish the bulk of our paper, but large quantities are also made of wood, straw and Esparto-grass (*Stipa tenacissima*); and in various parts of the world successful experiments have been made with a multitude of materials that have not yet been brought into general use. In France paper has been manufactured out of leaves which are cut, pressed into blocks, and then steeped in lime-water to reduce them to pulp. In Ireland the Mallow, the Hop-vine, the Yellow Iris, and even the Red Clover have furnished paper pulp, and in Scotland the stems of the Hollyhock, peat, bracken, flags and rushes of several kinds. Sea-weed and tan have also been used in Europe, and in the East, Ramie Pine-apple fibre, Bamboo stalks and the refuse of Sugar-cane.

Professor W. A. Henry, writing in *Agricultural Science* of some weeds that are becoming troublesome in Wisconsin, says: "On the great plateau along the eastern flank of the Rocky Mountains grows *Solanum rostratum*, a homely, harmless sort of plant. The naturalist knows it to be the original food-plant of the Colorado potato-beetle (*Doryphora lineata*). In the year 1872 or thereabouts the beetle, coming across the uncultivated strip of eastern Colorado and western Kansas, found a new food-plant in the common cultivated potato, and spread with marvelous rapidity over the country. *Solanum rostratum* also comes into the fields to conquer, and has spread on cultivated lands in Texas and Missouri, where, with greatly increased size, it proves a troublesome weed. Last summer Mr. L. H. Pammel, one of our agricultural graduates, now professor of botany in Iowa Agricultural College, found this plant growing at Watertown, in this State. It is following up the potato-beetle. Will it spread over as large an area as its old acquaintance?"

Nothing could have been more effective or in better taste than the floral decorations of the Metropolitan Opera House as arranged for the great Centennial ball and banquet last week. The walls of the lobbies and lower staircases were entirely concealed by plants so that they presented the aspect of verdant bowers, yet a certain architectural dignity was preserved by the systematic employment of tall, upright Junipers intermixed with the lower plants. On the face of the arch leading from the main lobby into the house the dates 1789-1889 were emblazoned in red upon a quiet green ground, but, with this exception, scarcely any cut flowers were used; and the growing ones were beautifully massed in contrasting groups. The corners were filled with pyramidal banks of pink Hydrangeas, and against the piers stood enormous tall clumps of white Lilies with masses of red Geraniums or Azaleas around their base. In other spots great Azalea bushes rose from a foundation of white Spiræas, or yellow Cytisus from banks of yellow-centred bush Daisies; and the beauty of the individual plants was as conspicuous as the tasteful richness of the general effect. In the supper room again there were no set pieces, but Azaleas, Spiræas, and other growing plants adorned the tables at intervals. The arrangement of the chandeliers in this temporary structure was especially pretty. They were formed as round baskets filled with Palms and Pine branches, apparently growing, and with streamers of Ivy, amid which rose gracefully curving stem-like supports bearing the electric lights. Few plants were used in the ball-room as space was precious, but the corners of the stage opposite the Presidential boxes were banked with pink Hydrangeas and other plants of an harmonious character, while long festoons of green hung from the proscenium arch. Of course, the finest display was when the house was arranged for the dinner on Tuesday; then the vast room was encircled with tall, green plants, and the tables were profusely yet most tastefully adorned, flowers of a single hue, or at most of two contrasting hues, being exclusively used on each of the different tables. Mr. Klunder has long been famous for his skill in floral decoration, but his success in this instance will add a conspicuous new leaf to his laurels.

MR. JOHN D. LYMAN, a popular writer about forestry in the press of northern New England, argues in a recent article published in the *Mirror*, of Manchester, New Hampshire, in favor of thinning the young Pine forests of that state. Mr. Lyman's arguments, like those of many other American writers upon forestry, are not based upon experiment; and in this particular case he falls back, in order to enforce his views, upon the statements of various local authorities and a number of English writers upon agriculture. Thinning a young Pine forest may or may not be a good thing to do, from a commercial point of view. There is no doubt that the trees will grow much more rapidly if they are judiciously thinned than if they are left to fight among themselves for light and nourishment. But who knows what the ratio of income will be under the two systems, or whether there is any money in helping Nature in the case of a forest of White Pines. The finest Pines which ever tossed their tops to the wind grew without any assistance from man; and man has yet to show that he can improve upon such trees. Perhaps he can, if money is not an object; but it is a serious object in the case of a crop which requires a century in which to reach maturity and which has such a low money value in comparison with the time required for its production. A rule of modern forestry, now almost universally adopted, is not to spend money on a crop for the mere purpose of hastening its maturity. Time is less important than money when the interest account is carried through so many years. Forests in Europe are rarely thinned, therefore, until the thinnings are of sufficient value to pay all the cost of the operation. Young White Pines have no value, unfortunately, until they are from twenty-five to thirty years old, and cannot be disposed of. This will be found the one disadvantage in this tree, in other respects one of the most valuable of all trees for general forest-planting.

But let us see where Mr. Lyman's thinning of the New Hampshire Pine forests, if it is carried out on any large scale, is going to lead to. It is not probable that a forest of young, self-sown Pines, which generally stand very close together, could be properly thinned for less than five dollars an acre. Compound interest at four per cent, will double this five dollars in a little less than eighteen years. In something under 150 years, when the Pine forest should have attained its maximum value, the five dollars will be \$144. If the thinning is applied to a hundred thousand acres, as it might well be in New Hampshire, this operation would mean an expenditure upon the crop at the time of maturity of more than fourteen million dollars.

But who knows whether this expenditure will be justified by larger returns from the soil, or how can Mr. Lyman verify the statement he will probably make in reply to this criticism that if the young forest is properly thinned it will reach maturity in half the time that the trees, unassisted by man, would have grown to the same size. Granting that the trees of the thinned forest will be ready for the axe in seventy-five years, there will still be an interest account against them of more than forty dollars an acre, and forty dollars an acre for pine-stumpage is a very large price—larger than any one seriously believes that it will be at any time during the next seventy-five years. The danger, too, of fire and of other accidents is not diminished by thinning.

Now, we neither acknowledge nor deny the value of thinning. It may be a good thing, and it may be a very foolish one from the point of view of economy; and forestry means the economical management of forests. What is needed now in this country are facts upon which to base systems; and facts of this sort can only be reached by long years of experiments, which only governments or corporate bodies like universities can inaugurate with any hope of that they will be persisted in till sound conclusions are reached. We have had enough of the vague statements, based upon personal opinion or the results of European experiments, which pass muster in this country as profound knowledge of forestry, and the sooner we get down to practical work the better it will be for us. It requires the term spanned by the lives of several generations of men to find out anything really reliable about a tree or about a forest, and, from present appearances, ours will pretty much all have disappeared before we get ready to set about learning what is the best way to take care of them.

Great interest is felt in Minneapolis in the new park schemes for the improvement of that city; and the advocates of the plans proposed by Mr. Cleveland have succeeded in arousing so much enthusiasm about them that these plans, with some unimportant modifications, are to be realized. Mr. Cleveland, in an address presented to the members of the Board of Trade, cited the benefit derived by the people of this city from the establishment of Central Park as an argument for city parks—an argument so convincing that we reproduce it for the benefit of those persons in other cities who are trying to impress upon their fellow-citizens the necessity of securing public parks in the midst of all urban populations before the increase in the value of city land makes it impossible to do so:

"The whole expenditure," he said, "for the purchase of land, construction of park, interest on bonds and maintenance for twenty-five years was \$44,000,000. The amount levied in taxes during the same period was \$110,000,000 so far in excess of the average value of city property, that after deducting from it the whole cost of the park, together with all the revenue that could have accrued from taxes at the ordinary rates, there remained the sum of \$17,000,000 to be credited to the park as clear profit. I wish to emphasize this statement, and have it clearly understood, for it is a matter of dollars and cents which cannot be gainsaid or evaded by those who raise the cry that we cannot afford to be sentimental. In the language of the gentleman from whose report I gather these figures, 'the most convincing arguments that can be deduced from theories are weak and impotent compared with the invaluable logic of these figures. They prove beyond the possibility of cavil the

necessity of securing at once all the park lands we may ever want.'

"I tremble," continued Mr. Cleveland, "when I think that this great gift, which is put right down before us, may be lost. In the possession of this area no other city could compete with us. In Chicago they would give millions of dollars to get it, and they are now constructing a forty-mile drive at great expense, which will give them access to an area something like it."

Recent Botanical Discoveries in China.—II.

Rhododendron.—Upwards of sixty species of this genus are enumerated in the seventh part of the "Index," which is just passing through the press, and fifty of them are comparatively recent discoveries. This number is considerably in excess of the total number described in Hooker's "Flora of British India," but it may suffer some reduction when the different forms are better known; and it includes the section *Azalea*, which finds its maximum development in eastern Asia. A very large proportion of the true *Rhododendrons* were discovered by the Abbé Delavay in the mountains of Yun-Nan, but all the mountainous regions of China yet explored have yielded their peculiar species. Taken as a whole, the new Chinese species are by no means so gorgeously beautiful as the Himalayan, though many of them are highly ornamental. *R. aucubafolium* has long, smooth, dark-green leaves and small, snow-white flowers, with very long, exserted stamens. It also resembles the common *Aucula* in having thick, straight, smooth branches. *R. Augustinii* is a densely-branched shrub, with crooked branches, coriaceous leaves, two to three inches long, lepidote beneath, and white or purple flowers, about the size of those of *R. Indicum*. *R. auriculatum* is a robust, large-flowered species, having large leaves, rusty-hairy beneath and slightly auricled at the base. *R. Bureaui* is another very robust species, the thick branches of which, as well as the stout petioles, under surface of the leaves and bracts, are clothed with a dense, rusty, felt-like tomentum, and the rosy or purple spotted flowers, of medium size, are borne in very crowded clusters. *R. decorum* has deflexed leaves, and is altogether so like the American *R. Catawbiense* that if it had been found in America instead of on the mountains of Yun-Nan it would probably have been referred without hesitation to that species. *R. Delavayi* is one of the showiest of the Yun-Nan species, strongly resembling the Indian *R. Campbellii*. *R. lacteum*, a very large-leaved species, has loosely corymbose, milk-white flowers of medium size, and the leaves are glossy above, and very thickly covered with rusty scales beneath. *R. Faberi* is one of the very few Chinese species having a large foliaceous calyx, and *R. bullatum* belongs to the same group. The former has flat coriaceous leaves, smooth above, and densely rusty-tomentose beneath. *R. stamineum* and *R. pitiosporæfolium* are closely allied species or varieties of one species, characterized by smooth, deflected leaves and small, narrow-lobed white or pink flowers on long, slender pedicels, and very long exserted stamens and style.

Baumontia breviflora.—A handsome species of the small, showy genus *Baumontia*, from the island of Hainan, differing from the other species in the manner indicated in the specific name. It is, of course, a warm-house plant. The Rev. B. C. Henry, of the American mission, discovered it, and he describes it as a magnificent vine, climbing over rocks and trees; flowers white and fragrant. Hooker's *Icones Plantarum*, t. 1582.

Rehmannia glutinosa, syn. *R. Chinensis*.—A very handsome plant, is figured as variety *Angulata* of this species in Hooker's *Icones Plantarum*, t. 1589. It differs so materially from the plant figured in the *Botanical Register*, t. 1960, and in the *Botanical Magazine*, t. 3653, that without connecting links one would regard it as a different species. Dr. Henry collected it at Ichang, and describes the flowers as red, with orange and scarlet markings. Commonly cultivated in China, where there are many varieties, recalling in their coloring the American genus *Salpiglossis*.

Trapella Sinensis.—This is a highly curious floating aquatic plant, mentioned here on that account only. It is the type of a new genus of anomalous structure, referred to the *Pedaliaceæ*. In foliage it bears a strong likeness to *Trapa*, but there the resemblance ceases. The small flowers have a funnel-shaped corolla, and the narrow seed-vessels are furnished with usually three long, rigid, hooked appendages, something in the way, though very different from the appendages to the fruit of *Martynia*, and other members of the same order. It is figured in Hooker's *Icones Plantarum*, t. 1595, and in the *Annals of Botany*, ii., t. 5 to 8. A native of Ichang and other parts of China and Japan.

Rubus Henryi.—The genus *Rubus* is represented in China by at least fifty well-marked species, the majority belonging to the simple-leaved section, to which the present species belongs. A tall, climbing shrub, with deeply three-lobed thick leaves, glabrous above, and clothed with a white tomentum below; flowers small, red, in terminal racemes. Received from Dr. Henry, Ichang, and figured in Hooker's *Icones Plantarum*, t. 1705. Certainly one of the most distinct of the genus.

Petrocosmea Sinensis.—A new genus of the *Cyrtandrea*, limited, so far as we know at present, to this species. An elegant little plant, in habit resembling a Violet. Dr. Henry found it growing on the surface of the rock in the bottom of a small cave near Ichang, with the leaves closely pressed against the rock. It has violet or blue flowers, and is figured in Hooker's *Icones Plantarum*, t. 1716. Several other members of the same natural order from China are figured in this work. Thus *Didissandra sesquifolia* (t. 1797), a remarkable species, from Mount Omei, Szechuen, with large flowers and very unequal leaves. *Hemibaea Henryi* (t. 1798), the type of a new genus, of which two other species are described. *Didymocarpus stenanthos* (t. 1799), a modest plant from Mount Omei. These plants are indeed all of them somewhat humble members of an order rich in showy plants.

Primula.—The mountains of Yun-Nan have yielded such a harvest of new species of this genus as nobody could have anticipated. It is not merely the number of new species, but the great diversity of types—among them two or three absolutely different from anything previously known. Altogether we have evidence of between forty and fifty species of *Primula* in China. Foremost among these novelties is *P. Delavayi*, the flowers of which are solitary on radical scapes, and appear before the long-stalked, cordate-rotundate leaves. Corolla deep purple, large, funnel-shaped, with fringed lobes. It differs from all other described species, too, in having large, flat seeds. Discovered in the mountains of Yun-Nan at an elevation of about 15,000 feet. *P. vinciflora* resembles *P. Elwesiana* from the Himalayan Mountains, and the large, solitary scapose flowers bear a striking likeness to those of a Vinca. *P. incisa*, a small-flowered, umbellate species, has small pinnate leaves on slender petioles very much like those of some of the small Potentillas. *P. nutans* has almost capitate flowers with the lilac-purple corollas directed downwards. *P. blattariformis* and *P. malvacea* are also very curious species; the former having racemes of flowers fifteen to eighteen inches long; the latter having whorled flowers with an usually large calyx. *P. bella* is a beautiful little plant, and the smallest from the Chinese region, but not so small as some of the miniature Himalayan species. Many of the others are equally as attractive as those named. Indeed, one might say that all of them are pretty.

Lindera fragrans.—An elegant shrubby Laurel from three to five feet high, with slender branches, narrow leaves and axillary clusters of small, fragrant flowers. From the neighborhood of Ishang, and figured in Hooker's *Icones Plantarum*, t. 1788.

Lonerila peperomiaefolia.—A pretty species, having fleshy, strongly-nerved, ovate, long-stalked leaves, a scapose inflorescence and loosely cymose flowers about an inch in diameter. A native of the province of Ishang figured in Hooker's *Icones Plantarum*, t. 1814.

Hemslaya Chinensis.—A new genus of *Cucurbitaceæ*, a very slender climber of elegant habit with pedately-divided leaves and dioecious flowers. The male flowers are very singularly formed, the almost free petals being recurved on the pedicel like an umbrella or parachute. The clavate seed-vessels are borne in clusters, and open at the top by means of a small lid, giving egress to the numerous winged seeds. A native of the provinces of Hupeh and Szechuen; figured in Hooker's *Icones Plantarum*, t. 1822.

Emmenopterys Henryi.—This is an ornamental tree, thirty to forty feet high, from the Patung district in the province of Hupeh, belonging to the tribe *Cinchoneæ* of the *Rubiaceæ*—a tribe that is almost wholly American. In this, as in *Mussaenda*, which belongs to a different tribe of the same natural order, the most conspicuous part of the inflorescence is the foliar development of one of the calyx-lobes of some of the outer flowers of the clusters, such as occurs in the South American genera, *Calycophyllum*, *Monadelphanthus* and others, and in the recently-discovered Malayan genus, *Craegbia*. A similar, though quite different ornamental appendage to the inflorescence, is found in the Indian genera, *Hymenopogon* and *Hymenodictyon*, belonging to the tribe *Cinchoneæ*. Here, instead of a foliar development of one of the calyx-lobes, some of the bracts of the inflorescence enlarge and color in a similar manner. The broadly funnel-shaped, al-

most campanulate flowers of *Emmenopterys* are yellow dotted and about an inch across, while the leafy expansions of the calyx are white, and persist until the fruit ripens and falls. Dr. Henry does not give particulars of the habitat of this tree, so that we are unable to judge its constitution; but in a general note relating to the plants from the Patung district, he states that most of them come from a range of mountains 6,000 to 7,000 feet above sea-level, along which virgin forest extends for many miles. *Emmenopterys* is figured in Hooker's *Icones Plantarum*, t. 1823.

Kew.

W. Botting Hemsley.

Horticulture in California.

THE gardens of this State are superb this year, as the winter was very mild, warm and moist, and the fifteen Rose-fairs soon to be held in different parts of the State will be unusually interesting. The orchards look well, and the fruit crop will be twenty per cent. greater than it was last year. Only the Apricots will show a shortage, owing to the heavy rains which fell when they were in blossom. The Apricot fails to fertilize well under such conditions.

I lately visited the "Northern Citrus Belt" of this State. It is, broadly speaking, the old gold-bearing belt of the Sierra foot-hills, in which nearly all of the famous old placer camps of 1849-53 were situated. In all this region Orange seedlings of great size and vigor are to be found, but commercial plantations have been established at only a few points. The most important of these is Oroville, on the Feather River, the county seat of Butte County, and sheltered on the north by a high plain, which rises to the great pine-clad volcanic wall of Table Mountain. There are several colonies here, and some two thousand acres of young Orange-trees are already planted. In the gardens of the beautiful little town are many trees of fifteen or twenty years of age, and the orange crop is already of considerable commercial value. The town holds an annual Citrus fair, late in December, in a large tent in the court-yard pitched over a number of well-grown Orange-trees in full bearing.

There is a manifest desire here to plant more native trees and shrubs. The beautiful *Romneya Coulteri*, so long a success abroad, has been, to some extent, re-discovered by Californians. It is now in great demand, but good plants cannot be obtained at the nurseries. A gentleman of Alameda lately sent a man to the mountains of San Diego County to dig up roots, and obtained in this way a good stock for his own garden.

In new fruits the Loquat (*Mespilus Japonica*) has become fairly naturalized. One farmer in Alameda County is able to sell \$100 worth of Loquats annually from two long rows planted originally for an avenue. The Loquat here presents several distinct types, one, apparently, the result of long selection, and well worth grafting. Many of the Loquats are not worth fruiting, but this better type has an undoubted future as a market fruit. The true Carob-tree is bearing here, in Alameda County. Unfortunately the trees were planted on low land, and grew too much to leaves, so that as yet the crop is but light. The Japanese Persimmons are slowly falling in public favor. For a few years producers made money shipping them, but now the large orchards planted ten years ago, when yearling trees cost a dollar apiece, are being cut down.

A curious source of revenue was brought to my notice the other day. Trees grow so fast in this climate, and there are so many old orchards, old gardens and old nurseries that good-sized trees of an immense variety of species are continually being cut down and carted to the wood-pile. A young man conceived the idea of buying up whatever woods appeared valuable and selling them to the carvers and turners in San Francisco. He knew nothing of botany, and the stuff was all sold in "mixed lots," but at high prices. In all he gathered up this winter from farms and gardens, within fifty miles of San Francisco, some seventy-five kinds of woods, none of them indigenous. One Osage Orange trunk was fourteen inches in diameter and eighteen feet long. The wood was a rich orange and brown, deepening to nearly black at the heart. A Pomegranate trunk was four inches through. An African Tamarisk, whose wood is very close-grained and creamy-white, was about the same size. A Japanese Persimmon was a foot through. The wood of this tree is light-colored, with curious black specks and stains, and works in the most charming manner. Among other woods gathered up were Ashes, Maples, *Retinosporas*, *Araucarias*, *Grevillias*, *Acacias*, *Paulownia*, *Cork Oak*, *Persian Walnut*, *Orange*, *Lemon*, *Large-flowered Magnolia* and *Olive*. I notice that the wood-turners call Osage

Orange, Pomegranate and Black Locust-wood all "acacia," that the oak-like woods are all "oak," and the yellow woods all "lemon."

The Japanese Quince fruits so freely here that alert house-keepers are making jelly out of it. The product is better than either apple or the common quince jellies, and would prove very marketable if it could be obtained in sufficient quantities. At present it is rare, and highly prized by the esoteric initiates.

The prettiest spring-blooming shrub I have seen among new things is a Japanese Apricot, sent over in a lot of Japan Plums from Tokio some five years since, and fruiting only last year. The blossoms are very abundant, being fragrant, and massed as they are, and tinted slightly, but deeper in color than the common Apricot, they have attracted much attention. The fruit is small and bitter.

Berkeley, Cal.

Charles Howard Shinn.

The Liquidambar.

THE North American Liquidambar, or Sweet Gum, as it is more familiarly called, is the type of a small genus of three or perhaps four or five species of trees peculiar to eastern North America, Mexico and Central America in the New World, and to Asia Minor and eastern Asia in the Old World. The genus belongs with the Witch Hazels and is characterized by naked flowers, usually of only one sex, produced in nodding, racemed, globular heads or catkins—the male consisting of a cluster of numerous stamens with short filaments intermixed with minute scales, the females of many two-celled and two-beaked ovaries from the axils of the minute scales, all cohering together, hardening in fruit, and forming a spherical, woody head of pods which opens between the oval-shaped beaks. The styles are two, stigmatic on the inner surface; ovules numerous, seeds few, covered with a wing-angled seed-coat.

The North American Liquidambar (*L. styraciflua*) is one of the most beautiful and characteristic trees found in the forests of the eastern portion of the continent. It rises under exceptionally favorable conditions to a height of more than 150 feet, with a tall, perfectly straight trunk, four or sometimes five feet in diameter, destitute of branches for seventy or eighty feet, and covered with pale brown, slightly furrowed bark. The branches are small and short in proportion to the height of the tree, and the outline of the head, even upon young trees which have had abundant room for free development, is narrowly pyramidal. Broad, corkey wings grow on the young branches, and make this tree in winter a conspicuous and always striking object. The leaves are rounded, deeply five to seven-lobed, so that they appear almost star-shaped, three or four inches across; they are thin, and shining especially on the upper surface, perfectly smooth, and borne on slender petioles. They are pleasantly fragrant when bruised, and in autumn turn to the most brilliant scarlet. There are few trees of the American forest which surpass the Liquidambar in the splendor of the autumnal coloring of its foliage.

The wood of the North American Liquidambar is heavy, rather hard, tough, although not particularly strong, close grained, satiny and susceptible of a good polish. A cubic foot of the thoroughly seasoned wood weighs 36.82 pounds, or rather more than that of our common Wild Cherry and of the Black Walnut, but a good deal less than white oak. The color is bright brown faintly tinged with red, and of the sap-wood nearly white. It is difficult to season, showing a tendency to warp and shrink badly. Experience and the adoption of better methods are gradually overcoming this difficulty, however, and large quantities of this lumber are now manufactured into furniture or used in the interior finish of buildings for which, when once thoroughly seasoned, the hardness, solidity and pleasant coloring and texture adapt it. It has been used to a considerable extent in some parts of the West for the plates and even for the frames of buildings, and largely in some western cities for street pavement-blocks.

The Liquidambar first makes its appearance in Connecticut, near the shore of Long Island Sound, in the vicinity of New Haven. It is confined at first to the neighborhood of the coast, but soon extends further inland, and, with the exception of the Allegheny ridges, is found all over the United States from New Jersey and southern Indiana and Illinois to southern Florida and the valley of the Trinity River in Texas. The climate of western Texas is too dry for this tree; but it reappears on the mountains of central and southern Mexico, where it often forms an important part of the forest-growth, and extends to Guatemala and Central America, or is represented there by one or two closely related and little known species.* It is one of the most common trees of the Mississippi basin, where, on the deep, rich, and often submerged bottom-lands lining the streams, it forms, with the Cotton-gum (*Nyssa uniflora*) and the Cottonwood (*Populus monilifera*), a large proportion of the tree-growth. Here it attains its greatest size and best development, forming vast forests, of which an idea may be obtained from an illustration upon page 235, taken from a photograph, by Mr. Robert Ridgway, of the Smithsonian Institution, to whom this journal is indebted for the permission to reproduce it. It represents a forest scene near Mt. Carmel, in southern Illinois, and the tree with the tall, clear stem in the middle of the picture is a Liquidambar of not unusual size or height.

The American Liquidambar is destined to supply a large amount of useful timber long after more valuable trees like the Cherry, the Yellow Poplar and the Black Walnut are practically exterminated for commercial purposes. The fact that the real home of this tree in those parts of the country where it attains its greatest development is in deep swamps, always inundated every year during several weeks at a time, and incapable of being drained and therefore of being cultivated, will insure, with slight attention, its perpetuation, and will make the future supply of the wood of this tree reasonably certain.

The name Liquidambar, applied by Linnæus to this tree, has reference to the fragrant terebinthine juice which exudes from the stem. This exudation is sometimes collected by herbalists and used in the form of a syrup as a substitute for storax in the treatment of catarrhal troubles, or externally as an ointment. This resinous exudation increases in proportion to the warmth of the climate in which the tree is found. It is almost wanting in trees growing at the northern limit of the species, and is produced in much larger quantities from trees in Mexico and Central America than from those growing in any part of the United States.

The American Liquidambar is a tree of first-rate importance in ornamental planting. It is easily raised from seed; it can be transplanted without difficulty; it grows rapidly, and is not particular about soil. A single specimen upon a lawn is always a handsome object, and the narrow, pyramidal shape of the head adapts it for general street-planting. The leafless branches afford a curious and interesting sight, and the splendor of its autumnal foliage places it in the front rank of trees to plant for autumn effects. It is not, unfortunately, perfectly hardy in eastern New England, suffering here in severe winters.

Liquidambar Orientalis, Mill., furnishes the liquid storax of commerce. This tree forms forests of considerable extent in the south-western part of Asia Minor. It is described as a handsome tree thirty or forty feet high, resembling the Plane.† A detailed and very interesting account of the history, properties and uses of liquid storax and of the methods used by the wandering tribes of Turcomans for extracting it from the trees will be found in Flückinger and Hanbury's "Pharmacographia," p. 241. It is a remarkable fact (although not at all an isolated one, for there is still much to be learned of the plants from which eastern nations

* Henesley, *Bot. Am. Cent.*, i., 400.

† There is a good figure of this species in Hooker's *Icones*, t. 1019.

derive many of their most valuable products) that the real source of liquid storax, which is known to have been sent to India from the ports of the Red Sea as early as the first century of the Christian era, and was known in Greece during the sixth or seventh centuries, was not found out until a few years ago.

The origin of this drug long perplexed pharmacologists, and the first account of it was published in a Greek newspaper in 1841, and only definitely settled in 1851.† The chief market for this drug is still, as it always has been, India, and considerable quantities are consumed in China also.

New or Little Known Plants.

Cordia Greggii, var. *Palmeri*.*

THIS is another of the showy flowering shrubs discovered last year by Dr. Palmer in the mountains about Guaymas. In its general habit and more important characters it accords with the species to which it is referred as a variety, which is a native of the Sierra Madre region farther to the east, where it was first collected many years ago by Dr. Gregg. This variety differs mainly in its larger and



Fig. 106.—*Cordia Greggii*, var. *Palmeri*.

The Asiatic species of Liquidambar (*L. Formosana*, Hance) is found in southern and eastern China, in the Island of Formosa, and in Japan.‡ It is the Feng-tree of the Chinese, and it has quite recently been discovered that the wood of this tree is very generally used in making the cases in which Chinese tea is exported. Mr. Hemsley finds another Chinese species in Herb. Kew, of which little is yet known (*Journal Linnæan Society*, of London, xxiii, 297). Its wood is also used for tea-chests. C. S. S.

† See *Pharmaceutical Journal*, xvi, 41, 461. There is a figure of this species in Hooker's *Icones*, t. 1026.

‡ *Liquidambar Chinensis* (see Hooker's *Kew Journal of Botany*, iv, 164) is now referred to the genus *Altingia*, of which the type is *Altingia excelsa*, Noronha (*Liquidambar Altingia* of Blume), a widely-distributed tree from east Bengal to China and the Malayan Islands.

broader flowers, the other differences in foliage, etc., being less conspicuous.

It is a much-branched and rather compact shrub, growing to a height of five to eight feet, with numerous small pubescent and light green leaves, strongly veined and sharply toothed. It is a very free bloomer, bearing the flowers in clusters at the ends of the branches, broadly funnel-form, pure white and fragrant. The fruit is somewhat fleshy, enclosed within the dilated calyx-tube, and contains a very hard 1-4-seeded stone. In the size and beauty of its flowers this species equals the *Cordia Sebestena* and others of the same group.

S. W.

* *Cordia Greggii*, Torr., var. *Palmeri*, Watson in *Proc. Amer. Acad.*, xxiv, 61.

Cultural Department.

Boronias.

THERE are about fifty species of *Boronia*, all of which are peculiar to Australia. Of this number nearly one-half have been cultivated at one time or another as green-house flowering-plants, but only a few of them are represented in gardens now. The introduction of *B. elatior*, *B. megastigma* and *B. heterophylla* within the last ten years or so has been the means of attracting attention to the older and almost forgotten species, which twenty years ago ranked among the choicest flowering-plants for the conservatory and for exhibition. The best of these are comprised in the list which follows. There can be no question as to the first-rate merits of *Boronias* as garden-plants, even in these days when there is so much to select from. They form shapely bushes under ordinary treatment, they bloom freely and last a long time, the flowers are pretty and generally very fragrant, and they have the additional attraction of distinctness. A specimen *Boronia* is unlike any other green-house flowering-plant. Its nearest relations, the *Croweas*, *Eriostemons* and *Correas*, are as different in appearance from *Boronia* as they are from each other. There is a good opportunity for any horticulturist on the lookout for an interesting and useful hobby in these neglected hard-wooded green-house plants from the Cape and from Australia. In the more southern states of America these plants would probably prove hardy and would thrive well. The *Boronias* are most abundant in West Australia from the Swan River southward. Here the hottest months are December, January and February, when the maximum temperature reaches 100° Fahr., the coldest months being July and August, when the thermometer falls to freezing-point. Undulating plains, covered with a profusion of vegetation, and a sandy soil, characterize this region. Springs abound, water being found at only a few feet from the surface, even in the hottest and driest weather, so that the plants are able to support long seasons of drought. These facts may be of some guidance to those readers who are situated in California and other southern states.

As green-house plants for temperatures approximating to those of England, *Boronias* should be treated as follows: Young plants may be obtained from imported seeds, from cuttings or by grafting. Some growers prefer grafted plants. Others, who are equally successful, prefer them on their own roots. If grafted the best stock is *B. pinnata*, which should be about two years old, with the base of the stem slightly woody. Splice-grafting is usually preferred. The cion should be about one and a half inches long, and firm enough to cut easily. The operation should be performed in February. Cuttings may be put in at the same time or in autumn. They should be obtained from the lowest and least sappy branches, planted in a very sandy peat-soil, covered with a bell-glass and placed in an intermediate temperature. When rooted and hardened off they may be transferred singly into thumb-pots and placed on a sunny shelf in a green-house. The soil should always be good peat, with a good proportion of coarse silver sand. Re-pot as often as necessary, bearing in mind that small shifts are best and that these plants do not require much root-room. The shoots must be stopped often, so as to get a good foundation for a well-furnished bush. *B. megastigma* requires constant attention in this respect, or it will run up into a thin, scraggy specimen. *B. elatior* and *B. heterophylla* may be cut back hard after they have flowered, and they will make all the better plants for it. A green-house where the temperature does not fall below 45° in winter, and where a constant supply of fresh air and light can be maintained is the most suitable place for *Boronias*. Re-pot large plants in March, and after they have been started in a close, sunny green-house let them have plenty of light and air, with a moist atmosphere in the evening and morning. In August all except *B. serrulata* may be placed out-of-doors to ripen their growth; this species, however, will not bear this exposure, but must be kept in the green-house always. It also likes a few degrees more warmth in winter. Under this treatment perfect specimens almost as high as a man have been grown in England.

The following species are the best of those known. They are all in cultivation in a few collections in England, whilst the most popular may be had of any nurseryman.

B. heterophylla, although the last to be introduced, is by far the handsomest of all known *Boronias*. As is now known to most of your readers, it was sent to Kew in 1881 by Miss North, the famous artist and traveler, and it has since been distributed by Messrs. Veitch, of Chelsea. It forms an elegant little shrub

with numerous branches clothed with dark-green, pinnate leaves, which vary in the number of pinnae, and are sometimes simple. The flowers are in axillary whorls, and are egg-shaped, drooping, half an inch long, the color being bright rosy-red, almost crimson. It differs from *B. elatior* in having larger leaves, fewer leaflets and brighter-colored, larger flowers. According to Baron von Mueller, who described it nearly thirty years ago, it is found "in West Australia, on the Kalgee River, in places sometimes inundated."

B. elatior was introduced by Messrs. Veitch in 1876. In habit it resembles *B. heterophylla*. The branches are hirsute, the leaves crowded, pinnate, two inches long, and the flowers on short axillary peduncles; they are nearly globose, open at the apex, nearly one-half inch long, very profuse on the branches, and dull rose-red. They are developed in spring and early summer. When well managed—and it is one of the easiest to cultivate—this species forms a bush four feet high, with hundreds of branches clothed with six inches of flowers. As a small pot-plant it is equally beautiful.

B. megastigma is not attractive in color, but what it lacks in that respect is more than atoned for by its powerful and delicious fragrance, as sweet as violets and even more penetrating. One small plant in flower is sufficient to scent the air of a large green-house. It is slender in habit, with thin branches, heath-like foliage and axillary flowers. These are formed of four spreading concave petals, which are purple-brown on the under side; yellow above. The stigma is four-lobed, large, truncate at the top, and purple; the stamens are in two series, one bearing large purple anthers, the other small yellow ones. This plant is scarcely ever out of flower. It is a native of King George's Sound, from whence it was introduced and flowered first in Kew.

B. pinnata is a free-growing, free-flowering, handsome shrub only surpassed in beauty by *B. heterophylla*. It has pinnate, smooth leaves, with from five to nine leaflets, and rather large axillary or sub-terminal corymbose flowers. The petals are one-half inch long, spreading and overlapping, fleshy, pale rosy-purple in color. They remain on the plant a long time: This species will continue in bloom from November till the following May. Twenty years ago it was one of the most popular of all flowering-plants for exhibiting. It has been in cultivation many years, and is a common plant in New South Wales and Victoria.

B. titrandra is very similar to *B. pinnata*, but differs in having smaller flowers. It blooms in April and May, and lasts about two months. The flowers are colored bright rosy-pink. Syn. *B. Drummondii* and *B. pulchella*.

B. Fraseri is a compact shrub three feet high, with green, pinnate, shining leaves and axillary corymbs of from four to six deep rose-red flowers on short peduncles. The corolla is one-third of an inch across and composed of four ovate spreading petals, which are downy on both sides. The stamens are fleshy and white. When well managed the whole of the upper six inches or so of the branches is heavily laden with flowers. They are developed in spring. Introduced from New South Wales about thirty years ago. Syn. *B. anemonifolia*.

B. crenulata is a distinct and pretty plant with fragrant flowers. The branches are slender, semi-erect and clothed with box-like leaves one-fourth inch long, obovate, overlapping each other and pointing upwards. The flowers are borne on axillary peduncles about the top of the branches, and are bright rosy-red. They measure one-half inch across.

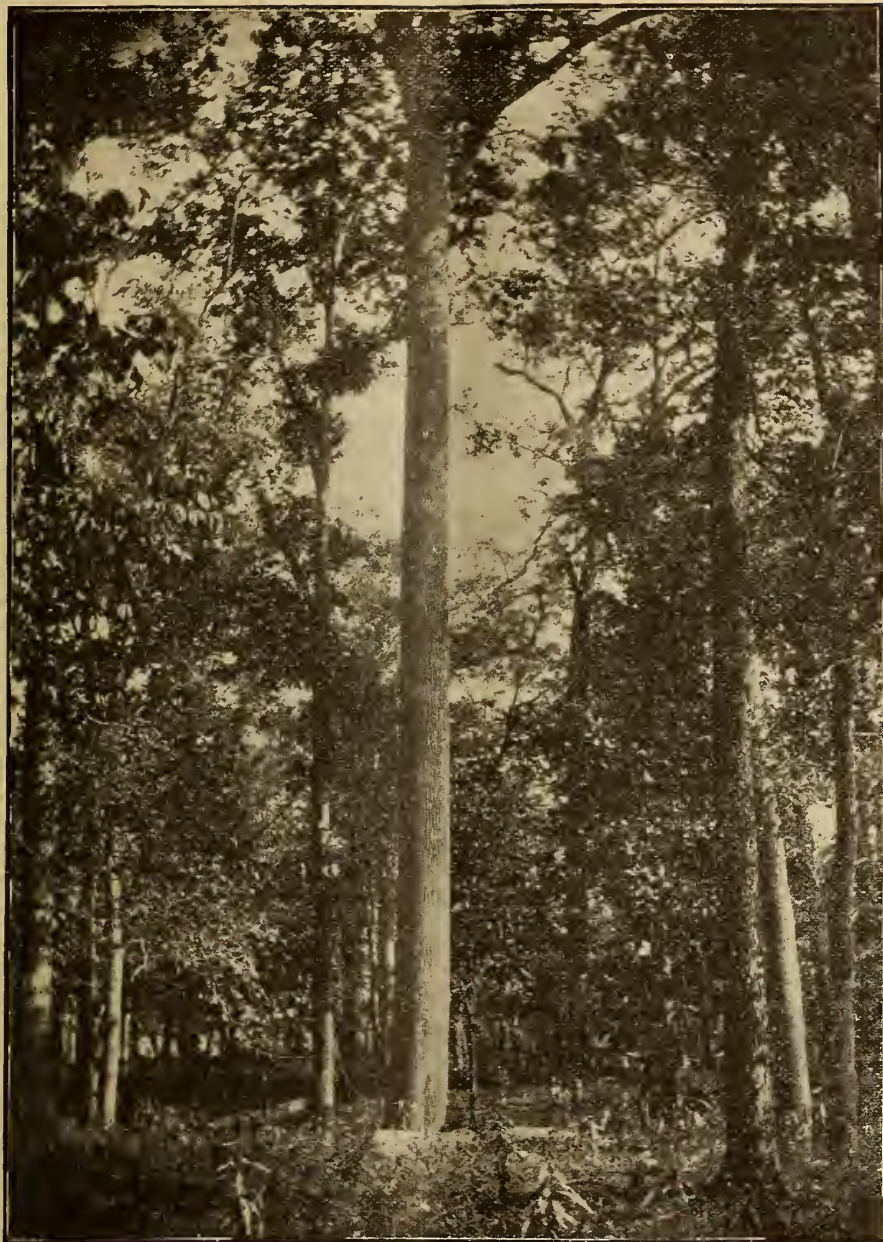
B. serrulata is much like the last-named, but is a more robust grower; the flowers are larger, darker and more fragrant. It is a native of New South Wales, where it is known as "the native Rose," probably on account of its odor, which resembles attar of roses. The two species last mentioned are almost unknown in English collections now. They certainly are more difficult to manage than the other kinds described here, but under favorable conditions they form attractive, pretty specimens.

W. Watson.

Kew.

Lima Beans.

THE Lima Bean is one of those vegetables which I have found to do better by having a permanent location in the garden than in rotation with other crops. It requires a richer soil than the ordinary dwarf Bean, and will pay well for special attention. Most growers use poles for these Beans which are entirely too tall. The crop is harder to secure from the tall poles, and the extra height is an absolute disadvantage since it encourages the upward growth of the vine and retards its fruiting. If poles are used at all, a height of five feet is enough. Before setting the poles run furrows with a plow where the rows are to be. In these furrows place the manure



A Liquidambar in Southern Illinois—See page 232.

or commercial fertilizer, then with a crowbar set the poles firmly in the furrow four feet apart. Next throw a furrow to the row of poles from each side, leaving them standing in a ridge. Now, with a rake, dress this bed of earth into good shape, and around each pole plant four beans, eye downwards, and only just beneath the surface. The elevated ridge around the poles will heat up sooner than a flat surface, and the germination will be much more rapid. When the plants are fairly established pull up all but two to each pole, and give a little attention to starting the vines on the poles, as they frequently need to be tied at the beginning. But the best way is not to use poles at all. Set two or three stout posts in the line where the Beans are to grow, and then stretch galvanized wire-netting, four feet wide, from post to post, and plant the Beans along the ridge about six or eight inches apart. The wire will furnish points to cling to from the start, and the Bean plantation will look much better than with the poles.

Perhaps the Lima Bean will in time be able to support itself. The new Bush Lima furnishes a starting point for a dwarf variety to take the place of the old Lima. The Bush Lima, though a good thing, is, nevertheless, the smallest of all Limas, and cannot yet entirely supersede the old large Lima. But having secured the habit it will not be long before we have the big bean on the small bush. As grown here last summer the Bush Lima, or Bush Sieva, was fully two weeks or more earlier than the pole Sieva, and more than that in advance of the large Lima. It will thus be of great advantage

in localities too far north for the large Lima. But even if we succeed in putting the large bean on the small bush, it is hardly probable that we can put so many there nor keep up the succession as late as on the running vines. Therefore we had probably better not dispose of our poles or wire-netting. In fact, by the use of this netting it becomes easy to grow many desirable Beans which the pole nuisance has almost banished from our gardens.

Crozet, Va.

W. F. Massey.

Orchid Notes.

Dendrobium ochreatum (Cambridgeanum) is one of the showiest Orchids in bloom with us at present. Unfortunately it is not flowering freely, and is seldom seen in perfection. It is one of the few *Dendrobiums* that produce flowers on the young, immature bulbs—a great advantage, since the deep green leaves form a fine background to the rich golden flowers. These are produced in pairs from the sides of the bulbs, and are some two inches across, the roundish lip ornamented by a large crimson blotch. The bulbs are about a foot long, with the nodes somewhat thickened. This handsome plant was introduced in 1837 from the Khasya Hills, where it grows on trees and rocks. Under cultivation it thrives in small baskets of peat and moss suspended near the glass. During active growth it needs abundant heat and water, and after flowering should be placed in a cool, airy house thoroughly to mature the bulbs.

Dendrobium McCarthia is a large-flowered kind, very pretty and rare, found on forest trees in the southern part of the Island of Ceylon. It produces slender bulbs about two feet long, with swollen, dark-colored nodes. The flowers are borne in twos or threes on pendulous racemes from near the top of the stem. In form they are peculiarly flattened, with a sort of spur at the base, the color being white, streaked and suffused with rosy mauve. The lip has a large, rosy-purple blotch in the centre, and is edged with rose. This fine plant is usually difficult to keep in good condition, or even alive. With us it is doing fairly well in the warmest corner of the Phalaenopsis-house, growing in small, shallow pans, drenched with water during growth and kept a little dryer while flowering.

Dendrobium fimbriatum is an old and showy species that may now be seen in full beauty in a great many collections. It is a strong plant with stout bulbs four feet long, thickened in the middle and tapering to the top. The flowers are borne in loose racemes from near the top of the bulbs, which continue to bear them for many years. They are of a bright orange color, the large, roundish lip being beautifully fimbriated. This plant was introduced from the Himalayas in 1820, and grows freely in good open soil among a general collection of stove plants. A very pretty variety called *Oculatum* (*Pav-tonii*) differs from the type in having shorter and more slender bulbs, and the flowers are ornamented with a large maroon blotch on the lip.

Bletia Shepherdii is one of the best of this genus of terrestrial Orchids. It is a very robust grower with round, flattened bulbs, surmounted by lanceolate plaited leaves about two feet long. The scapes are branching, two to three feet long and bear an abundance of reddish-purple flowers prettily marked with creamy-white streaks on the lip. It comes from Jamaica, and is easily cultivated in pots of sandy peat with a little rich loam added. It should be treated as an ordinary stove plant, and needs a good rest after growth is finished.

Erises Fieldingii is a magnificent plant of bold habit growing nearly three feet high, the stem closely clasped with thick, dark-green leaves about one foot long. From the axils of these are borne drooping racemes, often branched and two to three feet long, thickly set with large white flowers, mottled

and suffused with a rich rose color that becomes much deeper on the lip. It is a native of Assam, and thrives in baskets or cylinders with Sphagnum moss in the warmest house, and should at no time be allowed to become dry. Of several varieties of this species the rarest is called *Williamsii*, a pure white form.

Cyrtopodium Andersonii is a noble plant, and one not often seen. It is only suitable for large houses, as it grows nearly five feet high. The bulbs are sheathed with the bases of the large lanceolate plaited leaves. The stout scapes which appear with the young growths are about five feet long, branching and bearing numerous rich golden flowers. It comes from the West Indies, and should be grown in very rich, loamy soil, kept open by nodules of charcoal. Steady heat, abundance of water and liberal applications of liquid manure will tend to make strong growths, and when these are mature the plant should be removed to a cool, airy house and kept dry until the flower-scapes appear. The bulbs should not be shrivelled.

Cattleya citrina is now in full flower, and the golden-yellow, tulip-like flowers hanging from among the glaucous foliage and whitish bulbs, with the peculiar drooping habit of the plant, combine to give it a striking appearance. This Orchid has been known a great many years, and is abundant in Mexico, where it grows on the under side of the branches of the trees. In cultivation it does not remain in good condition for many years, but newly imported plants grow very freely, and with us last longest in good condition if wired to bare blocks of wood and suspended near the glass in the Heath-house. They should be drenched with water during growth, and merely kept plump at other times. The flowers are deliciously fragrant, and will last fully a month in perfection.

Kenwood, N. Y.

F. Goldring.

Trilliums.—Wood-Lilies, or Wake Robins, as they are often called, are among the best of our native spring-flowering plants. Many of the species are valuable for pot culture, and when grown in this way may be easily brought into bloom several weeks before their usual flowering period. To grow Trilliums well a moist, shady place and rich vegetable mould are necessary, for when found growing wild they are usually in shady woods, where the decaying vegetable matter affords abundance of rich soil for them to luxuriate in year after year. *T. grandiflorum* is probably the best-known species, and deservedly so on account of its large flowers, snow-white when first expanded, and changing to rosy-pink with age. A quantity of this Trillium growing wild, and just in bloom, is a sight to see and remember. If visited a week or two later the appearance of the flowers is so completely changed that the place will hardly be recognized. *T. ovatum* is a Pacific Coast species and is as ornamental as *T. grandiflorum*, the flowers being pure white and fully as large. These two species are often confounded, but on examination are seen to be quite distinct in the shape of the petals and stigma. *T. erectum* is a species common in the Eastern States, having green leaves with dark purple flowers. A white variety is also quite common, with yellowish-white petals and purple ovary, a very distinct plant, known as *T. erectum album*. Another eastern species is *T. cernuum*, or Nodding Trillium. This also is white-flowered. *T. sessile* is a species with purple flowers and foliage prettily blotched with purple. The variety *T. sessile Californicum* is a plant larger in all its parts and with the coloring of leaves and flowers of a much brighter color. This is a very desirable plant, and worth cultivating for its foliage alone. *T. nivale* and *T. pusillum* are two dwarf species not exceeding six inches in height, both having white flowers. *T. petiolatum* is very distinct in its foliage, which differs from all others in being heart-shaped and borne on long petioles. All of these Trilliums are of easy cultivation when given the position named, and a little trouble taken to make the plants feel comfortable will be amply rewarded. The best time to plant Trilliums is as soon as possible after the foliage has died down in summer or early in the fall.

Dicentra eximia.—We received some two years ago a plant of the true *Dicentra eximia* from a correspondent in Tennessee, and after growing it for two seasons we find that it may be strongly recommended as a hardy border-plant. The flowers are borne in compound racemes on stems about a foot high, and are produced simultaneously with the beautiful, finely-cut foliage, which starts in April and continues until autumn frosts. As a border-plant *D. eximia* is as ornamental as the old *D. spectabilis* or Bleeding Heart, and is much to be preferred on account of its being persistent. *D. spectabilis* dies down during the hot summer months. We have found *D. eximia* to be easily propagated by division and also by seed,

which is ripened in fall. The plant is perfectly hardy near New York.

Passaic, N. J.

E. O. Orpet.

Summer Flowering Bulbs can be used with advantage to fill vacancies in the herbaceous borders and open spaces amongst dwarf shrubs, such as Glent Azaleas and Kalmias, when grown in beds or borders by themselves. The commoner varieties of *Gladiolus brenchleyensis* are often used for lines in formal borders, and planted so have a very telling effect. The rarer hybrids may be planted in dozens or half dozens, at intervals, in a border and are equally effective. Other bulbs which can be used in groups are *Crocsmia aurea*, orange; *Montbretia crocosmiflora*, orange-vermilion; *M. Pottsii*, red; *Galtonia candicans*, the large white summer Hyacinth, and scarlet and orange Tigridias. Dwarfier and rarer sorts for the rock-garden are *Milla biflora*, with pure white flowers; *Cooperia pedunculata* with fine white fragrant flowers; *Zephyranthes Atamasco*, *Z. candida* and *Z. rosea*.

Wellesley, Mass.

T. D. Hatfield.

Pontederia azurea.—A tropical aquatic has just flowered with me, and I think for the first time in the United States. It is distinct from and finer than the now popular *P. crassipes*, and will undoubtedly flourish in the open air in summer. After trial in this manner I will report further.

Bordentown, N. J.

E. D. Sturtevant.

Notes from a Spring-Garden.

Anemone Appenina is a delicate bulbous-rooted species of southern Europe, with doubly pinnate leaves, the leaflets thin and drooping and erect one-flowered scapes a few inches high. The flowers are pale china-blue an inch or an inch and a half across, delicate and rather fugacious. They appear in succession, however, and the plants, of which there is a broad and spreading clump in the shadiest part of the rock-garden, have been in flower for several days. This is a shade-loving plant, and flourishes best and lasts longest in flower when it is planted under trees.

In the depth and intensity of the blue color of its flowers no plant, perhaps, certainly no plant which can be cultivated in our gardens, surpasses or equals *Omphalodes verna*, a dwarf perennial a few inches high, of the Borage family, from southern Europe, common in English gardens, but not very often seen in those of this country, where it is rather difficult to establish and not long-lived, perhaps, because it is not very hardy here at the north. Once established, however, this charming plant spreads rapidly by rooting runners, and as it remains in bloom during several weeks, and as the color of the flowers is so wonderfully fine, it is worth a little extra trouble and patience to secure a good mass of it on one of the half-shaded slopes of the rock-garden or in some sheltered nook by a wood-walk under deciduous trees.

The yellow-flowered *Fritillaria imperialis* is at its best—a stately and splendid plant, and one which, in spite of its mephitic tendencies, causes as much admiration as any plant in the garden. It quite eclipses the old-fashioned, dull-colored Crown Imperial in habit, in brightness of foliage and in beauty of flowers. The Crown Imperial has held its own in gardens for centuries, and has seen the coming and the going of plants and of races of plants long since forgotten. It has survived many fashions, and, thanks to its tenacity of life and its real beauty, it seems destined to survive many others. This yellow-flowered variety should serve to extend its popularity and make it known among people who value plants largely because they are new or little known; not that the yellow-flowered Crown Imperial is a particularly new plant, or one that is difficult to procure, for it is sold by many of the bulb-growers of Holland, and the bulbs cost only a few cents apiece, but it is little known, and therefore rare in the gardens of this country. And this is true of another plant of this same genus—*Fritillaria pallidiflora*, a native of southern Siberia. This is a smaller plant, rarely attaining a height of ten inches, with very pale glaucous-blue leaves arranged along the stem, which bears at its summit three or four large, nodding, bell-shaped flowers, pale yellow in color, and striped and spotted on the inside with deep purple. It is hardy and long-lived, and for many years has flowered undisturbed in the same spot, which is one of the most exposed and driest in the whole rock-garden. It is truly a perennial source of pleasure.

And so is the Summer Snowflake (*Leucoium aestivum*), and I never look or think of it without wondering why it is that I never see it in other gardens, or why everyone who has a bit of ground and loves flowers does not plant a few bulbs of this plant. Its long, dark green, erect leaves, its

tall, bold scape and the cluster of white, bell-shaped, nodding flowers, which do not appear until the early-flowering bulbous plants have passed their blooming, all commend it to the lovers of hardy flowers, among which there is none, I think, which equals it in grace of carriage and in a certain charm of dignity, if such a word can be applied to a humble herb, which barely raises its head two feet above the ground, and whose annual appearance barely covers a quarter of the year.

Viola pubescens and *V. Canadensis* are both just now conspicuous objects in the rock-garden, as they have spread widely from self-sown seed, and the young plants are blooming freely. They are both native species, the former with yellow, the latter with larger white flowers, tinged with purple; and they are both easily cultivated, and improve both in size of plant and of flower under generous treatment. The Canadian Violet especially is an admirable garden plant, with its tall, leafy stems, which are sometimes two feet high, and its large and abundant flowers. It thrives, too, in the densest shade, a valuable quality in almost any plant; and it will flourish almost as well in an open situation in the full glare of the sun. There are several other of our wild flowers blooming here just now. Some of the showiest and some of the most graceful plants which are cultivated in gardens are found in the New England woods and fields, and there are no plants, when they are transferred to a New England garden, which give greater pleasure or cause greater admiration among persons who are not botanists and whose knowledge of flowers does not extend beyond the ordinary inhabitants of the conventional gardens of the present day.

The Wake Robbin (*Trillium grandiflorum*) is the showiest in flower of these plants now blooming here. It is an excellent garden plant, and if people who plant it are sometimes disappointed in the result at first, it is only because this *Trillium* requires three or four years in which to get fairly at home in its new quarters; but when it is once established it will produce larger flowers than it produces in the woods, and spread and multiply and flourish wonderfully.

Uvularia grandiflora is another inhabitant of northern woods; a graceful and attractive shade-loving plant, which is at its best just now. The common name of Bellwort is derived from the slender, bright yellow, Lily-like flowers, which nod two or three together from the summit of the slender, leafy stems. No plant is more easily cultivated, and once established it spreads rapidly, and will occupy all the space which can be afforded to it.

Boston, May 4th.

C.

Notes from the Arnold Arboretum.

THE season is one of promise. It is still early, and plants are flowering eight to ten days before they did last year. Few plants have suffered during the winter, and nearly all those which bloom upon the wood of the preceding season—that is, in early spring—are unusually full of flowers or of flower-buds.

The different species of *Prunus* are, of course, next to the Asiatic Magnolias, the most conspicuous of the small trees and shrubs which flower here in April. *Prunus Davidiana*, from northern China and Mongolia, was, as last year, the first to open its pale pink and rather small flowers, but it preceded by two or three days only the Sweet Almond (*Prunus Amygdalus* or the *Amygdalus communis dulcis* of many authors). The Sweet Almond is one of the familiar plants of European gardens and shrubberies, but for some reason or other is rarely seen in those of this country—at least in the Northern States. It is perfectly hardy, nevertheless, although, like most of the Almonds, Peaches and Apricots, often short-lived here, owing to the attacks of borers or of fungus. An Almond-tree in full flower is a beautiful object. The flowers are rather larger than those of the common Peach, or almost two inches across. The petals are pink, shaded towards the base to rose, while the calyx is purple. They appeared here on the 18th of April, and the trees are still covered with bloom, although many petals have, of course, fallen. These flowers have experienced during the past two weeks excessive summer heat, sharp frosts, violent thunder-showers and two prolonged north-easterly rain-storms. There are few flowers which can bear so much hard treatment and look fresh and bright at the end of three weeks.

The Almond is a native probably of Mesopotamia, Persia and the Trans-Caucasian countries, but it was early introduced into Europe by the Greeks, and has now become fairly naturalized in the countries of southern Europe and in Algeria. It is a tree twenty to thirty feet in height, with a spreading

head of rather sparse, upright branches, and it is only when the tree is in flower that it is an object of great beauty, as it is not remarkable in its foliage or in its habit or general appearance, which are not very unlike those of the common Peach-tree. The earliness and lasting qualities of the flowers, their large size, abundance and individual beauty are what make the Almond such a desirable tree for the garden. There are several varieties of the Almond in cultivation, but the variations are principally in the fruit. They are largely cultivated in southern Europe, especially in Portugal, and in the Orient, and recently somewhat in California, where the climate is well suited for this tree. The varieties with sweet and with bitter fruits were distinguished, according to A. De Candolle, by the Greeks and even by the Hebrews.

The plants found in nurseries are usually worked as tall standards upon Plum stocks, as the Almond is found to grow more vigorously and to last longer worked on the Plum than when it is grown on its own roots. The variety with sweet, hard-shelled fruit (*Douce à coque dure*) is much used in France as stock upon which to work the Peach, which is found, when treated in this way, more prolific in dry soils. According to Charles Downing ("The Fruits and Fruit-Trees of America") "the common Almond, the hard-shell Sweet Almond and the Bitter Almond are hardy in the latitude of New York, and will bear tolerable crops without care. The soft-shell Sweet Almond, or Ladies' Almond, will not thrive well in the open garden, as a standard, north of Philadelphia; but they succeed well trained to a wall or on espalier rails in a warm situation, the branches being slightly protected in winter."

It is well to record, perhaps, that the flower-buds of the Siberian Apricot (a wild form of *Prunus Armeniaca*, a common and widely-distributed tree through Siberia to northern China and Manchuria) were killed during the past year. It is a handsome, vigorous and perfectly hardy tree here, of rapid growth, but it has never flowered freely or set fruit, and this is the first time that the flower-buds have been killed.

The Japanese *Prunus pendula*, of which an illustration was published in the first volume of GARDEN AND FOREST, p. 196, flowered two weeks earlier than it did a year ago, but as usual the plants have been covered with flowers. It is certainly one of the most graceful of all small trees, and one of the freest and most constant bloomers. There is no tree of northern gardens with which it can be compared, and none when its pale pink, nodding flowers cover the long, drooping branches which possess its delicate refinement and peculiar charm. Fortunately it is hardy and a rapid grower, flowering early, and it is easy to multiply by grafting upon the common Cherry-tree, so that there is really no reason why this little tree should not be seen wherever gardens are cultivated or beautiful plants esteemed. And yet, strange to say, it is hardly known yet in European nurseries, while in this country, although a few plants have been cultivated for nearly twenty years, it is rarely seen outside perhaps a dozen gardens.

A variety of the cultivated Peach raised from seed sent to the Arboretum by Dr. Bretschneider from Peking, is now conspicuous with exceptionally large, abundant and deep-colored flowers. It has some value as an ornamental tree.

It is a curious fact, and one not very easily explained, that the Myrobalan Plum is so rarely seen in our gardens, although now that the purple-leaved Persian variety, the so-called *Prunus Pissardi*, has been so generally propagated, we are going to see more of it in one form at least. The green-leaved plant is far the handsomer of the two, however, when the trees are in bloom, and it is, moreover, one of the handsomest of the Plums at this season of the year, as the leaves, which are about half grown when the flowers are fully expanded, make a charming and effective setting for them, and afford what most "fruit-trees" lack in flower—a contrast of colors. The Myrobalan is a small tree of good habit. It is perfectly hardy, not particular about soil or exposure, and one of the freest bloomers of the genus. It is one of the plants which has most puzzled botanists, as although it has been in cultivation for centuries it is nowhere known in a wild state. It is probably a variety or form of the common Plum (*P. domestica*). The fruit is small, depressed-globular, scarlet or yellow, and of little value except for the handsome appearance which it presents as it hangs upon the branches. The Myrobalan is one of the best of the early-flowering trees to plant in a small garden or on a small lawn. Judged by the plants grown in the Arboretum, it is longer lived and less liable to be injured by borers than the purple-leaved *Prunus Pissardi*.

Prunus tomentosa is in full bloom, and as usual, an object of much beauty. It is a native of northern China, whence long ago it was carried to the gardens of Japan, where it is generally cultivated and highly esteemed. This little Cherry is a

spreading bush, growing three or four feet high by as much through. The stems are long and wand-like, and are now covered from end to end with pale pink flowers the size of those of a common Cherry-tree, which appear just as the young leaves, which are thickly clothed with tomentum (a peculiarity of this species), are unfolding. The flowers remain open during several days, and are succeeded by bright scarlet, almost transparent fruit, which is ripe here during the month of July. This is a very hardy shrub. It is easily raised from seed or from cuttings, and when it is better known its value will be appreciated, and it will be seen wherever shrubs are cultivated for ornament.

Amelanchier oligocarpa was first figured in GARDEN AND FOREST, i., p. 247. It has been in flower in the Arboretum for a week, and is the earliest of the genus, and a shrub of great beauty in cultivation. A native of cold, northern bogs only, it takes kindly to cultivation, which soon increases its stature and the size and abundance of the flowers, which are the size of a shilling, with broad, obovate, pure white petals. They are borne on long peduncles along the entire length of the stems, and are not fully open until the young leaves, which are bright bronze-green, are more than half grown. The pure white flowers in their setting of deep-colored leaves, the compact habit and general appearance of thrift and vigor which the plant displays in cultivation all commend it. It is one of the native shrubs unknown or entirely neglected by cultivators which the Arboretum is gradually calling attention to. The flowers of *Ribes saxatile*, the first of the genus to open, now cover the plants. They are yellow, produced in short, erect racemes, and make an agreeable appearance in contrast with the somewhat darker yellow of the foliage. This plant is a native of Siberia, long known to botanists and in gardens, in which it deserves a place, both for its pretty flowers and because of all the shrubs cultivated in the Arboretum it is the earliest to cover itself with leaves.

Of the shrubs, however, which flower here in New England during the last days of April, there are none which can be compared with the Forsythias for splendor of bloom, or with *Spiraea Thunbergii* for a profusion of pure white flowers. There are three Forsythias in cultivation—the old *F. viridissima*, a poor plant, comparatively, blooming fully a week later than the others, and with smaller and paler flowers, more erect branches, and less graceful habit. The others are *F. suspensa* and *F. Fortunei*, the latter a more upright growing variety of *F. suspensa*, with rather larger flowers, and by far the handsomest and most desirable of the three. It is hopeless to undertake a description of a large plant of this variety—ten or twelve feet high by as many through, with long, graceful, arching stems; a mass of brilliant yellow bells flashing in the sunlight, as I write—or to imagine how any other plant of its size can be more beautiful or give such an idea of marvelous profusion of flowers. There is some confusion in gardens in this country about the different species and varieties of Forsythias, and drawings have been prepared here to show the difference in the flowers and fruit, for publication in a later number of GARDEN AND FOREST.

Spiraea Thunbergii is handsome from the middle of April until the middle of November. It blooms profusely; the flowers, although individually small, cover the plant; the foliage is particularly graceful; the habit of the plant is good, and it is almost the very last in the autumn to change the coloring of its leaves, which, when most deciduous trees and shrubs are leafless, are brilliant with orange and scarlet tints.

Cercidiphyllum Japonicum is one of the introductions of the Arboretum which, although little is really known with regard to it yet, is a tree of so much promise that it may not be out of place to call attention to it. *Cercidiphyllum* is a Japanese genus of two species which is now considered to be more connected with the Magnolia family than with any other. *C. Japonicum* is a large timber tree in its native country, and, judging by the rapidity of its growth here, it promises to become a tree of considerable size in this country. The seed was first sent to the Arboretum in 1878 by Mr. W. S. Clark, at that time President of the Agricultural College at Sapporo, and the largest trees raised from that seed are about sixteen feet high. They are as fastigate in their manner of growth as a Lombardy Poplar or a fastigate Oak, and all attempts which have been made here to induce the young plants to assume a different habit by removing the lower branches have resulted in their death, caused, apparently, by the exposure of the stems to the sun. The young trees grow, perhaps, in dense shade naturally, so that when transplanted into the open, the lower branches are essential to protect the tender bark of the stems. This, as well as the slender branches are covered with thin, red-brown bark hardly to be

distinguished from that of the native Black Birch (*Betula lenta*), while those of the ultimate branchlets are dull red. The leaves appear here earlier than those of any other tree, with the exception of those of the Manchurian form of the Bird Cherry, figured upon page 295 of the first volume of GARDEN AND FOREST. They are opposite; round, or nearly so, deeply heart-shaped at the base, crenately-toothed, and, when they first appear, resemble, in color, the young leaves of the Purple Beech, with bright red stalks and conspicuous, narrow red stipules, half an inch long. They gradually lose their bronzed-red color, and later in the season are dark, rather dull, green, turning bright, clear yellow in the autumn. The flowers which have not yet been produced here are not conspicuous, and it is for its habit and its handsome foliage, so striking in the early spring, that the *Cercidiphyllum* will prove valuable if, upon longer trial, it is found really suited to this climate. The plants seem to flourish, and to grow most rapidly in peaty soil. The fact that it starts to grow so very early in the spring will prevent its being successfully grown in climates in which late spring frosts prevail. Here in New England, where such frosts are of rare occurrence, this tree is one which now seems to promise a good deal. It is worth, at any rate, a careful and extended trial.

May 2d, 1889.

7.

Periodical Literature.

In *Harper's Magazine* for May, Dr. C. C. Abbott writes pleasantly and instructively of "A Meadow Mud-hole," telling how charming are the things which Nature often puts there, and how many more may easily be added by the hand of man. The greater part of his article is devoted to the Yellow Lotus (*Nelumbium luteum*) and its exotic cousin, the Rose or Sacred Lotus (*N. speciosum*). Of the former plant he tells the familiar tale—that it is native to the waters of the Western and Southern States and is occasionally found in the Middle States, but in the valley of the Delaware so rarely that it is believed to have been introduced there, probably by the Indians; but he then adds a fact less generally known. It seems that this Lotus has not succeeded with the modern cultivator, although he finds no difficulty with its foreign relative. The description given of a water-meadow in New Jersey where the Rose Lotus and many other exotic Lilies now grow in splendid masses, and the accompanying picture, indicate that he refers to Mr. Sturtevant's plantation, recently described at length in these columns. All this multitude of Lotuses, he says, have sprung from a single tuber, planted in 1881; and, he adds, a tuber set out a year ago in a "mud-hole" of his own already overshadows all the native plants in its vicinity. "For a time they are permitted to be co-occupants, but not for long. The lusty Lotus is even now reaching out to a wide stretch of marshy meadow; and there, too, I doubt not, it will flourish as at my neighbor's. It is a rightful ambition to be able to sit down beneath one's own Vine and Fig-tree. Let me add the Lotus, for it has come to stay." Selling cheaply in our city streets, too, "this famous flower of other lands must soon appear." Are not these words sufficient encouragement to the most humble of horticulturists to assist in the happy task of spreading this lovely plant? If a single tuber will so quickly develop a numerous progeny, and if a mere meadow mud-hole will serve as its home, should it not soon become as familiar an object as the white Water-lily, with which it contrasts so well? Like the Water-lily, too, it has the merit of being a persistent bloomer. "If not a joy forever, it is at least one of a protracted season. Buds or blossoms, they are alike beautiful. Among many that are pale yet distinctively tinted there often stands out one or more with the loosening petals tipped with deepest crimson. Far more are like gigantic Tea-rose buds that soon open like a Tulip, creamy-white and rosy at the tips. Often these glorious flowers measure ten inches across when fully open, and are supported by stems extending far beyond the tallest leaves. One such that I measured was more than eight feet high. When the flower is fully expanded, the huge seed-pod . . . is of the richest yellow, and surrounded by a delicate fringe of the same color. The seeds are seen imbedded in the flat, upper surface—gems in a golden setting so lavish that their own beauty is obscured."

In turning over the pages of this number of *Harper's* no flower-lover will fail to pause at those where old Andrew Marvell's beautiful "Thoughts in a Garden" are reprinted with delightful illustrations by Alfred Parsons, the well-known English landscape-painter. And to more practical minds Mr. James K. Reeve's "Agriculture as a Profession" will give food for serious thought.

Correspondence.

Opening Buds.

To the Editor of GARDEN AND FOREST :

Sir.—It is a very interesting thing to keep a record, year after year, of the dates of the appearance of flowers or leaves. When one has done so for thirty years he is able to refute some popular notions. One of these is, that the seasons are changing. If, however, we compare cycles of years, rather than contrast two contiguous seasons, we find a general level is maintained. A phenomenally early spring this year may be offset by a late one in 1890 or 1891. And, by the by, we have known earlier seasons than this, so far as the flowers are concerned. To be sure, the *Houstonia* opened on March 26th, but we find other things about on time. Thus: *Houstonia cærulea*, March 26th; *Potentilla Canadensis*, April 4th; *Acer dasycarpum*, March 23d; *Draba verna*, April 13th; *Hepatica triloba*, April 20th; *Nepeta Glechoma*, April 18th; Horse-chestnut, leaves appearing April 19th; *Anemone nemorosa*, April 19th; Magnolias, April 21st; *Viola sagittata*, April 23d; *Acer platanoides*, April 23d; *Caltha palustris*, April 24th; *Taraxacum Dens-leonis*, April 25th. The date for *Houstonia* here given is the earliest I have. Usually I have found it about the 9th to the 15th of April. The year 1865 presented some very early dates. That year I found *Anemone nemorosa* in full flower near Barrington, Rhode Island, April 15th. I especially recall the day from its sad historic interest.

I find our Horse-chestnut trees extremely variable. Why is it that a certain tree, like that in the yard of the Friends' meeting-house, leaves out a week before all others in town? I have observed the same thing with Lindens. Indeed, two standing side by side, manifest this difference. I greatly regret that in my twenty-six years of collecting, I did not keep a connected record of natural events. Such a diary is of immense use not only to one's self, but to science generally. Many, I imagine, are, under the inspiration of recent teachers, now so engaged.

Providence, R. I.

W. W. Bailey.

To the Editor of GARDEN AND FOREST :

Sir.—The laborer in a good cause is worthy of his hire in the shape of frank acknowledgement of his services. I am glad therefore to be able to tell you that I recently heard a gentleman say: "I am just building a new house, and although there is only an acre of ground around it, my conscience was absolutely bullied by GARDEN AND FOREST into employing a landscape-gardener to lay it out for me."

Providence, R. I.

H. G. B.

Maple Avenue Nurseries.

To the Editor of GARDEN AND FOREST :

Sir.—A ride through Chester County, Pennsylvania, is always a delightful experience, and especially so at this season, when the broad meadows which skirt its numerous streams, and the pastures on its hill-sides are mantled with the purest green, while the opening leaves of its frequent woodlands show a diversity and richness of color which even the foliage of autumn can hardly equal. Never were flowers upon early-blooming trees and shrubs more abundant. On all the wood-borders the Dog-woods are white as snow. The branches of the Judas-trees are quite hidden beneath the deep pink blossoms, and the Lilac bushes by every farm-house actually bend under the weight of their flowers. Just on the outskirts of the fine old town of West Chester are the nurseries of Hoopes Brother & Thomas, and in the border of specimen shrubs which extends for 300 yards beside a sheltering hedge every plant in bloom is apparently trying to produce more flowers than ever it did before.

A spacious and level lawn, in perfect condition, fronted by a long line of noble trees, makes an attractive entrance to these nursery-grounds. The land is not uniformly level, however, but is marked by the same diversity of surface which characterizes the county generally, and some of the elevations command prospects of great extent and remarkable beauty. The soil is fertile, easily tilled and well adapted to give a thrifty growth to young trees and shrubs, and, by a system of close evergreen hedges, they are well protected from the winds, so trying in winter to many plants which do not suffer from cold alone. It would be difficult to find anywhere in this country so great a length of such perfect hedge. The Hemlock hedge is much the most beautiful, and no conifer, when clipped to a line, can show so soft a surface. The Arbor Vitæ hedges, too, are admirable in their way—dense, uniform in color and texture, and showing no weak spot from end to end. But Mr. Josiah Hoopes considers the Norway Spruce the ideal hedge plant in this climate for practical purposes, and it is only excelled in beauty by the Hemlock. It is tenacious of life, endures the knife more patiently than any other conifer, and after

long cutting, becomes almost as solid as a wall of stone and quite impervious to any ordinary assault. Mr. Hoopes has not observed that the hedges have any injurious effect upon the plants near them by robbing them of food or moisture. The young stock certainly looks well now, and in one place a block of Japan Maples, which were fairly ablaze with brilliant color, looked brighter still for the dark-green background of the hedge behind them.

It is thirty-six years since Mr. Josiah Hoopes began business here in a small way, and now the firm of Hoopes Brother & Thomas has nearly 400 acres under cultivation. Their trade is nearly all wholesale, and their aim is to keep a full line of such stock as is in demand by other nurserymen and dealers. They can hardly be said to have any specialty, although the fact that last week they set out 115,000 hardy Roses indicates an extensive business in that direction. Fruit trees, of course, occupy the greater portion of their grounds, and for some years past the sales of Norway and Sugar Maples and European Sycamore have indicated a general activity in planting street trees. This year Mr. Hoopes tells me that there has been a marked increase in the inquiry for ornamental trees and shrubs, including the choicer conifers. Some fifteen years ago Mr. Hoopes planted a Pinetum which contained all the species and varieties of conifers then obtainable, which promised to be hardy in this climate, but a large proportion of them have failed, showing how unsatisfactory it is to plant trees of this family, except those which have proved themselves sturdy and useful for special purposes. Most of the foreign Pines have yielded to attacks of fungus; the Cypressess are practically all gone, and a large proportion of the Junipers and Yews. Among the noteworthy trees that remain I remarked a *Pinus cembra* var. *Helvetica*, *P. Manchurica* and *P. peuce*, all fine specimens. Among the Spruces, *Picea pungens* and *P. ajanensis* are making strong growth. A Spanish Fir (*Abies Pinsapo*), under the lee of a sheltering belt of trees, is in excellent condition. *A. concolor* is thrifty, and so are *A. brachyphylla*, *A. Cilicica* and *A. Nordmanniana*. Very interesting, too, is a particularly fastigate form of the common European Silver Fir, which is well furnished from the ground up.

The most interesting group of trees I saw, however, stood in the old nursery grounds, where most of them were planted by Mr. Hoopes in 1853. Here is an Oriental Spruce, some thirty feet high, and now fairly red with its abundant male flowers. A specimen of *Abies grandis* measures nearly two feet in diameter, and near it stand fine examples of *Picea Smithiana*, *Abies Cephalonica* and many more. Near the house a tall *Magnolia Fraseri* was just opening its great flowers, which are a delicate canary color on the outside, and I wondered why it is not more frequently planted. A collection of Beeches, including large trees of the cut-leaved and fern-leaved varieties, stands near, and among them is an immense Bird Cherry (*Prunus Padus*), with a trunk nearly two feet in diameter, and its branches meet the grass in a circle forty-five feet across. It was covered completely with fragrant flowers. Of the shrubs in flower some *Exochordas* were noticeable for their great size, while retaining the compact habit of smaller plants. A Japanese Judas-tree, near the house of Mr. Thomas, seemed about nine feet high, and was, of course, a mass of flowers. This plant had been used several years to supply cuttings for propagation, but as soon as it was left to itself it began to shoot upward and spread outward, and is still growing rapidly. It bids fair to become almost as large as our native *Cercis*. Some plants of *Rhododendron Vaseyi* were bearing abundantly their clear pink flowers. *R. Rhodora* was also showing its rosy flowers, and this was in a structure some 200 feet long, with top and sides lathed, for shade-loving plants like *Kalmias*, hardy Ferns and many herbaceous perennials.

In a long-established nursery like this, one can find scores of beautiful things to admire; but, after all, the general tidiness, good order and organized system with which the great volume of business moves smoothly forward is the fact which most impresses the visitor. The nursery will hold an honored place in the history of American horticulture, and the writings of Mr. Josiah Hoopes in various periodicals for several years past have exercised a wholesome influence in moulding taste and directing practice in horticultural matters.

West Chester, Pa.

S.

Recent Plant Portraits.

CHAMEROPS HUMILIS, var. DACTYLOCARPA, *Bulletino de la R. Soc. Toscana di Orticultura*, March.

SCILLA LEDIENI, *Gartenflora*, March 15th.

CHRYSANTHEMUMS, WHITE VENUS and C. CULLINGFORDIA, *Gartenflora*, April 1st.

Notes.

An unusual number of forest fires have been raging for a week past from the Shawangunk and Catskill Mountains of this state to the woods of northern Minnesota. The fires have been exceptionally destructive in Michigan.

In the plant collection of Monsieur Beaucarne, a Belgian amateur, which was sold a few weeks ago, one of the most remarkable things was a specimen of *Vanda Lowii* which measured five feet and five inches in height.

Mr. Goldring, one of our regular London correspondents, who has been in India during several months engaged in superintending the formation of some new gardens for the Gaikwar of Baroda, has now returned to England for the summer.

An English journal speaks of *Rhododendron fragrantissimum* as one of the most attractive flowers offered this year at Easter. "Plants in eight-inch pots have bushy, spreading heads, and the point of every shoot is terminated by a cluster of large, bell-shaped, bluish-white and sweetly-scented flowers."

"Chrysanthemum-Growing in America" (showing method of protecting the plants) is the title of a large illustration in a recent number of the *Garden* (London). The picture represents a corner of Mr. Gerard's garden at Elizabeth, New Jersey, although not the same one that was portrayed in these columns last autumn.

A plant of *Rhododendron Veitchianum* recently exhibited at Newcastle-on-Tyne is noted, by one of the English horticultural journals, as "one of the finest specimens of this *Rhododendron* ever seen. . . . It is a compact bush, is in excellent health, and furnished with upwards of 300 of its large, white flowers, which are crisped round the edges and quite five inches across."

Many of the political exiles who are wasting their lives in Siberia are men of cultivation and scientific knowledge, and one of the few industries or amusements with which they are permitted to console themselves is the formation of herbaria of local plants. In the May number of the *Century Magazine* Mr. Kennan speaks of having aided an exile whose term had expired to secure the money needed to take him back to his home by purchasing for a hundred rubles a collection which he had made.

The fourteenth annual meeting of the American Association of Nurserymen will be held in Chicago on June 5th and 6th. The programme, which we have received through the courtesy of the Secretary, Mr. Charles A. Green, shows that addresses on an unusually wide range of topics may be expected from speakers well qualified to give instruction. These meetings have proved of great value, both from an educational and from a business point of view, and the nurseryman who neglects to attend them fails to live up to his privileges.

A correspondent from Germantown writes that the woods about there, although much of their primitive character is lost, still produce many wild flowers. A collection of eighty-four kinds was gathered for the last meeting of the Germantown Horticultural Society in four hours. Of Violets alone nine species were shown. The collector of these flowers stated that the *Asplenium pinnatifidum* is quite abundant yet, in its locality along the Schuylkill, where Nuttall first found the Ferns on which he bestowed the name. It grows on rocks that are not easily reached, and hence will probably be safe from destruction for some time.

The great Tulip-bed in the centre of Union Square was not planted this year in as satisfactory a way as usual. Instead of the splendid effect of reds and yellows which has often met the eye, the dominant flower was a very dark, dull purple variety, which had neither purity nor brilliancy of tint to recommend it, and harmonized badly with the few more brightly-colored varieties that were associated with it. A Tulip-bed is nothing if not gorgeous, and it seems strange that, with so many effective sorts to choose from, this ugly one should have been so lightly favored. Doubtless, however, it was an experiment which will not be repeated.

Cercis Chinensis, often cultivated in this country as *C. Japonica* and introduced here from Japan several years ago through the Flushing Nurseries, is a plant of great beauty wherever it can be successfully grown. A very fine plant, no doubt one of the relicts of the Centennial, may be seen in the neighborhood of Horticultural Hall, in Fairmount Park, Philadelphia. It is there a broad bush four or five feet high, with many erect, rather spreading, stout branches, which, last

week, as the native species was just coming into bloom, were completely covered from the very base of the stems with flowers. These are considerably larger than those of the other species and of rather deeper color than the flowers of our common eastern Judas-tree. This plant is fairly hardy in the neighborhood of this city, but it only does really well in a rather milder climate. It may be seen in Washington in very great beauty. North of this city it is killed almost every winter. This *Cercis* is a native of northern and central China, and it is believed to have been introduced into Japan with many other Chinese plants. Seed gathered in the country of its most northern range may be expected to produce plants which will prove hardy in our northern states. The Chinese Judas-tree is said to be an important timber-tree in China, growing to a considerable height with a trunk several feet in diameter, so that it is possible that the shrub of our gardens is only a dwarf variety, produced or cherished by the Japanese, and that the typical tree is still to be introduced.

Mr. Douglas W. Freshfield recently read before the Royal Geographical Society in London an interesting paper on "The Peaks, Passes and Glaciers of the Caucasus." Few persons realize that the slopes of the central Caucasus are steeper than those of the central Alps, and that they are clothed by splendid draperies of ice and snow, amid which the freshness of the loftiest snowless slopes stands out with singular vividness. At a height of more than 13,000 feet Mr. Freshfield gathered flowers, while at 10,000 feet above the sea, near the great Mestia glacier, *Rhododendron Caucasicum* was growing in great clumps, and the grass was sprinkled with Poppies, Geraniums, Veronicas, Ranunculuses, Gentians, Forget-me-nots and Campanulas. "The steppe," says the abstract of the address printed in *The Garden*, "except in the river-beds, was treeless; but no sooner did the ground begin to rise than wild fruit-trees appeared, soon to be succeeded by dense groves. The glades were bright in summer with millions of wild Sunflowers. The flora of the basin was wonderful. A horse laden with baggage was entirely hidden by the growth of flowers; the head and shoulders of a mounted man only rose above them. Wild Sunflowers and a species like Canterbury Bells grew to a height of six feet and eight feet. There were no waterfalls, and neither lakes nor tarns. Of late years the glaciers had oscillated in a manner corresponding to the Alpine glaciers. They were all in retreat in 1868; about 1875 they began to turn, and last year were sensibly advancing. The humidity of the summer climate was at once a charm and a vexation. The atmospheric effects were beautiful and various; the sky of the northern steppe was luminous and soft; the light was the light of the east; the colors those of the Roman Campagna."

At this writing (May 7th) the great display of Tulips in the Public Garden in Boston is at its best, and surpasses that of any previous year in good taste, in the arrangement of the different varieties, in the beauty of the varieties themselves and in the individual excellency of the plants. Mr. Doogue has reason to be well satisfied. The display is specially marked by the absence of double and semi-double varieties, which are only sparingly used. They are always inferior in beauty to the single flowers. An exception may be made in favor of the semi-double Couronne d'Or, a variety with very large, bold flowers, orange streaked with red. Turban Violet, a double flower of a dirty purple, will not probably sufficiently commend itself to secure a place in the garden another season. This last is the only really bad flower in the collection. If we should venture a suggestion it would be that more of the bright scarlet and yellow-striped varieties be used in place of some of the self-colored flowers which predominate. The interest and value of the display is greatly increased by cards placed over each bed, on which the names of the varieties are handsomely printed. It is an open question whether the carpet of Pansies used to cover the ground in the Tulip beds adds to their effect or not. The Tulip is such a stately and gorgeous flower that it may lose something of its character if brought into too immediate contrast with any humbler herb. In the days when the Tulip played a greater part in the world than it does now they were planted always alone, and it would be well to contrast another year beds carpeted as they are this year with others in which the Tulip was allowed to grow alone. But nothing certainly could be more lovely in the way of a spring flower-bed than some circles thickly covered with Daisies, among which have been plunged pots of the Hoop-petticoat Narcissus, and which can be seen near the Charles Street entrance to the central walk. Large specimens of the double-flowered white and of the double-flowered scarlet Peach, completely covered with blossoms, are objects of surprising beauty.

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The Attack on the Niagara Reservation.

LAST week we spoke of the constant watchfulness that must be exercised by the public-spirited portion of the community, if city parks are to be saved from invasion and spoliation. It should be added that the same unceasing vigilance is needed for the protection of other reservations which a wise policy has set apart for the general benefit and enjoyment of the people. The conveyance of the Yosemite Valley to the National Government, and subsequently to the State of California, was made to guarantee the protection of its wonderful scenery from defacement and vulgarization and to insure the preservation of its natural sublimity and beauty throughout all coming time. But experience has shown already that it is in constant peril from the attacks of private greed. There are complaints, which seem well-founded, of the slaughter of the game, the burning of the woods and the mutilation of the marvelous cones and basins of the geysers in the Yellowstone Park. In our own state all efforts to save the Adirondack forests from the destructive invasion of railroads have so far proved unavailing; and even the Niagara Reservation has within a few days narrowly escaped from an attack upon its integrity by a private corporation.

The organized effort to preserve the scenery of the Falls of Niagara, which resulted at last in the passage of an act to make certain lands about the Falls free forever not only to the people of New York but to all mankind, was one of the most remarkable movements of recent times. From the outset to the end, appeal was made directly to the most elevated sentiments and the most generous emotions of the people. They were invited to aid in the redemption of Niagara, not because it would enhance the value of their real estate, not even as a matter of local pride, but simply because the unparalleled sublimity and loveliness of this spot, with its power to kindle noble thought, was one of the priceless possessions of the race. Many men of this state and of all parts of the Union—men eminent in every walk of life—made bold to declare in a memorial to the Governor of New York and the Governor-General of Canada that "objects of great natural beauty and grandeur

are among the most valuable gifts which Providence has bestowed upon men. The contemplation of them elevates and informs the human understanding. They are instruments of education. They conduce to the order of society. They address sentiments which are universal. They draw together men of all races, and thus contribute to the peace of nations." Upon this high level the campaign was conducted throughout, and the victory was gained without a single appeal to sordid or selfish motives.

Notwithstanding the gratifying response of the people and of their representatives in Albany to the efforts of the public-spirited citizens who kept reiterating their appeal through the press and in public addresses and private correspondence until every intelligent reader of the state was informed of the exact condition of Niagara, of its danger, and of the reasonableness of the proposed legislation, it was always plain that an adequate appreciation of the value of the scenery of Niagara was not universal. There were good people who were willing to see the Reservation occupied by museums and monuments, and who would encourage the erection of buildings for educational ends, because they felt, in a vague way, that education was a good in itself, and who would not be made to understand that any unnecessary structures would help to mar the scenery, which was the essential thing to be saved. Every attempt at invasion of this sort has fortunately been repelled, and it was hardly to be expected that any private corporation would at this early day be bold enough to attempt the capture of the Falls in order to use them as a water-power for private advantage. It is a fact, however, that a bill with this intent has been introduced into both houses of the Legislature, and received a favorable committee report in both cases. The Niagara Hydraulic Electric Company was authorized, so far as the committees of both houses had the power, to build coffer-dams above the cataract, to erect machinery, and to bore a tunnel under the bank of the river. Of course it was claimed that all this would inflict no injury upon "the scenery," but it is plain to every one familiar with the way of similar corporations that this factory would have despoiled the spot of much of its natural charm, and would have been a wanton defacement and desecration which must have given pain to every beholder.

The moral of all this is, as has been well expressed by Mr. Harrison, the Secretary of the Niagara Association, that "great wisdom and decision will always be required adequately to protect the Niagara Reservation from the encroachments of greed and vulgarity. In the nature of things it can never be safe for the people of intelligence, good taste and public spirit of the State of New York or of the country at large to withdraw all oversight and interest from the management of the Reservation and the care of the scenery about the Falls." This bill was checked in the Senate, but other bills will be presented at every session of the Legislature, and the friends of Niagara and of American civilization must be in constant readiness to meet attack if they hope to save what has been gained.

There is rarely sufficient room near any tree for all the seeds which it produces to germinate or for the seedlings to develop into fully-grown individuals. Nature is lavish in sowing seeds that the succession of the plant may be insured. Most trees are gregarious, therefore, in extreme youth, from habit transmitted through many generations. They love company, and really thrive only when closely surrounded. Close planting is essential, therefore, to insure the best results. As the trees grow, the weaker are pushed aside and finally destroyed by the more vigorous, and the plantation is gradually thinned. This is the operation which is always going on in the forest when man does not intervene. It is a slow and expensive operation, however, and the result is attained by a vast expenditure of energy and of good material. The strongest trees come out victorious in the end, but they bear the scars of the contest through life. The long, bare trunk and the small and misshapen head—the only form of a mature tree found in the

virgin forest—tell of years or of centuries of struggle, in which hundreds of weaker individuals may have perished that one giant might survive. But man can intervene, and by judicious and systematic thinning help the strong to destroy the weak more quickly and with less expenditure of vital force. Thick planting is but following the rule of nature, and thinning is only helping nature do what she does herself too slowly, and therefore too expensively. This is why trees in a plantation intended for ornament, like those in a park or pleasure-ground, should be planted thickly at first, and why they should then be systematically thinned from time to time; and it is because this systematic thinning is altogether neglected, or put off until the trees are ruined for any purpose of ornament, that it is so rare to find a really fine tree in any public place or private grounds. Of the implements required to produce a fine tree the axe is certainly the first and most important.

The Art of Gardening—An Historical Sketch.—V. Judea and Phœnicia.

ON the whole we may conclude that while gardens were known and prized in Judea, they played no such conspicuous part in royal and priestly life as they did in most Oriental countries, while the private citizen—usually devoted to agriculture and devoid of wealth—rarely, if ever, created them on an extensive scale. Moreover, we can divine that the royal gardens themselves were primarily places for the propagation of fruit-trees and other useful plants. Even the poetical imagery of the Bible reveals this fact, speaking much more of fruits, sweet smelling herbs and serviceable trees than of plants prized for their beauty or for the luxury of the shade they gave. Flowers were not required in religious ceremonials, but incense was, and odoriferous herbs are constantly referred to in the Scriptures, sometimes as very precious things. A "balsam garden" at Jericho was important enough to be noticed by Strabo, but in reading authors of his time we must not forget the great influence which Greek and Roman conquest had then had upon the world. Of course, flowers cannot have been neglected in Judea—there is no civilized time or country when this has been the case. But their rôle was private, not public; and plants are only mentioned in connection with the temple in those simulated forms of Pomegranates, Palms and "flowers of Lilies," which entered into its carven decoration. So learned and enterprising a king as Solomon may well have filled his gardens with exotics obtained from his constant helpers, the traveling and trading Phœnicians, and the mention of planting "strange slips," in Isaiah xvii. 11, seems to indicate that they were especially valued. The Levitical law against the propagation of mixed species must, however, have stood in the way of such horticultural operations as have enriched the garden flora of modern peoples.

The Jews had a peculiarly keen sense for the beauty and grandeur of natural scenery and of wild-growing forms of vegetation. Why, then, were their gardens less numerous and important than those of other Oriental nations? Partly, as I have said, because of their relative poverty and simple ways of life, but partly because, while the Egyptians, for example, were artists by nature, the Hebrews were not. The same difference which shows in the history of gardening shows in that of other forms of art. Art of every kind was vitally essential to the religious ceremonials of Egypt, but it played a minor part in Judea, and in many of its developments was absolutely outlawed. It was proscribed as a spring of spiritual danger. But it would hardly have been proscribed for this or any other reason among a people endowed by nature with a strongly artistic temperament. The Jews were a highly imaginative race, but their imagination concerned itself most of all with moral and spiritual things, least of all with the things of art.

The Phœnicians were likewise a Semitic people, and therefore devoid of that instinct for the arts of design which covered Egypt, Assyria and Greece with splendid monuments. But, unlike the Jews, they were rich, luxurious, and given to sumptuous and sensual religious rites. A nation of traders and travelers by land and sea, wealth flowed freely into private hands and was as freely spent for private pleasure, while the native lack of artistic ideas was made good by perpetual borrowings. This we know from the works in the minor arts which have come down to us from the Phœnicians, and their technical experience is proved by the familiar fact that Solomon sent for Tyrian artificers to build his temple and his

palace. The highest merit of the Phœnicians in their own day must have seemed their manual skill; to-day it seems the part they played in carrying the works and the ideas of one country to another and thus developing the rudimentary gifts of their less advanced neighbors. They originated nothing, unless it be certain forms of decoration which, many ages later, bloomed into new and richer life under the hand of Byzantine artists. But they were the world's carriers—the transmitters and perpetuators of much that without their help would have perished where it was born.

Gardening was widely and successfully practiced in Phœnicia. The country was merely a narrow strip of land; but its soil was fertile, and the needs of a dense and wealthy population incited to careful culture. Ezekiel implies as much when he cries to the King of Tyre, "Thou hast been in Eden, the garden of God," and we know that hydraulic engineering, upon which agriculture and horticulture so largely depend in southern countries, was elaborated on an extensive scale in all parts of Phœnicia and its colonies.

The chief towns of the mother-country were isolated, rocky citadels, where the merchants plied their trade and gathered for defense in times of war. Here the poorer citizens lived in crowded, many-storied streets; but the rich had their homes in the suburbs, in countless villas surrounded by beautiful grounds. It is easy to imagine what these villa-gardens were. In this art, as in every other, the Phœnician must have borrowed from the Egyptian and Assyrian, and laid out his gardens in a formal way. So eminently practical a people were doubtless enterprising and successful horticulturists; and trading from far beyond the Pillars of Hercules to the shores of the Indian Ocean, and eagerly laying hands on everything new, beautiful or curious which came in their way, they must have filled their pleasure-gardens with a multitude of exotic plants.

Carthage, the greatest of Phœnician colonies, surpassed in wealth and splendor any city of the motherland; and we know that, like these, it was encircled by villas with gardens, which extensive works of irrigation kept fresh and green. The Roman conquerors were impressed with the beauty of these Carthaginian gardens, and it is said that some of them were so long preserved that they could be renewed and improved in very much later times by the new race of conquerors from Arabia. Of course the same taste that expressed itself in Carthage must have been displayed in all the colonies of Phœnicia, and we may picture the shores of the Mediterranean, even before the extension of the Roman power, dotted with garden-encircled villas, embowered in beautiful plants gathered from many foreign lands.

The sensual religion of Phœnicia—in which the gross worship of Astarte held a prominent place—demanded numerous temples; wherever there was a temple in the ancient world there was a "sacred grove," and we can hardly conceive such a grove without some characteristics, in arrangement and accessories, which would entitle it to rank among gardens. The Phœnician temple-garden, however, has perished from men's knowledge as entirely as the building which it enshrined.

All these gardens, at least in Phœnicia itself, must have been comparatively small. There was no room in such crowded suburbs for large demesnes, and palace-gardens cannot have been very conspicuous in a country which consisted of a number of almost independent towns, held loosely together by commercial interests, but ruled by no great potentate such as those who sat at Babylon, Nineveh and Susa. Nor in a community of busy traders, where even the king was a merchant like his subjects, can there have been a demand—even had there been a place—for those wide hunting-parks which the Persians so dearly loved. In Carthage the royal gardens may have been more extensive, but a people so inartistic as to have produced neither great architects, great sculptors nor great writers has naturally left few traces of itself on history's page. It is not because Carthage was conquered and ruined by the Romans that we know so little about her. Nineveh, too, was ruined, and Jerusalem. But the buried lithic records of the one and the magnificent literature of the other have preserved their memory green.

"All passes—Art alone
Enduring stays to us;
The bust outlasts the throne,
The coin, Tiberius."

Perhaps when the nations of to-day have perished, something besides their art will remain—the prosaic printing-press turns out its reports in quantities which Time itself may despair of destroying; but literally nothing remains of ancient nations except their art. No ancient land in which art—in

stone or in books—has not developed in some conspicuous, national, individual way, has left more than the memory of a name behind.

New York.

M. G. Van Rensselaer.

Foreign Correspondence.

London Letter.

The English Flower-Garden, by W. Robinson, London, was published in 1883, and now a second edition of the book is issued. In England we have no work which deals with the subject of the garden, and how to make it beautiful and interesting, so thoroughly as does this by Mr. Robinson. In the effort to reform the style of flower-garden which in England was prevalent ten years or so ago, no man worked with greater zeal and persistence than did Mr. Robinson. Indeed it might be said that he alone was the founder of the style of gardening known as the natural style, as it exists in so many English gardens to-day. With the aid of his various books and periodicals he has forced his views and opinions down the throats, as it were, of horticulturists, so that in place of the strong and bitter opposition which assailed Mr. Robinson and his followers ten years ago we have now general concurrence in all they taught; and English gardens have been greatly beautified in consequence. The herbaceous border, wild garden and natural arrangement in regard to almost all hardy plants are now features in all good English gardens. Following on a change in the style of gardening we have a great demand for hardy plants of all kinds, giving an impetus to the introduction and distribution of hosts of beautiful flowering-plants which a few years ago were practically unknown in horticulture. "Few know the many flowers fitted to adorn our open-air gardens. No stereotyped garden of half a dozen kinds of plants will satisfy any one who knows that hundreds of beautiful aspects of vegetation are possible in a garden in spring, summer and autumn. It is disheartening to see how little pleasure men get out of their gardens, and how near to a desert they make them in this country of verdure and fertility. Yet the smallest garden may be a picture and a pretty one. Not only may we easily have much more variety in any one garden, and that of the highest beauty, but if men would give up mere imitation we should be charmed with the contrasts between gardens. Even small gardens might refresh us with their brightness and their pleasant variety. In the larger gardens opportunities are great—and seldom used. They are stereotyped at the season when they ought to be full of delightful change." These are Mr. Robinson's words. His book is intended to show what a wealth of flowers and beautiful plants are available for out-door gardens. It is profusely illustrated, the descriptive and cultural information is all that one could wish for, and the suggestive observations on position, style and taste in arrangement which form the first part of the book, are sure to be of service to amateurs. Some of the most characteristic of English gardens are illustrated and described, as also are a few of what the author considers of the worst style. There is also a supplement by Mr. W. Goldring, in which the best of hardy trees and shrubs are described and directions given for their culture and management. Mr. Goldring is one of the very few English landscape-gardeners who combine a wide knowledge of plants of all kinds, with skill to use them to the best advantage in the construction of gardens. When this is the case it naturally follows that considerable variety in style and effect is easily obtained, whereas a landscape-gardener, with only a limited knowledge of plant-material, must necessarily make his gardens very much alike. "The English Flower-Garden" is too comprehensive a title for Mr. Robinson's book, as it does not embrace in-door gardening at all. There is as much pleasure in good in-door gardening as in that practiced in the open, whilst a great deal more care and skill are required in the management of in-door plants than is necessary for those which thrive out-of-doors.

Following on the heels of Primrose Day, we had last Tuesday a display of Auriculas, Polyanthus and other Primulas such as had scarcely if ever been seen in the south of England before. The Auricula Society flourishes almost if not quite as well in the neighborhood of London as in Manchester and other northern towns. Mr. Horner, the acknowledged king of the Auricula cult, read an interesting paper on the breeding of Auriculas, and recommended a more severe selection if better varieties were to be obtained. He despised Fancies and Alpines, notwithstanding the fact of so many preferring them to the show kinds. The history of the Auricula Society is most interesting. Its strongest supporters have been, and still are, men who live in towns, generally smoky towns. Mr. Horner told a story of a famous northern Auric-

ula grower who, when he saw the blackened grass, trees and shrubs which stand for St. Paul's Cathedral garden, right in the heart of London, declared that if he had that garden he would grow better Auriculas than had yet been dreamt of. Besides the Auriculas, however, there was a great display of Polyanthus of all shades; the common Primrose, too, was represented by many varieties, whilst of exotic kinds there were many very pretty and rare ones shown. *P. Sieboldii*, the Japanese variety of *P. cortusoides*, and one of the most ornamental of all Primulas, was exhibited in splendid form by Messrs. Ryder & Son, of Sale, near Manchester. There were all shades from white to purple, as well as variegated, each variety being represented by a large pan-full of plants six inches or so high, with perfect flowers and foliage. One of the easiest to manage, requiring the coolest and airiest position if grown in a frame or green-house, though it is perfectly hardy, this species should become as popular in the garden as any we have. The meeting was essentially a spring-flower day. Daffodils were shown in thousands, and never finer. *Lilium Thomsonianum*, with a spike two feet high, bearing fifteen elegant lavender-colored flowers, was amongst a group of hardy plants shown by Mr. Ware, as also was the double-flowered Lily-of-the-Valley, a curiosity only, and far less pretty than the single form, though apparently much larger in its proportions. A distinct and pretty Epiphyllum called Makoyanum was exhibited by Messrs. Veitch, and obtained a first-class certificate. It differs from all other known kinds in having flowers which in shape are like those of a Phyllocactus, *i. e.*, the petals all radiate from the centre instead of forming a kind of tube and irregular limb, as in *E. truncatum*. In the former the petals number about fifteen, and are narrow, acuminate, one and a half inches long, crimson outside, salmon-red inside. There is another, if not the same as this, known as *E. Gartneri*, and which was certificated at South Kensington in 1885. Rhododendron Her Majesty, from the same firm, also obtained a certificate. It is a beautiful flowered plant with small, oblong, leathery leaves and large-spreading, rather flattened flowers five inches across, the margins undulate and the petals of good substance. They were white, with a faint flush of rose. This plant is said to be a hybrid from *R. arboreum* and *R. Fosterianum*, but there were no traces of the former species in the plant shown by Messrs. Veitch.

In the collection of plants sent from Kew were flowering specimens of two very interesting root parasites, *viz.*, *Lathraea squamaria* and *L. clandestina*, the former a British plant, the latter a native of the European Continent. These remarkable plants are not easy to establish in gardens, but when once they take hold they increase rapidly and flower abundantly every year. *L. squamaria* grows only on the roots of the Elm, although it is supposed that *Rhododendron ponticum* is another host-plant for it. *L. clandestina* is on the roots of a Willow in wet ground near a lake. The flowers are clustered, tubular, one and a half inches long, and deep purple in color. *Heuchera sanguinea* is a delightful little plant for pot culture. In the Kew conservatory it has been a picture of elegance and color for a month or more. It is easy to manage if kept in a cold frame and placed in a slightly heated green-house in March. Nothing could be prettier than the flowers of this plant, and the color harmonizes with almost any flower. The prettiest arrangement at Kew is a mixture of the *Heuchera* with Lily-of-the-Valley.

The following rare and interesting as well as pretty-flowered green-house plants are now flowering at Kew:

Protea nana.—A dwarf species of a very ornamental genus of Cape shrubs, which fifty years ago were popular in English horticulture, though now hardly known. The plant under notice is a dwarf grower, being only fifteen inches high, well branched, the leaves linear, one inch long and pointed, the flower-heads terminal and drooping. Each head is cup-shaped, two and a half inches across, and is composed of numerous overlapping, petal-like bracts colored deep crimson. The flowers proper are arranged in a cluster, like the pappus in *Compositae*, in the middle of the cup. There are many species of *Proteas* in abundance at the Cape, and as they appear to be as easily managed under cultivation as Camellias, they are worth obtaining. Some of them bear very large flower-heads, colored brightly. They are also remarkable for the copious secretion of nectar in the cup-like flower-heads, some of the species secreting so much that the Boers collect it and make sugar from it.

Befaria glauca.—This is the Andean Rhododendron already mentioned in one of my letters. It is evidently a free-flowering plant when once it has got to the flowering age. The large, erect, crowded terminal racemes of rosy flowers on plants three feet high are distinct and ornamental.

Agapetes buxifolia.—A handsome, Ericaceous shrub with box-like leaves and numerous axillary tubular flowers, one inch long, and bright scarlet in color. For a cool greenhouse, such as suits Azaleas and Rhododendrons, this plant is perfectly adapted. It remains in bloom a long time—six weeks or more—flowers when quite small, and is easily cultivated, requiring a sandy peat-soil and plenty of water.

Goodia lotifolia is an elegant Cytisus-like shrub of bushy habit and very free flowering, every little branch developing a spike of yellow and brown flowers. These are very fragrant, and they remain on the plant a long time. Probably this plant, if taken in hand by florists, would prove quite as useful for spring flowering as the popular *Cytisus* (*Genista*) *racemosus*. The *Goodia* is a native of Australia, and has been in cultivation in England many years.

Bossiaea linophylla is one of the most graceful of all Australian leguminous plants. At Kew there is a huge bush of it eight feet high and this is a glorious picture now, every branch being a long, pendant string of bright yellow and purple-brown flowers, very small, but in great numbers and brilliant as jewels. Small plants of this species flower just as freely. There are many similar plants of Australian origin, but which are now scarcely known in gardens. The *Aotus*, *Dillwynia*, *Chorozema*, *Leptospermum* and several other genera are in flower in the Kew collections, but notwithstanding their beauty, they are not in favor with horticulturists generally.

The illustration of *Nelumbium speciosum* in New Jersey, published in GARDEN AND FOREST for April 10th, has created quite a sensation here. The magnificence of such a picture as is described by Mr. Sturtevant is enough to tempt horticulturists to America specially to see it. We have tried to cultivate this species and *N. luteum* out-of-doors in England, but without any success. Our summers are not, as a rule, warm enough to enable these plants to make the strong growth necessary to their withstanding the winter. Mr. Sturtevant ought now to obtain some of the extraordinary varieties of *N. speciosum* which are known to be in cultivation in Japan. I have tracings of many of these, some showing double flowers, others single, others with lacinated petals and so on, whilst in color they are said to be almost as variable as the garden Tulip. At Kew, in addition to the type, there are also living plants of the pure white and the deep rose-flowered varieties, as well as a few of the Japanese kinds, but these have not yet flowered.

Kew, April 26th, 1889.

W. Watson.

New or Little Known Plants.

Brodiaea Palmeri.*

THE latest addition to the characteristic Californian genus *Brodiaea*, which now numbers about twenty-five species, was found by Dr. Palmer in 1887 at the extreme southern limit of the range of the genus, near Los Angeles Bay, on the gulf side of the Peninsula of Lower California. It is a stout species, often two feet in height, with an unusual number of long, thin leaves, and is peculiar in developing a quantity of small bulblets at or below the surface of the ground. The flowers are numerous in the umbel, on slender pedicels about an inch long. As in many other species, they are bright purple in color, rather more than half an inch in length, funnel-form in shape from a narrow base, and are cleft nearly to the middle. The six filaments are distinctly roughened or papillose, and bear linear anthers, which are attached by the base and become closely coiled when old.

The dilated staminodia that are found in some species, and the wing-like appendages to the filaments in others, are here replaced by a row of short scale-like processes between the points of insertion of the filaments. While the form of the corolla is that of the group of species which constitute the section *Seubertia* or *Triteleia*, the basifixed anthers and the presence of these appendages are characters which belong rather to the true *Brodiaea* section, and weaken the distinction that has been made between these groups. The plant was found growing in abundance in low places on the sandy plains about Los Angeles Bay. It has not yet been tested in cultivation.

S. W.

* BRODIAEA PALMERI, Watson in *Proc. Amer. Acad.*, xxiv., 78.

Yucca angustifolia.

ILLUSTRATIONS of two large arborescent Yuccas which grow in the region adjacent to the boundary between the United States and Mexico have been published in earlier numbers of GARDEN AND FOREST. *Yucca angustifolia*, which appears in the illustration on page 247 of this issue, is the smallest of the Yuccas and the most northern of the genus in its geographical distribution. Linnæus knew the three species which occur in the southern and south-eastern states—*Y. filamentosa*, *Y. aloifolia* and *Y. gloriosa*—but no other Yucca was described until the publication in 1816 of the "Flora of North America," by Frederick Pursh, who then first made known the subject of our illustration from a specimen collected on the "banks of the Missouri River," and preserved in the herbarium of Thomas Nuttall, who doubtless discovered it in his first western journey.

Yucca angustifolia is a stemless, or very short-stemmed, species, with numerous linear, rigid, spiny-pointed leaves, scarcely contracted above the broad base, nearly flat on the upper surface, convex below, with slender marginate fibres. The flowers are an inch and a half to nearly two inches long, in simple spike-like racemes. The fruit is erect, capsular, six-valved, ovate-obtuse and sharply cuspidate. The large seeds are half an inch in diameter, with wide margins.

Yucca angustifolia occurs, often in great abundance, on dry prairies and plains from north-western Missouri and western Iowa to Dakota, Colorado and New Mexico. A Yucca peculiar to some parts of Arkansas, Louisiana and Texas, with wider, softer and less rigidly pointed leaves, and with a more paniculate inflorescence, was considered by Dr. Engelmann, whose knowledge of these plants was unrivaled, to be a form of this species (var. *mollis*).

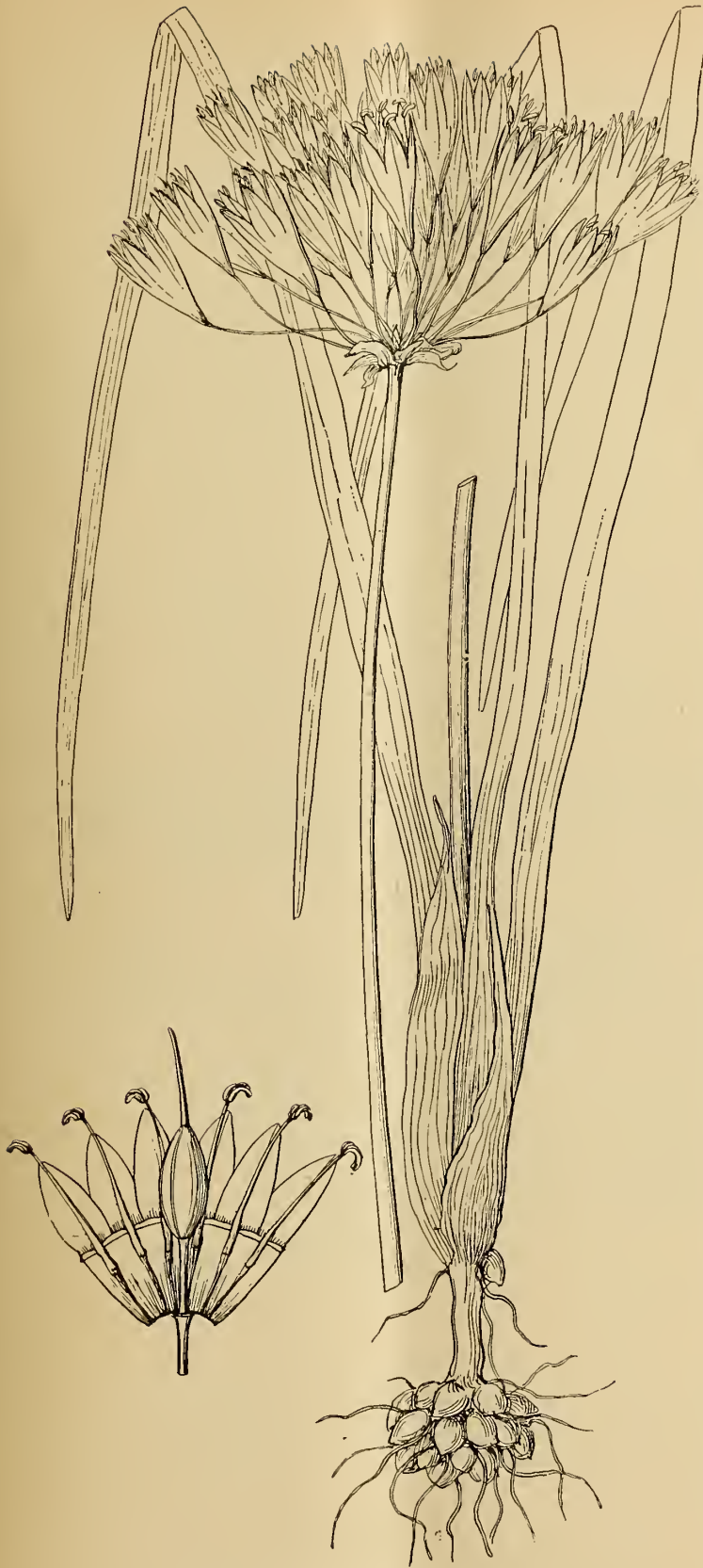
Our illustration is made from a photograph taken in Colorado by Dr. R. H. Lamborn, to whom we are indebted for its use. It is a characteristic view of the arid western plains as they appear sometimes in early summer, enlivened by the beautiful flowers of this plant, the most conspicuous feature of their scanty vegetation.

C. S. S.

Cultural Department.

Artificial Manures for Vegetables.

FEW of the amateur cultivators of suburban gardens realize the amount of fertilizing material used by the market-gardeners in their neighborhood, and they wonder frequently why their own little plots fail to produce as good an average as the large gardens. The amateur buys a load of manure and imagines he has enriched his garden, while the market-gardener would have spread five times as much on the same area. Another difficulty in the way of amateur gardeners is that few of them have gardens arranged for horse-culture. No spade work short of regular trenching can compare in thoroughness with the breaking down by a large plow and a pair of heavy horses, followed by a spring-toothed harrow and a home-made plank-drag. The difficulty of procuring manure is generally a formidable one to suburban cottagers, and at best it is disagreeable to handle and not nearly so convenient as the commercial manures which are now made in such a thorough manner by reliable firms. I grow many acres of vegetables every year, but experience has demonstrated that we can grow better crops, and cheaper, by using the concentrated fertilizers on the vegetables, and letting our accumulations of animal manures go upon our grass lands. But it should not be imagined that a thin sprinkling of commercial fertilizer will make a garden rich. I use from 600 to 1,000 pounds per acre of the best rawbone superphosphate, and for some crops mix in a portion of nitrate of soda and sulphate of potash. For Peas and Beans the superphosphate and a little potash is best; for Radishes and Lettuce superphosphate and nitrate of soda, which is also good for the Cabbage crop; but for these a top-dressing of nitrate of soda encourages a rapid growth and enables them to outgrow the worms. In using artificial manures in the garden I do not use them broadcast. All my vegetable crops are planted wide enough apart to allow of horse cultivation, land being the cheapest thing I have and human labor the dearest.

Fig. 107.—*Brodiaea Palmeri*.—See page 244.

When land is very valuable, and in small gardens, of course, vegetables must be planted closer and cultivated with hoes.

It is a good practice, on a large scale, to lay out the rows with a plow and sow the fertilizer thickly therein. A furrow is then thrown from each side, making a ridge immediately over the first furrow. This ridge is then chopped off flat with a hoe and the seed sown in a furrow marked thereon with a narrow hoe, or a seed-drill may be run through. After sowing the seed, cover and roll each row with a light hand-roller, so that the earth is well packed on the seed. The young plants

on the ridge are not so easily drowned out by rains, and can be worked earlier by horse-power. It is always easy to follow up one crop with a later one by splitting the rows and clearing up the remains of the first crop or burying it in the soil.

In buying fertilizers amateurs should always deal with the manufacturers, and never buy less than a 200-pound sack, even if the garden is very small. The manufacturer can supply a first-class superphosphate for \$30 to \$35 per ton, probably the latter price if bought by the single sack, but the little packages of fertilizers sold by seedsmen usually cost about four prices. In one of the recent bulletins of the Cornell University it was shown that an article sold by a leading seedsman under the name of "Economic Seed Manure" in fancy packages at the rate of \$2,000 per ton was really worth but little over \$30 per ton. It is best, therefore, to buy seed from a seedsman whom you are sure you can trust, but buy your fertilizers from a reliable manufacturer, and let some one else pay for the fancy packages. A superphosphate made from raw bones or bone-black is preferable to one made from South Carolina fossils. This last can be bought for \$15 to \$16 per ton; the raw bone phosphate at \$30 is more satisfactory for vegetables.

A rank odor in a fertilizer is often deceptive. It does not require a large percentage of ammonia to exhale a strong smell if it is in a volatile condition, and the fertilizer which has the most pungent ammoniacal smell is the one to avoid, because it is rapidly depreciating in value. But there are other and more worthless substances used in many fertilizers merely because they offend the nostrils, for manufacturers know that so many people judge this article by the smell, that they gratify this prejudice with old leather, fish scraps and the like. Shun "ammoniated" superphosphates; you can ammoniate it more cheaply and better yourself by adding nitrate of soda, and you can add the sulphate of potash for such crops as the Legumes and leave out the nitrogen. It is, therefore, desirable and cheaper to get these three materials separately.

Crozet, Va.

W. F. Massey.

Early Tomatoes.

IN the market-gardens of this latitude early Tomatoes are in the ground by the first of June, but in the family garden they can be often set out earlier with safety, as special protection can be given to a few plants when it cannot be used for a larger number. I remember an instance where Tomatoes had been set in the ground for a week when a frost threatened; the plants were nicely lifted on a wheel-barrow, rolled into the barn, and the next day set again in the ground and they went on growing, while others left out were killed. When set against a fence or building they are usually safe from frost. A temperature below 34° kills the leaves and the tender stems, but the plant will live and sprout again from the root if left, but will produce fruit late. The best plants are those grown four inches apart in flats. They are, in a measure, stunted, but not drawn up into spindling form, and if set in rich earth they will grow with great vigor. Tomatoes like warmth and moisture, and frequent waterings will keep them a growing.

As to varieties for the home-garden, I consider Dwarf Champion as good as any, as the bush is compact and the plant is easily staked. A barrel-hoop, raised a few inches above the ground by stakes nailed to it, will make a sufficient support for it. If the crimson color is an objection, the Volunteer or Perfection, indeed, any of Livingston's seedlings may be substituted for it. There is little to choose among varieties as far as earliness is concerned. All of the early kinds will ripen within a period of ten days. The commercial fertilizers seem well adapted to the Tomato, and a pint of any standard brand, well forked through the soil where the plant is to stand, is almost certain to bring large, smooth fruit.

Whether it pays to stake Tomatoes is a question. In the home-garden it is well to stop the growth of the vine by pinching, to encourage early fruit; but for late fruit I let them run at will. Thinning out the laterals to give free circulation of air is good practice, and helps to prevent rot, but the fruit often scalds if exposed to full sunshine. The best specimens of fruit will be found on the well-fed vines that have abundant room. Plants of Dwarf Champion can be set less than three feet apart, but the lustier growers would find themselves crowded at this distance.

West Springfield, Mass.

W. H. Bull.

Plants for Bedding.

IT is now time to think about the arrangement of beds and of the plants with which to fill them. As Coicous, Geraniums, Alternantheras, Echeverias and other plants found in the usual bedding lists are almost invaluable under proper conditions, but their exclusive use, especially when arranged in the form of national emblems, mottoes, medallions and other set patterns, cannot be considered elevating in their influence upon popular taste. A great variety of plants with ornamental foliage can be employed for bedding-out in our climate, and with fine effect, particularly when tastefully combined in sub-tropical beds.

Prominent among these are the finer varieties of *Canna Indica*, such, for instance, as *Imperator*, a grand variety where space is allowed for its full development, the strong shoots with their Musa-like foliage frequently attaining a height of seven to eight feet. And where a more dwarf variety is needed, *Adele Levallois* will be found most satisfactory, its bright green leaves rarely reaching a greater height than four feet. The free-flowering character of this variety is also a point in its favor.

Of bronze-leaved Cannas, *Adrien Robine* is one of the most beautiful, and makes an average growth of five to six feet in the season. *Canna metallica* is also good, and *C. Bihorelli*, though quite dwarf in habit, is very noticeable with its dark reddish-bronze foliage and bright crimson flowers. *C. Ehemanni*, now becoming well-known, should find a place in every garden, not only on account of its handsome growth, but also for its large and beautiful flowers.

Another excellent plant for our purpose, either in a mass by itself, or in combination with other tall-growing plants, is *Arundo donax* and its variegated form. These are free-growing and very graceful, and although hardy enough to stand the winter in favorable seasons, at least in the latitude of Philadelphia, yet they can be made to do better service by lifting them in the fall, and placing them in the green-house, where the variegated form, besides its pleasing effect, will prove useful for cutting.

Some of the strong-growing Aralias, for instance, the Rice Paper plant, *A. papyrifera*, and also *A. Sieboldii*, are very effective plants for summer bedding, their large, bold leaves making a pleasing contrast with the smaller foliaged plants. A few of the Dracenas may also be added to the list, notably *Dracena australis*, *D. indivisa* and *D. Draco*, all of which thrive admirably out-of-doors. The so-called New Zealand Flax, *Phormium tenax*, and its variegated form, and also *P. Colensoi variegata*, the latter having the leaves broadly margined with white, are all good plants for outside work, their strong, tough leaves being seldom injured by storms. *Grevillea robusta* is another good plant not so often seen as its merits deserve, being of easy growth, and presenting a most graceful appearance with its finely divided foliage. That charming Japanese grass, the striped *Eulalia*, must not be omitted, this being one of the most valuable additions to the list of hardy, ornamental grasses that has been made in recent years.

If favorably situated, some Codiaums or Crotons may be used to advantage, as may also *Aucuba Japonica*, the latter being capable of enduring much more hardship than the Crotons, and the female plants of the *Aucuba*, when nicely fruited, are very attractive as an edging for some of the beds. *Peristrophe angustifolia* is usually most successfully grown in a light soil, though this is not absolutely essential to its welfare.

Some varieties of Musa, especially *M. ensete* and *M. Cavendishii* do well in certain locations, but should be planted in somewhat sheltered positions, as otherwise their immense leaves will be damaged by the wind.

Many of the hardier Palms can be successfully used in outdoor arrangement, and the following species will be found among the most satisfactory for this purpose: *Chamærops humilis*, *Corypha australis*, *Latania Borbonica*, *Areca lutescens* and *Sabal Adansonii*.

Holmesburg, Pa.

W. H. Taplin.

Isopyrum biternatum.—This pretty native plant is well worthy of cultivation on account of its finely-cut foliage and pure white flowers, which are produced in early spring and have a charming effect when planted in the front row of the flower-border among other low-growing plants. This species is a native of the western States, and is perfectly hardy. Another interesting plant is *Synthyris reniformis*, which was flowering early in March, its blue flowers arresting attention by their intense color. Although this plant is found only on the Pacific Coast, it is quite hardy in the eastern States, and even when not in bloom is worth having for its large, shining, reniform

leaves. *Phlox bifida* has generally proved impatient of cultivation, and the more care bestowed upon it the more slender was the hope of success. Last spring we were induced to plant it in a gravelly soil, and, to our surprise, the plants are now in a vigorous condition and flowering freely. The petals are so deeply cleft as to remind one of the spokes of a wheel.

Gentiana acaulis.—What can equal in intensity the rich deep blue of the *Gentianella*? We have a number of strong plants covered with their lovely blue flowers. Many species of this genus are hard to cultivate, *G. verna* being one which we have tried and failed with miserably, and there are others of which the same might be said; but it is not so with *G. acaulis*, which is, perhaps, the finest species in cultivation. If planted in a rich, moist soil, where the roots may penetrate deeply and be in no danger of drouth, *G. acaulis* may be grown and flowered successfully year after year. Ours have received no protection from hot sun in summer and have passed through a winter which, on the whole, has not been a good one for alpine plants, which are usually at their best after a winter covering of snow, and yet the plants under note are now a sight to gladden the dullest eye. Those who wish to grow the *Gentianella* are advised to get strong plants to start with. Our experience with weak ones has taught us this lesson.

Polemoniums.—There appears to be some confusion about the species of this beautiful family of hardy perennials. In the Dictionary of Gardening *P. Richardsonii* is given as a synonym of *P. humile*. Now we have *P. humile* in bloom side by side with *P. Richardsonii*, and the two plants are quite distinct—*P. Richardsonii* has blue flowers nearly an inch in diameter and grows nearly two feet high. This we obtained from a reliable firm in England. *P. humile* is a much dwarfer plant, with a somewhat creeping habit, and the flowers correspondingly small. This we received direct from the Rocky Mountains. Also, the two (being synonyms) are given as flowering in July; here they are at their best in April. I should like to have the experience of other growers of these plants.

Passaic, N. J.

E. O. Orpet.

Notes from a Spring-Garden.

THE Poet's Narcissus (*N. poeticus*) is an old-fashioned flower, so very old-fashioned that it has been an inhabitant of gardens probably as long as gardens have existed. Everybody who has ever been in an old-fashioned garden knows it and loves it, and for many persons it is the most charming of all flowers; and it has other qualities besides beauty; for of all the different species and varieties of Narcissus it is here the hardiest, the least particular about the treatment it receives, and the most prolific in the production of new bulbs; so that once established in the garden, it soon spreads and multiplies rapidly, and from a single bulb planted in rich soil a hundred can be obtained at the end of a few years. The Poet's Narcissus, too, of all the bulbous plants which will grow in this climate, is the best to naturalize in the woods and even in hay-fields. It always looks perfectly in place in such positions, and a field of young grass with the flowers of Narcissus open among the leaves is one of the most delightful objects imaginable. The bulbs planted in this way last for years, and gradually spread, as the leaves have ripened and died down before it is time to mow. It is, moreover, an excellent border plant; it makes a graceful spring edging to the shrubbery, and, of course, is not out of place in the rock-garden. It is the latest of the family to bloom here, the flowers appearing immediately after those of *N. biflorus*, a character which adds to its value, as the flowers are open after the coming of pleasant weather, and contemporarily with those of many shrubs and herbaceous plants. No better piece of advice can be given to a beginner in gardening than to plant the Poet's Narcissus. Plant a few every year and so gradually extend the plantation. Wherever there is an unoccupied corner or a vacant place in the border, wherever the lawn-mower does not run, put in some of the bulbs. They cost a trifle; a hundred thousand can be bought for less than is often paid for a single small plant of some peculiar Orchid. There are several varieties of this plant in cultivation, but none of them are really better than the type, and are not worth cultivating except by persons particularly curious in such things.

Several species of Phlox are in flower. There is really none handsomer than the dwarf *P. subulata*, the Moss Pink, and it is none the less beautiful because it covers hundreds of acres of sandy and of rocky ground in New Jersey; and because the early settlers in this country saw and appreciated its beauty and took it into their gardens, where their descendants of the

old-fashioned sort still cherish it. The low mats of stems and gray-green minute foliage are now entirely hidden by the masses of rose-colored and in one variety of white flowers. Planted in pockets among the rocks it spreads and droops over them very charmingly, extending out over the walk, and so supplying that irregular natural edge of verdure so difficult to obtain and so essential in any attempt to bring a touch of natural arrangement into a rock-garden made with human hands. *Phlox reptans* is very fine, too, to-day. It is another dwarf species which is found on the moist slopes of the Allegheny Mountains. It has long, creeping pointed stems, from which flower-stems rise to a height of six or eight inches, bearing rather large reddish-purple flowers. Like the last it is an admirable plant for the rock-garden or to carpet the ground under shrubs, as it thrives equally well in broad sunlight or in partial shade. The rare and beautiful *Phlox Stellaria*, of which a figure was published in GARDEN AND FOREST, Vol. I., p. 257, is also in full bloom. It takes kindly to cultivation, although

it possesses real merit. It is now propagated and can be procured from the Dutch bulb-growers.

The pretty little *Tulipa Clusiana*, the Lady Tulip of gardens, is in bloom. It is one of the most delicate and delightful of the species of Tulips, with its slender white flowers, the three outer segments of the perianth brightly flushed with red. No collection of hardy flowers is too choice to contain it.

The English Globe-flower (*Trollius Europæus*) is a sturdy perennial, long a familiar object in gardens. It has palmately divided leaves, and large orange or paler yellow flowers of many-colored, concave sepals converging into a sort of globe, and concealing the smaller petals, and the stamens and carpels giving to it the appearance of a large semi-double Buttercup. It is a native of moist woods of north and central Europe, and is one of the easiest perennial plants to cultivate. Very hardy, too, and perfectly satisfactory here in New England, is another European plant referred to last year (p. 177), *Anemone ranunculoides*, which spread considerably last summer, and is



Yucca Angustifolia in Colorado.—See page 244.

liable to suffer during very severe winters, and should find a place in all collections of spring-flowering plants, for the charming pale-blue color of its deeply-notched corollas. There are few plants which give me greater pleasure, although it is not at all showy.

The Virginia Cowslip (*Mertensia Virginica*), which is not a Cowslip at all but one of the Borage family, is one of the desirable herbaceous plants which flower at this season. It is a smooth, pale plant, a foot high, with long-stalked obovate leaves, and large trumpet-shaped blue corollas, which, as they fade, turn to a delicate purple color. It thrives in deep, rich soil, and as it needs to be thoroughly established in order to bloom freely, it should not be disturbed or divided often. This plant is widely distributed through the Middle States, although nowhere very common, and was cultivated in England as early as 1799.

The double white *Anemone nemerosa* is finer than ever before this year. It lacks, of course, something of the charm of the wild plant, but the flowers are in themselves very beautiful, and they last long in perfection, and as a garden-plant

now handsomer than ever. It is a tuberous-rooted species, growing a few inches high only, with bright yellow flowers an inch or more across, and rather coarsely divided, dark green leaves.

Boston, May 8th.

C.

Notes from the Arnold Arboretum.

AMONG trees which bloom here during the last days of April and in early May, none compare in the magnificence and profusion of flowers with those species and varieties of *Magnolia* which produce them in advance of the appearance of the leaves. They are all natives of China and of Japan, and all belong to or are derived from three species. Most of these plants have been known in this country for many years, and their perfect hardiness and adaptability to the climate of eastern America have been abundantly demonstrated. They grow rapidly under proper conditions, and begin to produce their marvelous flowers when only a few feet high. They are not seen here, however, as often as might be expected, and, relatively, they are probably less frequently

planted than they were thirty or forty years ago. As no one ever sees a good plant of *Magnolia conspicua* in full bloom without being filled with admiration and with the desire to possess such a wonderful object, their comparative rarity in American gardens can only be explained by the facts that all these plants are rather difficult to transplant, unless it is done at the right time, and that they are fastidious about soil and require clean and constant cultivation until they are fully established. The secret of transplanting Magnolias successfully consists in doing it as the leaves are opening; that is in the case of these Asiatic species, just after the flowers have fallen. Magnolias have large, fleshy roots, which decay rapidly when they are cut or bruised, and do not, therefore, recover easily from transplanting unless the plants are moved at a time when they are in active growth, and so in a condition to make new root-growth rapidly. Magnolias moved early, while the roots are dormant, often suffer seriously or do not start to grow again, so that by many people they are considered difficult trees to transplant, while in reality they are not, if the peculiar character of their roots is considered, more difficult to manage than other trees. They all dread drought, and do best in peaty soil. Drainage does not appear essential, and fine plants are developed in positions where the ground is saturated with water during several months of the year, and where it is never completely dry during periods of protracted drought. Such constant moisture is not, however, necessary to them, and very fine specimens may be seen growing in good, ordinary garden-soil. They love the same treatment as the Rhododendrons—a soil of peat, leaf-mould, sand and turfy loam deep enough to prevent dryness at the roots, and an open situation in the full sun, that the flowering wood may be thoroughly ripened. The ground about them should be kept clean and well cultivated for a few years after planting, and abundant space be allowed for the free lateral development of the lower branches.

It is now known—thanks to the intelligence of an American horticulturist—that all of the Chinese Magnolias grow more rapidly and make larger and more shapely plants if they are grafted on some one of the strong-growing American species. *Magnolia acuminata* and *M. tripetala* are used for this purpose in American nurseries, and each is preferred by different cultivators. Only plants grafted upon one of these species should be bought or planted, as they are unquestionably better than any others.

These Magnolias are naturally shapely plants, and they suffer from crowding. Indeed, their proper use is as single specimen plants, isolated upon the lawn or rising from the midst of broad masses of Rhododendrons, whose dark-green foliage makes a proper setting for the blooming but leafless Magnolias. The foliage, when it does appear, is rather heavy; the outline of the plants is bushy and compact, and they do not compose well with other trees, if brought into immediate connection with them.

The earliest to flower is the little shrubby *Magnolia stellata* (the *M. Halleana* of some American gardens), the last introduced into our gardens, and still very rare here. It has been so often described in these columns that further mention of it is unnecessary beyond the bare facts that it is perfectly hardy, that it flowers here soon after the middle of April, and that it is one of the most beautiful and desirable shrubs of recent introduction.

Magnolia conspicua follows *M. stellata* in time of blooming, its flowers opening here in ordinary seasons about the first of May. This is the handsomest of the whole series in flower, and the most desirable, except that here in New England the flowering period is sometimes cut short by the north-east rain-storms, which often arrive simultaneously with the flowers; and that in climates where spring frosts prevail these early flowers are destroyed. *M. conspicua* is a shapely, round-headed tree, capable of reaching a height of fifty feet or more under favorable conditions. It is low-branched, the main branches dividing in many tortuous, branching divisions. The bark of the stem and of the main branches is smooth and ashy gray; that of the young branches is chestnut-brown. The flower-buds which are formed during the summer, are large, and protected during winter by thick, woolly, stipular sheaths. The flowers, with petaloid sepals, are pure creamy-white and pleasantly fragrant; they are cup-shaped, four or five inches deep, with obovate, mucronate sepals and petals, two inches broad, and red stamens. They are produced in the greatest profusion, and quite cover the trees as with a white sheet. They are quickly followed by the leaves, which are obovate, contracted into a short stout point, three or four inches long, downy when young on the lower surface, ultimately thick and deep dark green. The fruit is slender, often contorted, and two or three inches long. It is produced here abundantly.

Magnolia conspicua is a native of China, where it seems to be widely distributed from the neighborhood of Peking to Shanghai, and probably also of Japan, where it is very generally cultivated. It is the Yulan of the Chinese and of European gardens, and the *Magnolia Yulan* of Desfontaines and some other botanists. An interesting account of this tree may be found in the "Memoires concernant l'Histoire des Sciences des Chinois," written by the early French missionaries at Peking (iii., 441), from which it appears that the Yulan was cultivated under the dynasty of Tang in 627, and has since been always a favorite in the gardens of the Imperial palaces and of the temples, and that young plants are used for the decorations of the Imperial apartments in winter. It is the symbol of candor and of beauty; and a powder prepared from the green fruit is used to alleviate bronchial affections.

Magnolia conspicua was introduced into Europe as early as 1779, but it was much later before its beauty was appreciated and it became common in cultivation there. There seems to be no record of its earliest introduction into the gardens of the United States, and if there are any very large plants in the country they will be found, probably, near some of the large cities of the Middle or South Atlantic States. The best in the north are in the city of Newburg, where very fine symmetrical specimens may be seen, planted, no doubt, by Downing, or propagated in the nurseries which he early established there, and from which many good plants were sent into the gardens of this country.

Thunberg, who was in Japan from 1773-79, discovered there a small shrubby Magnolia, with slightly obovate or acuminate leaves, precocious, fragrant flowers, with very small yellow or yellow-green, narrowly acuminate sepals and large acuminate petals, deep purple on the exterior, and creamy-white on the interior face. This is the *M. obovata*, variously known also as *M. purpurea*, *M. discolor* and *M. denudata*. It was introduced into Europe a few years after its discovery. It is a hardy shrub, once a great favorite in gardens, although now much less commonly seen than formerly, having given way to that race of hybrids of which it is one of the parents.

The first of these hybrids dates from 1826. It sprang from a seed of a *Magnolia conspicua* in the garden of M. Soulangé-Bodin, of Fremont, in France, of which the flowers had been fertilized with the pollen of *M. obovata*. Whether this hybrid was the result of chance, or of intention, is doubtful. Loudon ("Arboretum," i., 278) speaks confidently of "accidental fecundation," but in the elaborate account of this hybrid, to which is joined the earliest figure, published in the *Annales de la Société d'Horticulture de Paris* (i., 90), it is expressly stated that M. Soulangé intentionally hybridized the flowers of *M. conspicua* with pollen of *M. obovata*. It is now known as *M. Soulangiana*, and is almost intermediate between the two parents, except in habit, which is arborescent, and not different from that of *M. conspicua*. The leaves are intermediate in size and narrowly obovate, with the point of those of *M. conspicua*. The flowers are also intermediate in size, with smaller sepals than occur on those of *M. conspicua*, although still petaloid, and the sepals and petals are streaked, especially towards the base, with purple. This plant, although far less beautiful in the color of its flowers than *M. conspicua*, has the advantage of blooming a week or ten days later, and therefore at a time when storms and frosts are less liable to injure the flowers. It is as hardy as either of its parents, and produces fertile seeds.

A number of other hybrids between these species appeared in Europe about the same time as *M. Soulangiana*, differing in the amount and in the shade of purple of the flowers, and especially in the size and shape of the sepals. *Magnolia Alexandrina* and *M. speciosa*, according to Karl Koch, originated in the garden of M. Cels, a famous French patron of botany and horticulture, and *M. Norbertiana*, another hybrid in that of Soulangé-Bodin. The plant which grows here under the last name is remarkable for its small greenish-white acute sepals, hardly larger than those of *M. obovata*. The flowers are only faintly marked with purple, are small, three to three and a half inches deep, and are the last to appear, being fully a week later than those of *M. Soulangiana*, and between two or three weeks later than those of *M. conspicua*. The trees are as free-growing as the others, and equally hardy. Whether this is the variety originally distributed as *M. Norbertiana* it is impossible to say, or to satisfactorily distinguish any of the various forms of these hybrids except the original *M. Soulangiana*. They vary little among themselves; descriptions, when they can be found, are not reliable, and there are no colored figures which can be depended on to refer to. Certain forms are known traditionally in certain nurseries or gardens under certain names, but such traditions are always misleading, and it seems hopeless, at least with the informa-

tion available in this country, to do otherwise than call all forms with purple and white flowers varieties of *M. Soulangeana*, and drop the other names.

A hybrid of more recent appearance and of doubtful origin is in some respects the most interesting of the whole series. This is the plant known in gardens as *Magnolia Lenné*. Van Houtte, who published a colored plate of the flowers twenty years ago, took it for granted that it was a hybrid between *M. conspicua* and *M. obovata*. He states, without further explanation, that it originated accidentally in Lombardy, where it was discovered by the nursery gardener, Turf of Erfurt, who introduced it into Germany, naming it in honor of Lenné, the Royal Garden Inspector at Berlin.* The origin of this plant is not as apparent as that of *M. Soulangeana*, however—that is, it is not as clearly intermediate in characters between its two supposed parents. It is shrubby rather than arborescent in habit, with wide-spreading stems branching from the ground. The branchlets are much smaller than those of the other *Magnolias* of this class; the leaves are larger than those of the other species, they are broadly ovate or sometimes slightly obovate and pointed at the summit, but quite destitute of the short contracted point found in those of *M. conspicua* and of *M. Soulangeana*. The flowers are the largest of the series, three and a half to four inches deep, with colored petaloid obovate sepals about one-half the size of the petals, which are broadly obovate, rounded at the extremities, fully four inches across, deep dark purple over the whole of the exterior surface, and pure snowy-white in the interior. The anthers are deep and the anthers paler purple. The flowers are deliciously fragrant, and the fruit and seeds, which are produced in profusion, are larger than those of either of the supposed parents. *Magnolia Lenné* might very well pass for a very robust, large-flowered variety of *M. obovata* were it not for the petaloid sepals and the broadly obovate petals, which point to the blood of *M. conspicua*, and a probable hybrid—a solution which, however, is not altogether satisfactory.

Magnolia gracilis of gardens I have never seen, but, judged by the figure in Hooker's "Paradisus Londinensis" (t. lxxvii.), it is nothing more than a slender form of *M. obovata*.

The handsomest of the *Magnolias* with precocious flowers, and the finest of the genus, with the exception, perhaps, of the evergreen, *M. grandiflora*, of our southern forests, is *M. Campbellii*, a large forest-tree, peculiar to the mountain valleys of Sikkim and Bhotan, at elevations of 8,000 to 10,000 feet. The flowers are white or rose-colored and eight or ten inches across. This species is apparently difficult to manage, although it has been cultivated for many years in different parts of Europe. It has flowered in a garden near Cork, in Ireland, where this tree is fairly hardy, but in northern Italy it has so far, I believe, failed to produce flowers, and I have not heard of it blooming elsewhere. It is hardly probable that it has been introduced into the United States, although, owing to the more humid summer climate, it might be expected to flourish in some parts of the Gulf States perhaps better than in southern Europe.

May 8th.

C. S. S.

Principles of Physiological Botany, as Applied to Horticulture and Forestry.

XX.—INJURIES AND MALADIES.

(Conclusion of the Series.)

ONE of the severest accidents with which any of our young trees can meet is girdling or "ringing." The removal of a ring of bark from the stem does not at first appear to affect the vigor or freshness of the plant, because, at the outset, the upward supply of water is not cut off. During this period of apparent resistance to the injury an attempt is made by the tree to heal the wound by a growth of bark over it. If the ring is not too wide, it is possible to repair the injury by such a growth, but usually the younger, outside, wood of the stem is invaded by decay, the water-supply is more or less completely arrested, and then the tree yields. There are numerous instances of remarkable vitality in trees, by which they have been able to live, after a fashion, for many years, after they have been girdled. One of the most recent records of this kind attributes to a common Pine a lease of life for fifteen years after complete ringing. The account as given in the *Canadian Record of Science* for October, 1888, is very remarkable, and presents some features which cannot be readily understood. Examples of the survival of Orange and Olive trees, after serious injuries of this kind, are not rare.

* The best figure of *Magnolia Lenné* will be found in the *Revue Horticole*, 1866, t. 33.

Freezing, followed by rapid thawing, may be numbered among the most troublesome of the mechanical injuries to plants. It is well known that many species of plants in our climate are capable of being frozen and rapidly thawed many times in a single season without suffering any apparent injury, whereas there are tender species of exotics which are irreparably injured by being subjected to a temperature near, but not below, freezing. The difference between sudden and slow thawing of a frozen part can be seen by a simple experiment upon living plant-hairs placed for examination under a microscope. If the work is done with sufficient care, the protoplasm in the plant-cells can be completely frozen, and a separation of the watery parts of the living matter from its more solid constituents can be produced. This can be followed by a thawing so slow, and a repair so perfect, that the protoplasm will again assume its former character, and, when the proper temperature is reached, the motion which belongs to it normally is seen to begin again. Now, in certain instances, the freezing injures the cell-walls and the delicate protoplasmic lining, whereas in others the walls are not apparently harmed in any way. In the case of woody plants there is reason to believe that the water in some of the parts beneath is not frozen even when subjected to an extremely low temperature, but the subject has not yet been thoroughly examined under conditions of careful experiment. In such an unusual season as our present winter has been at the North, it is evident that harm results from the freezing which is sure to follow the partial starting of buds in mid-winter. Such injuries come under the general head of what is known as winter-killing, but there are others which are more obscure and are not easily explained in the same way. A few of them, for instance the killing of evergreens in some winters, and their complete immunity in others, can be understood upon the view that the process of evaporation of water from the leaves goes on even in cold days in winter, when from the cold ground little or no water can be supplied to the roots to take its place. But there are still some instances of the sort which cannot be yet understood.

The nature of the injury produced by lightning has been studied in the case of a few species of trees. Usually part of the stem is torn in such a way as to indicate that some of the water lodged in the woody tissues had been suddenly converted into steam, and by the expansion has shattered them. It does not appear that any tree is exempt from lightning.

MALADIES OF NUTRITION.—These belong rather to under-feeding than to over-feeding, although there are marked instances of the latter. Generally the lack of some mineral matter essential to a fertile soil is shown by a general dwarfing and unsatisfactory growth. The problem is not exceeded in complexity by any which falls under the observation of cultivators. Even the distance of a few rods on the banks of some rivers makes a difference in the bouquet of wine from grapes in adjacent vineyards. In some of these cases chemical analysis fails to detect differences in the character of the soil sufficient to account for these differences in the character of the grapes from precisely the same variety. Nor can it be a matter of exposure to the rays of the sun, nor any other one factor yet suggested. This is, however, an extreme case. In our own country there is known to be a difference in the character of the tobacco grown on a virgin soil and on an exhausted one which has been artificially restored to its former fertility. Larger and stronger plants can be raised on the fertilized soil, but the wished-for delicacy of leaf and flavor cannot, as a rule, be again obtained.

That the subject presents peculiar difficulties is illustrated by the disease known as peach-yellows. According to some assiduous investigators, this complex affection is due in part, at least, to an insufficiency of potash salts in the soil, which causes an undue accumulation of starch in certain parts and an irregular distribution in others. But there are other competent students of the subject who regard the malady as attributable to the agency of micro-organisms. From the principal facts bearing on this group of allied subjects, which is of paramount importance to every cultivator of plants, the reader is referred, with confidence, to works by Johnson* and by Storer,† in which the topic is treated with fullness and clearness.

It is to the experiment stations in this country and abroad that we must look for the solution of the many difficult and important questions of a similar nature remaining unsettled in the departments of Physiological Botany and Vegetable Pathology. Under the liberal governmental grants made for the purpose of supporting research in this field, stations have

* How Crops Grow, and How Crops Feed.

† Agriculture.

been established which are doing excellent work. In many states there are similar stations established and supported by state aid. It seems to be desirable to secure complete concert of action between these useful establishments. In this way alone the field of research may be in some satisfactory manner divided up, so that more strength can be given to investigations in regard to certain problems. Doubtless this co-operation will be in some way or in some measure secured as the work of the stations advances.

Further, it is evident that the public must not be impatient with investigations which seem, at the surface and at the outset, to be far from practical in their bearings. Many of the purely scientific questions which are waiting solution can be best attacked in the experiment stations where Horticulture and Forestry are made prominent features. The history of science has shown over and over again that the results of pure, scientific research are, sooner or later, likely to be turned to the highest practical account.

In the foregoing series of communications the writer has endeavored to point out the leading general principles which are believed to be established in regard to the life and work of plants. But even under the limitation of confining the treatment of the subject to those principles which have special bearings upon Horticulture and Forestry, he has been obliged to indicate at times the fact that certain portions of the subject have not as yet been sufficiently explored by investigators. In the examination of such subjects investigators can frequently be much aided by observations made by practical men. The establishment of a journal like GARDEN AND FOREST affords still another excellent opportunity for both these classes of observers to exchange views and thus advance general as well as special knowledge.

The series of papers now brought to a close has had for its aim the presentation of the more important principles which are now embodied in the leading text-books on the subject, bringing these matters, as far as possible, into language readily understood by the reader. It is to such authoritative works as the text-books referred to at the end of previous papers and of this, that the reader must turn for further study and for further guidance in the examination of the phenomena of plants.

Cambridge, Mass.

George Lincoln Goodale.

Periodical Literature.

The April number of the *Kew Bulletin of Miscellaneous Information* is devoted to a list of new garden-plants described and published during the year 1888 in various English and foreign periodicals, such as the *Botanical Magazine*, the *Gardeners' Chronicle*, GARDEN AND FOREST, *Revue Horticole*, *Reichenbachia*, several German publications and two or three nursery-garden catalogues.

It will be found an indispensable aid to all persons who wish to keep themselves informed of recent additions to garden plants, or whose business it is to deal in or to write of such plants. Hybrids of garden origin and garden varieties are necessarily omitted from this list, which they would swell to inordinate proportions. Of the 674 entries (including varieties) sixty are credited to this journal. This publication shows clearly the present tendency of horticultural fashions. Of the 674 entries 176 are of Orchids, with forty-five *Cypripediums*, while only twenty-eight trees, exclusive of Palms, are mentioned, nearly all unimportant garden varieties of common species. The number of *Bromeliaceæ* is large comparatively, while Ferns, a few years ago the most popular garden plants in England, hardly find a place. By far the largest part of the new shrubs figured are found in the columns of GARDEN AND FOREST.

When the first of this year's crop of Maple sugar reached the market, a correspondent of the *American Cultivator*, writing from Wilmington, Vermont, one of the great sugar-producing towns of that state, gave the following interesting information with regard to the improved methods of this industry:

"There has been as great improvement at the tree-tapping and catching the sap as in any department in the work. Sixty years ago my father used for tapping, a common three-quarter inch auger (not very common either at the present time, for it was made by a blacksmith of all work). This was bored into the tree about four inches, then a spout made of sumac, anywhere from eight to twenty inches long, so as to accommodate the trough, that might have to be placed at the latter distance from the tree on account of its spreading roots, or an immovable rock, was driven in, the basswood trough placed underneath was blocked up with stones, and the tree was tapped. The

distance between the spout and the trough was often of necessity so great that much sap was lost by the wind, but if leaves were a compensation, enough of these were found in the trough to give color to the sugar. At the close of the season the troughs were turned over at the root of the tree, where they remained till wanted the next spring. This size and depth of hole was a great improvement upon the practice of a previous generation. Then it was common to 'box' the tree—that is, to make a reservoir for the sap by chopping into the tree from which the sap was drawn into the trough. Trees could not stand such 'heroic treatment' many years.

"Our sugar makers now use a half-inch bit, or less, some preferring one three-eighths of an inch in diameter, and say the latter size will afford as much sap as a larger size. The flow of sap is not confined in upward parallel veins. It has a lateral flow as well when given the opportunity. This being the case, the larger bit will hardly draw more sap than the smaller, while it will do more injury to the tree. That the sap will flow laterally has been demonstrated by putting in a second spout, ninety degrees from the first, and even at this distance the flow from the first was perceptibly diminished. When another was put in on the opposite side from the last, the flow from the first was still further reduced."

Correspondence.

A Public Loss.

To the Editor of GARDEN AND FOREST:

Sir.—During the preparations for the recent centennial celebration in this city gratifying proofs were given of the fact that the people of New York feel it incumbent upon them to protect the trees and shrubs on public and private grounds from threatened injury. The trees which rose through the public stands were railed off so that their branches might not be broken, and where stands stood over shrubs, as around the Reservoir and on the south-west corner of Fifth Avenue at Washington Square, they, too, were carefully shielded; and now that the boarding is everywhere removed, singularly few signs of damage appear. A large tree was indeed pulled down in securing the triumphal arch at the lower end of Fifth Avenue; but it fell because, being rotted through, it could not stand a strain which was applied with no ill effects to its companions; if it was not already dead, it could not have long survived.

One exception to the general rule, however, was observed on Fifth Avenue, where within the owner's fence had stood, time out of mind, a large English Hawthorn-tree, perfectly healthy, luxuriantly developed, and if not symmetrical in form, owing to the close neighborhood of the house, only the more picturesque on that account, leaning out over the railing as though with an almost conscious impulse to get as far from the bricks and mortar as possible. Many citizens now in middle life recall this tree as one of the great joys of their childhood, and even in adult years have watched for the unfolding of its fragrant wealth of blossoms as for the first sure sign that summer had arrived. It was one of the finest Hawthorns in New York or in its vicinity, and certainly the prettiest object in the whole length of Fifth Avenue. Yet it was cut down in order, apparently, that the one window it obscured, in a house where both front and side windows commanded a view of the processions, might be freed from the screen of budding foliage. It is not too much to say that a wail of horror went up from the inhabitants of this quarter of the town when they missed the well-known Hawthorn. No one will question the legal right of property owners to cut trees on their own grounds, but certainly the owners of this particular tree did not realize the amount of pleasure it had given to hundreds of people, and was capable of giving to hundreds more, or they would not have destroyed it for what seems to have been an ephemeral purpose. Wealthy New Yorkers, escaping to the country early in spring, seldom realize, perhaps, what a treasure to the city-bound classes is every piece of natural beauty that New York possesses; and few examples of this kind remain anywhere in our streets which are as precious as was this slaughtered Hawthorn-tree.

Twelfth St., N. Y.

Waverly.

The Home of the Bean.

To the Editor of GARDEN AND FOREST:

Sir.—The valuable article in GARDEN AND FOREST of April 3d, as to the American origin of the Garden Bean has recalled some observations of Roger Williams bearing on this interesting question.

In his "Key into the Language of America," which Zachariah Allen, late President of the Rhode Island Historical Society,

had copied for the Society many years ago, from the original in the Bodleian Library, at Oxford, Mr. Williams discourses not only on the language of the Indians, but also on their birds and on the vegetable products of the soil, as well as on their religion and traditions.

In his introduction to the work, he says: "It is famous that the Sow-west (Sou-an-ia) is the great subject of their discourse. From thence their traditions. There they say (at the Southwest) is the Court of their Great God Kau-tan-tou-wit; at the Southwest are their Forefathers' souls; to the Southwest they go themselves when they dye; from the Southwest came their Corne and Beanes out of their Great God Kau-tan-tou-wit's field; and indeed the further Northward and Westward from us their Corne will not grow, but to the Southward better and better."*

Subsequently, when discoursing on the Birds or "Fowle," Mr. Williams comes to the "Crow, Crowes," he observes that "These birds, although they doe the Corne also some hurt, yet scarce will one native amongst a hundred kil them, because they have a tradition that the Crow brought them at first an Indian Graine of Corne in one eare, and an Indian or French Beane in another, from the Great God Kau-tan-tou-wit's field in the South west, from whence, they hold, came all their Corne and Beanes."†

The pre-historic traditions of the Narragansetts thus concur with, and, as far as they have authority, confirm, the conclusions of Professor Wittmach and others from the discovery of pre-historic Beans in pre-historic graves of Arizona and Peru.

Providence, R. I.

William D. Ely.

Pearl River Nurseries.

To the Editor of GARDEN AND FOREST:

Sir.—Few people of the thousands who daily cross the Hackensack as it winds sluggishly through the salt marshes near its mouth have any idea of the beauty of the valleys down which this river and its affluents flow from the highlands in which they take their rise. A few miles north of the line which divides Rockland County, New York, from Bergen County, New Jersey, on a long ridge which separates the Valley of the Hackensack from the Valley of the Pascack, or rather of a rivulet which joins the Pascack a short distance below, are located the Pearl River Nurseries. From the crest of Pearl River Ridge the view across the broad valley to the east is bounded by the Palisades, while to the west stretches a prospect equally attractive across a country of glittering streams and fertile farms and frequent woodlands, with the distant Ramapo Mountains against the sky. It is a most attractive location, where Mr. John Thorpe established himself rather more than a year ago, but the nurseries belong rather to the future than the present. Just now the active work of the place is directed mainly to growing flowers for the market while the preparations are in progress for the production of plants which will in time be the principal business of the establishment.

No man in the trade is more widely known or more generally respected for his skill and for his unselfish devotion to the cause of horticulture than Mr. Thorpe. He was the founder of the Society of American Florists, its first president, and continues to hold a most influential position in its councils. He has been a most successful hybridizer, having originated many admirable Gladioli, some of the most popular Geraniums in cultivation and such standard Carnations as Black Knight, May Queen, Portia, Petunia, Rosalind, Charles Henderson and E. G. Hill. He was conspicuous among those who helped to bring the Chrysanthemum into the public favor it now enjoys in this country, and he originated such notable varieties as Jennie Y. Murkland, Wm. Elliott, Sam Henshaw, Mrs. J. H. Spaulding, Thorpe Jr., Mrs. Charles Pratt, Mrs. R. Brett and many more besides the famous Mrs. Carnegie. I found Mr. Thorpe making large preparations for the summer flower trade in New York. He says that, in spite of the great summer exodus to the country, there remains an immense flower-buying population in your city. These are not the wealthy society people, and they do not buy flowers because it is the fashion. They are men and women in comfortable circumstances who buy flowers because they love and enjoy them. They spend about the same amount of money for them in one season as in another, and in the summer they buy a great many more because flowers are cheaper. Formerly the great wholesale and commission flower-dealers closed their places in summer, but now the shops are kept open the year round. Mr. Thorpe added that summer buyers liked variety, and that he raised many kinds of flowers in abundance now which were scarcely known to the trade a few years ago.

*R. I. Hist. Coll., i., p. 27.

†R. I. Hist. Coll., i., pp. 85-6.

Among such flowers he named *Coreopsis lanceolata*, Gaillardias and the smaller Sunflowers like *Helianthus orgyalis* and *H. cucumerifolius*.

To meet this summer demand Mr. Thorpe has planted 2,500 running feet of Sweet Peas, 60,000 Asters, besides Mignonette, Dahlias, double and single, Corn-flower, Hydrangeas, Lilies, Calendulas, Stocks and many other kinds in similar abundance. He will have 20,000 Chrysanthemums for early winter, including 500 plants of Mrs. Carnegie. I was curious enough to inquire which varieties of Chrysanthemums he considered the best for cut flowers, and he replied that his list was comparatively brief. A Chrysanthemum to be profitable in this direction must, in the first place, be of a clear and desirable color, then it must be a good shipper—that is, it must be able to endure the rough handling of expressmen without becoming bruised and disheveled; and lastly, it must wear well—that is, hold its form and color well after it reaches the wearer. His list of the varieties, combining in the highest degree these good qualities, would be something like this: For yellow flowers—Golden Desgranges, first early; Gloriosum, early; President Hyde, medium, and Grandiflorum (a splendid shipper), late. For white flowers—Desgranges, Robert Bottomly, Blanche Neige and Puritan, named in order of earliness. Lilac or pink—La Triomphante, M. Boyer and Troubadour, and to these Mrs. Fottler would probably be added another year, since it is a most promising flower. Crimson—Thibaut and Keleleer and Cullingfordii. Bronze—Compte de Germiny, Val d'Andorre and G. F. Moseman.

Of the flowers now going to market I was especially struck with the Gladioli, which were really better than they can be grown in the open air. The varieties which Mr. Thorpe uses most freely for forcing are Shakespeare, Romulus, John Bull, Eugene Scribe and Brenchleyensis. The La France Roses were remarkably good, but what particularly struck me was a row of Niphotos Roses extending along the entire length of one side of a house some 125 feet long. These were grafted on seventeen strong plants of Marechal Neil four years ago, and they showed remarkable vigor. From these seventeen plants 16,000 Roses had been cut since October. They were bearing abundantly still, and Mr. Thorpe assures me that they are never without flowers. I noticed a distinct blush shading in the buds that is unusual in Niphotos, and thicker petals with a firmer texture than belongs naturally to these flowers, and readily agreed with the suggestion of Mr. Thorpe, that these variations can be attributed to the influence of the stock, which is much more vigorous than the Niphotos, which is naturally a weak grower.

A house full of Peach trees was an interesting sight, although from the Early Alexander trees—more than half the entire number—the fruit had already been gathered. The trees of Hale's Early still bore many Peaches. The ripe ones are sent to market every day, and have brought during the season from eight to twelve dollars a dozen. The trees are only two years old from the bud, and they are planted in boxes a foot wide, a foot deep and four feet and a half long. Four trees are in each box, and a man at each end can easily carry them out to a stone-boat, so that a horse can draw them to their out-door quarters. These boxes are now arranged across the middle space of the house, and are but little more than a foot apart, so that about 200 trees can stand in a house 100 feet long. When first brought in they might stand much closer, if necessary; but early in the winter the cool temperature of this house makes the space between the boxes available for growing Narcissus, and after the bulbs have flowered the space is again used to force Astilbe for Easter. During the summer the house will be used for growing Chrysanthemums. The Peach-trees show wonderful vigor, which Mr. Thorpe largely attributes to bone-dust and hard-wood ashes in the soil and waterings with liquid manure.

But amid all this diversity of occupation and the preparation for forcing vegetables as well as fruits and flowers, Mr. Thorpe has not neglected his experiments in cross-fertilization, and he now has some 800 seedling Chrysanthemums from special crosses—that is, from seed in which the parent plants have been selected for some special excellence. Ninety-nine out of every hundred will probably prove of no commercial value, but Mr. Thorpe's experience is that good varieties do not come by chance. His greatest successes have been those which came from a long and careful series of trials to ascertain the qualities likely to be transmitted by a given strain or a particular cross. Here is a field in which knowledge is gained only by years of patient application. The men who persevere in unrequited studies of this kind merit the gratitude of every one interested in horticultural progress.

Pearl River, N. Y.

S.

Notes.

Tea Roses of the best varieties, of fair quality and with the fashionable long stems, were selling in the streets of Boston last week, ten for twenty-five cents.

The trade journals note a marked decline in the demand for cut Tulips. For two or three seasons back Tulips of every kind had been extremely popular, especially for table decoration, but for some unexplained reason they have not been favorites this year.

A most instructive picture of the two large specimens of the California Fan Palms (*Washingtonia filifera*) at Los Angeles has recently been published in the *Scientific American*. These two trees, which stand near an ancient well, are believed to be the largest in existence and to have been planted by the founders of the early Spanish Missions in California, who may have brought them from the desert farther south, where this species is only known to grow naturally. The two trees which stand close together, one on each side of the well, mingling their leaves far above it, are about ninety-five feet high and their trunks are seven feet in diameter. They are believed to be a hundred years old.

The *Revue Horticole* recently noted the first success that has been achieved in the artificial crossing of two allied species of conifers. Monsieur Vilmorin, in the year 1867, fertilized a female flower of *Abies Pinsapo* with the pollen of *A. Cephalonica*, and procured one cone with a single fertile seed. This produced a plant which last year fruited for the first time. The hybrid tree, which is now twenty-one years old, is remarkable for its fine development, and in appearance stands midway between its parents, most closely resembling *A. Cephalonica*, however, both in length of its leaves and in their silvery color. In color and form the cones also are more like those of the male parent.

The illustrations of floral devices which were recently published in the *American Florist* and noticed in these columns, are commented upon in a late number of the *Gardeners' Chronicle* (London). "Some of the designs," it is written, "are exceedingly pretty and appropriate, but what shall we say of a table-cloth entirely covered with Pansy flowers of a huge bell similarly covered, or a floral butterfly? For the dead journalist a desk and inkstand, all made of flowers, are prepared as a funeral ornament. *Chacun à son gout*, but not too much of it." The French proverb is a wise one in the majority of cases, but to use it here is to use it unworthily. "To every one his own wish," would be a better phrase.

A pretty picture in a recent number of *The Garden* showed "A Growth of Hellebores in Winter" in one of those places where most people think "nothing will grow"—a shady garden corner beside a fence. "The soil is the poorest possible—a dry sand and under the shade of Fir-trees. A bank was thrown up to conceal a road, and the Hellebores, then young seedlings, . . . were planted in groups. On other parts of the same bank were varieties of minor Periwinkle, Solomon's Seal and common hardy Ferns, all doing well." *Iris fatida* was also used and Irish Ivy to cover the fence; and from the witness of the picture we can well believe that throughout the past winter this unpromising spot has been "the best clothed bit of the garden."

The hybrid Violets of the particular strain for which Mr. Robinson suggested in *The Garden* the name of Tufted Pansies, are among the most interesting flowers now in bloom. They are from the common Pansy crossed with an alpine Violet. They have a more tufted habit and grow rather more closely than the Pansy, endure the winter quite as well, flower very freely for a long time, and are delightfully fragrant. There are several named varieties, but in the garden of Mr. John N. Gerard, at Elizabeth, New Jersey, a bed of unselected seedlings now in bloom captivates every visitor. As Mr. Gerard says: "Some of the highly-bred Pansies have been improved a little too much; they once smiled, but now they grin," and these more modest hybrids, with their delicate self colors, make a pleasing change.

In the garden of Professor Charles N. Shepard, Charleston, South Carolina, is a Rose remarkable for its size and vigor. The original stock, a Banksian Rose, was planted more than fifty years ago, but—at heights varying from ten to fifteen feet—grafts of Maréchal Neil, Marie Van Houtte, Devoniansis, Cloth of Gold, Madame Eugénie Verdier and other choice varieties have been inserted, and these have made wonderful growth. The trunk at the base is nearly a foot and a half in

diameter and the branches cover two trellises, each some forty feet long and twelve feet wide, besides rioting over a piazza sixty-five feet long and forty-five feet high, while the topmost shoots are aspiring to cover the roof. From a photograph, kindly sent us by Professor Shepard, it can be seen that this great vine was thickly covered from bottom to top with finely-developed flowers.

Papyrus, universally used for writing upon in the ancient world, was manufactured out of the stalks of the plants of this name (*Cyperus*). The largest portion of the stalk was chosen and was split down one side; the soft centre was removed, and the sheath, about eight inches in breadth, was pressed, polished and rubbed with oil of Cedar to preserve it from decay. Two sheets were then gummed one upon the other in such a way that the fibres of one ran at right angles to those of the second, in order that sufficient consistency might be obtained; and then these doubled sheets were attached to one another to form rolls of any desired length. Papyrus was so generally used even in the later Roman period that Cassiodorus, says a recent writer in the *Revue Horticole*, wrote an epistle congratulating the whole human race upon the fact that the import duty laid upon it by Theodoric had been decreased. In the time of Xerxes an immense number of Papyrus cables were manufactured in Egypt for use in his fleets and in his bridge-building enterprises.

It is pleasant to know that the money bequeathed a few years ago by a gentleman of Chicago for the purpose of erecting a gateway to the yard of Harvard College, will procure a beautiful piece of work, which will greatly enhance the dignity of the group of buildings behind it, harmonizing with the solid simplicity of the older halls, yet ornate enough to be in keeping with so fine a modern example as Sever Hall. The design of the architects, Messrs. McKim, Mead and White, as published in the *American Architect and Building News*, shows a large wrought-iron gate, with simple uprights and a delicate traceried top, supported by two square, massive piers. These have sunk panels on their faces, enframed in simple borders, and bearing the arms of the college and appropriate inscriptions, and are crowned by a well-profiled cornice and a low coping finished with a ball. From these piers extends on either hand a stretch of wall lower than the gate, in which is a round-arched doorway, and, between this doorway and the gate, a fountain in one case, and in the other an oval-grated window for the use of the custodian when the yard is closed. These walls end in low piers, and the whole construction is recessed behind short, advancing arms of wall, finished with similar piers, from which, to right and left, extends a graceful wrought-iron railing. The design, if it is necessary to give it a name, may be called "Queen Anne," and is therefore in keeping with the oldest buildings in the yard, while handled with greater delicacy and refinement than one usually finds when the same name is suggested by a modern piece of work.

A correspondent of the *Gardeners' Chronicle* (London) speaks as follows of the botanical gardens at Maritzburg, Natal: "The Maritzburg Botanic Gardens were first enclosed and planted in 1874, and are 100 acres in extent, situate in the Zwartkop Valley, two miles from town. The site is very diversified, consisting of a gently sloping piece of ground in extent about thirty acres, which is watered by two perennial mountain streams, the remainder consisting of a steep hill-side rising to a height of some 300 feet above the rest of the garden, the sides of which are being planted with *Pinus insignis*, Acacias, etc. The local temperature is frequently over 80° in the shade during summer, and sinks to 3° and 4° of frost in the winter. . . . The lower part of the garden is about 2,300 feet above the sea, and is planted with a selection of trees and shrubs which, considering their age—none over seventeen years—it would be difficult to match elsewhere for vigor and size. Taking the girth of a few of the largest at five feet from the ground we find *Casuarina tenuissima* to be 5 feet 3 inches; *Acacia dealbata*, 7 feet; *A. melanoxylon*, 4 feet; *Cupressus macrocarpa*, 5 feet; *Pinus Canariensis*, 4 feet; *P. Pinaster*, 4 feet; *P. insignis*, 5 feet 6 inches; *Grevillea robusta*, 3 feet 9 inches; *Cupressus Lawsoniana*, 3 feet; *Eucalyptus globulus*, 5 feet 6 inches, all in fine health. There is a fair collection of flowering shrubs. . . . Of glass-houses there is scarcely a vestige. The garden of the capital of Natal contains but one iron conservatory, eighteen feet by nine feet, in a wretched state of repair, and not a glass frame of any kind! It may be added that the Government grant is only £350, and the public subscription list for last year only £28. Few plants are sold, but a considerable number of young trees are granted free to the railway and other Government institutions."

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The Care of Young Trees.

PROFESSOR BEAL, in a letter printed on another page of this issue, suggests the reason why so few practical results and real benefits have followed the wholesale planting of trees which has been going on in this country, or in some parts of it, at least, during the last dozen years. The twelve trees planted only a year before with impressive ceremonies, which Professor Beal describes, are a fair sample of the newly-planted trees in this country. It is an easy thing to pull up a sapling tree and then thrust it back into the ground again with dry and mutilated roots, for this is what tree-planting means to a not inconsiderable part of the community who plant trees. This operation comes within the scope of the most limited intelligence, and it can be completed in five minutes. It is a much more difficult matter, and one that requires patience, the power of observation, and skill to select and plant a tree thoroughly well, and then to see that it is properly protected from all the enemies which beset plant-life and so has a fair chance to grow until it attains a size and strength sufficient to enable it to take care of itself.

We have already explained more than once how trees should be planted; and now that the planting season is over for this spring a few suggestions upon the care of newly-planted trees may not be out of place.

Newly-planted trees, except conifers, and unless they are very small, or planted very thickly together, need the support of stakes to prevent the swaying of their heads from loosening the roots before they have taken firm hold of the ground. It is best to fix the stake firmly in the ground before the tree is planted, but if that has not been done a stout stake should be driven down close to the stem. It should be as high as the tree, which should be attached to it with bast, or with strips of linen, or of thin canvas from a point two or three feet from the ground to the very top. Cord or wire or any tying material which is hard enough to cut or injure the bark should not be used in fastening the tree to the stake. The reason why a stake as tall as the tree is needed is, that when a short stake is used, the stem of the tree being immovable and the top

free to sway in the wind, the bark is bruised by rubbing against the top of the stake. Many young trees are injured in this way, and in some cases the stem is snapped off short in a gale just on a line with the top of the stake when the lower part of the tree only is held too rigidly.

Thorough cultivation is needed for newly-planted trees. It prevents them from becoming choked by weeds, and by checking evaporation increases the moisture available for their support. The surface of the ground, therefore, about newly-planted trees should be stirred once in every two or three weeks from the time they are planted until the middle of August or the first of September, when cultivation should cease, that a late growth may not be encouraged and that the wood may become thoroughly ripened before the advent of severe frosts. The weeds which start after the middle of August have only a brief life and cannot injure the tree. When a few trees only are planted, or when it is impracticable to stir the ground continually, the growth of weeds can be prevented and evaporation from the surface reduced by covering the ground with a mulch of strawy manure, meadow hay, spent tan-bark, or the clippings from the lawn. A thick mulch if it is left on the ground all winter harbors field mice, and there is no mulch really so effective as the scuffling hoe, regularly and thoroughly used. Young trees require constant watching if they are to grow into fine specimens. Borers must be looked for and removed, and all the harmful insects which prey upon trees destroyed. The judicious employment of the nails of the thumb and forefinger on a young growing shoot will save the use of the pruning knife and the saw in later years. A little summer pruning of this character during the second and even during the first year after planting is of immense value to trees. A tree may thus be induced to assume the proper shape without any loss of vital force, and without any outlay beyond that of a little intelligence. A branch growing in the wrong position, or with an excess of vigor, an incipient fork which later may destroy the beauty and even the life of the tree, a false leader or unimportant branch crossing and chafing against an important one, may be rubbed out when the tree is young with the movement of the hand without inflicting a serious wound upon the tree. This familiar example will serve to illustrate, perhaps, the value of a little judicious pruning. It is not uncommon where second-growth White Pine abounds to find tall trees with a trunk divided close to the ground into two stems of nearly equal size. Such trees have little ornamental or commercial value. They have grown with two trunks because when they were little seedlings the leader was broken off, or eaten off by some browsing animal, and was replaced by two leaders of equal vigor. Had some one interested in trees and familiar with their mode of growth passed by the injured seedling a year or two after the accident, and stopped the growth of one of the leaders by picking out the top, or by knocking it off with his cane, the tree would have grown up as straight and tall as if no accident had ever happened to it, and a good tree would stand in the place of a misshapen one.

If a young tree is expected to grow into a noble, symmetrical, long-lived specimen it should be examined two or three times a year, and such pruning performed as may appear necessary; and this must be done during several years, until it has assumed its permanent form and attained a size which renders further care beyond the removal of dead branches unnecessary.

Many noble trees have grown, of course, to very great age without care and without thought, but the proportion of really good trees to the whole number which spring up naturally or are planted in the world is very small, perhaps not one in a million, and if even a reasonable proportion of planted trees are to fulfil a fraction of the hopes which fill the hearts of those who plant them they must be nursed and watched and cared for intelligently. It would be interesting to know how many of the 600,000,000 trees (if that is the number), which western Arbor-day

orators boast of as planted in Nebraska during recent years, ever survived the first summer, or how many among them promise to become of any permanent value to the community; or to know what proportion of the people of the United States who plant trees do it intelligently, and so reap the benefits which should come from their expenditure of money and time and labor.

It has grown to be a custom in several parts of the country to reward children in the public schools for planting trees, the amount of the reward being in proportion to the number of trees planted. A much wiser plan would be to give the reward five years after the trees are planted to the child who had reared the best tree. Quality is better than quantity in tree-planting, and the experience which a child would gain in caring for a single tree intelligently during five years would be worth more to him individually in after years and to the country at large than the careless planting of a much larger number, which, like the twelve Michigan trees, were only planted to perish—a result which is not calculated to have a stimulating or useful influence upon a youthful mind.

Kew Gardens.

SO many of our readers visit London every summer that we are sure to do them a service by reproducing for their benefit the following extract from an article which recently appeared in the *Saturday Review*, upon the greatest botanical and horticultural establishment in the world, where lovers of plants have more to learn than in any other spot:

"From time to time one of those people who apparently enjoy creating a little sensation by airing their imperfect knowledge of facts uplifts his voice in the House of Commons as aggrieved at the great expense to which the nation is put in maintaining the Royal Botanical Gardens at Kew. He is possibly under the impression—as, indeed, are the majority of people—that Kew Gardens are mere highly ornamental open spaces, to which the public and the inhabitants of Kew, especially, are granted admission at all times. Under these circumstances the keeping up of so many costly conservatories is, in the opinion of those who are not aware of the truth, inexcusable; and, although they have a vague idea that the *Victoria Regia* costs a small income to enable it to bloom annually, to the delight of holiday-makers and of our cousins from across the Atlantic, they would willingly vote for such a decrease in the grant accorded by the nation to the Directors of these Gardens for their proper preservation that before many months the most beautiful of Water-lilies would have ceased to exist and the great Palm-house be a howling wilderness. There is, however, every just reason why, instead of being diminished, the grant to Kew should be augmented. Let any intelligent person take the trouble to go systematically around these Botanical Gardens, and he will be at once convinced of their great importance, not only to England, but to the colonies and the Indian Empire; for they are emphatically not mere pleasure-grounds, but have a distinctive function to perform in the commercial economy of the country, and are the headquarters of a vast organization, having ramifications in every part of the known globe—and, we might almost say, the unknown, for missionaries and travelers are constantly sending to Kew from newly-discovered lands specimens of the rarest of plants, many of which are absolutely unknown to botanists. The staff of learned men engaged here is not a large one, but its activity and intelligence cannot be over-estimated. Thanks to them, no less than three important publications are issued every month from Kew—the *Botanical Magazine*, edited by Sir Joseph Hooker; *Icones Plantarum*, which deals with the dried or colorless specimens of plants; and the *Bulletin of Miscellaneous Information*; and to these may be added a number of special pamphlets, issued from time to time, treating of fresh discoveries, which are sent out to the colonial Governors, directors of museums and botanical gardens, as well as to the leading scientific men of Europe.

"To the right of the grounds stands an ancient mansion of the Georgian epoch, which in by-gone times was inhabited by the King of Hanover. It is now the principal centre of the organization to which we have above alluded, and here is preserved unquestionably the largest collection of dried specimens of flowers and plants in existence. Hither come students of every nationality to gather information which cannot be ob-

tained elsewhere; and only the other day, when we were visiting the principal hall, a pile of pressed leaves and plants lay upon the table which had just arrived from a Jesuit missionary laboring in an unknown region of China. In the Gardens themselves are other special museums of great interest. The splendid Orangery has been converted into a museum for woods, tissues, roots, grains, seeds and models of edible fruits, many specimens of which figured in the great Exhibitions of 1851 and 1862, and in the Colonial and Indian Exhibition. And here we should not forget to mention the handsome gallery presented to the nation by Miss North, which contains the wonderful series of drawings of plants which she made during many years when on her extended travels through tropical regions. But, independently of the museums, the out-door gardens and the numerous conservatories are arranged on purely scientific principles, and, although they are very picturesque and beautiful, their utilitarian side is never for a moment lost to sight, so that the horticulturist can see for himself in the most practical manner how particular plants should be grown, as well as the results of their careful culture. None of the produce of the Gardens is sold, but the surplus of seeds and young plants is exchanged for other specimens from public institutions of a like character abroad. The great Palm-house is unquestionably one of the most beautiful and extensive in the world, and gives us as fair an idea of tropical beauty as it is possible to conceive without actually visiting a jungle; but close to it is a small conservatory of far greater value, in which plants of a useful kind are exhibited. Here, for instance, grows the Coca, whence the much-talked-of cocaine is derived. There are also several varieties of Teas, and a little plant, newly discovered—the *Gymnema sylvestre*, to which the attention of Kew was drawn by Sir Mount Stuart Grant Duff—from the leaves of which an alkaloid can be abstracted which deprives us of the taste of sweetness for at least forty-eight hours, without injurious effect; and hard by it is another newcomer, the Miraculous berry of the Gold Coast, the leaves of which, treated in the same manner, produce a totally different result, for they cloy the mouth with a saccharine sweetness so great that it matters not what we eat or drink afterwards it will always have, during the time the effect lasts, the flavor of honey. In short, Kew Gardens is a centre round which not only all the similar establishments in England but those of the whole Continent revolve; for it is acknowledged that it is the most complete of its kind in existence.

"The learned little world which does its work so regularly at Kew, in its various museums and offices, is of far greater importance to the world at large than is generally imagined. The chief secrets of botany are only now being disclosed; and, as within only a few years past such a wonderful anæsthetic as cocaine has been introduced, whereby certain operations can be performed with impunity, it would be hard to tell what fresh discoveries are in store for us, and it is only at such an institution as Kew that the scientist can diligently pursue researches which may eventually prove of inestimable benefit to mankind. Therefore, independently of their beauty as a pleasure resort, from a purely utilitarian point of view, Kew Gardens have claims upon the general public which it would be folly to ignore, and absolute wickedness to seek in any way to diminish. In connection with Kew it may be observed that, notwithstanding the enormous crowds which flock here on a fine Bank Holiday, scarcely a single instance of drunkenness or misbehavior has been registered; and it is pleasant to record that the tea-house and refreshment-kiosk, introduced after some demur, have proved very successful."

Boring Beetles in the Ash Finish of a Chapel.

A FEW years ago a self-constituted board of visitors invaded the chapel of the Theological Seminary at Andover, Massachusetts, and, like another board, not unknown to modern ecclesiastical history, proved the reverse of welcome to the faculty and trustees of that institution.

Under date of November 9, 1882, the treasurer of the seminary wrote us as follows: "You may have noticed in the public prints reference to a chapel in Andover, the finish of which is being eaten by worms. It is becoming a serious matter, for if it continues to spread, the finish of our new chapel will be ruined." A piece of the mop-board was sent us as a sample of the work, and a few days later Mr. Edward Taylor, the treasurer, wrote us that the evidence of the work of the borer had been found in various localities about the house, and that it was increasing, and he asked for information as to the best means of preventing further ravages from the worms, at the same time enclosing the following statements published by General Meigs, of Washington, and some suggestions which

are worthy of reproduction here. "The timber is suffering from a disease well known to the manufacturers of shovels and pickaxes, and called by them 'powder post.' A worm eats the ash handle, which show minute holes, and when jarred by striking a hard substance gives out a shower of fine powder, 'powder post.' It is so common that they do not attempt to keep long any stock of handled spades, shovels and picks; and I was advised by the late Mr. Oakes Ames, at the close of the war, to sell off at auction the large stock of such stores left in the army depots, as it would be impossible to keep the handles from destruction.

"Saturation with petroleum was tried, and I think gave protection and prevented the progress of the disease.

"Perhaps petroleum applied in abundance by a sponge or brush might arrest the destruction to the Andover church.

"Captain F. Petrie, Honorable Secretary of the Philosophic Society of Great Britain, has written me as follows: 'I believe it will be found an effectual cure if the wood-work, or even the parts affected, are painted with paraffine oil; I have not known it to fail. We are going to try it on places where we see them at work.'"

We suggested the application of a coat of oil to the "finish," as any oily substance if thoroughly applied would tend to soak into the wood, especially where mined by the borers, and kill them. It may be borne in mind that insects breathe by little openings in the sides of the body, and if a film of oil or any greasy substance spreads over the breathing pores or spiracles, the worms will speedily die by asphyxiation.

The oil was applied, with the results kindly communicated to us by Mr. Taylor, under date of March 28, 1888. "I have heard no complaint of these worms at work in our chapel for some time, in fact I think evidence of their work ceased to appear very soon after the application of the wash applied to the places where they gave signs of working. I think kerosene, or something of that kind, was applied, only in places where they threw out their champing, and this, I was told, was in what the carpenter called sap wood."

The piece of Ash sent us in 1882 was honey-combed by the mines or tunnels of what was probably the young of this beetle, and which were between one and two millimeters in diameter; in some places there were a dozen holes, or places of exit made by the beetle, to a square inch of the surface. Much of the wood had been affected by dry rot, the work, as we understand it, of a fungus. It is most probable that the lumber used was affected by the dry rot, and that the larvæ of the beetles began their work in situations thus affected.

We have observed somewhat similar beetles (probably *Sinoxylon*) boring in the wooden bottom of a trunk, which had also been affected by "dry rot."

Specimens of the depredator, found in August, 1883, and which proved to be rather a rare beetle, were sent to our leading coleopterist, Dr. G. H. Horn, for identification, who was kind enough to name it as *Teretrius Americanus*, Leconte.

It belongs to the family of mimic beetles, or *Histeridæ*, so named from their power of drawing up their limbs and feigning death. Now, this insect does not belong to a group of borers, for most of the species, as Westwood says, feed upon decaying vegetable and animal matter, or on dung, while others are much flattened, and thus are adapted for a life under the bark of trees. However, some forms appear to connect the family *Histeridæ* with that of the stag beetles (*Lucanidæ*), whose larvæ are wood borers, though attacking rotten wood.

In this connection I may quote from a letter of Dr. Horn, in which he says: "The idea that they do the boring is strenuously opposed by Mr. George Lewis, who says that they enter the holes made by the larvæ of *Lyctus* and *Sinoxylon* with murderous intent. I cannot see any reason why they should be wood borers. In fact, I cannot recall any coleopter that is an in-borer. I am, therefore, inclined to accept his idea that they enter the holes with predaceous intent."

While there are no facts to justify the inference that the beetles themselves gnawed into the wood, it is not improbable that their young or larvæ were the culprits. Yet, no larvæ were found in the piece of wood sent us, and only one or two of the beetles, and it is rather singular that more dead specimens did not remain in the wood. At present, then, we are inclined to believe that the *Teretrius* in the larvæ state made

the tunnels, though it is still not impossible that some species of *Sinoxylon*, a small beetle of the size and general appearance of the *Teretrius*, may have been the culprit. Moreover, we are inclined to believe that the ash wood used in making the finish was affected by dry rot, either before or very soon after it was put into the chapel.

Providence, R. I.

A. S. Packard.

The Lindens of Western Europe.

EUROPEAN Lindens were introduced early into the Eastern States, and, although now known to be not as well suited to the American climate as our native species, they are still favorites with many persons, and numbers of them are planted every year, especially in the neighborhood of the great nursery centres.

Planters of these Lindens in Europe, as well as in this country, rarely distinguish, however, between the three species of western Europe, which they generally regard as one and the same plant, usually called in nurseries *Tilia Europæa*; and the specific characters and the nomenclature of these trees are still, apparently, very imperfectly known, except by botanists familiar with the European flora.

Linnaeus, to be sure, in the "Species Plantarum," grouped the different European Lindens together under the general name of *Tilia Europæa*, distinguishing five varieties Scopoli, in the "Flora Carinolica" (1772), separated the Linnaean species into two—*Tilia platyphyllos* (the Var. ϵ . of Linnaeus) "*folia magna, subhirsuta*;" and *Tilia ulmifolia* (the Var. γ of Linnaeus) "*folia duriora, minora, nullibi villosa*." Hayne, in the "Abbildung der Deutschen Holzarten" (1815), further divided the Linnaean species by proposing a third—*Tilia vulgaris* (*T. intermedia*, DC. "Prodr.," 1., 513). Colored figures showing plainly the characters of the three forms were published by Hayne, with whose views as to the limitation of these species later botanists, from De Candolle to Nyman, have generally concurred.

I can find no distinguishing characters in the bark, in the habit of growth, or in the flowers, which in all three species are destitute of the petaloid scales that occur in those of our American species, or in the winter-buds of these trees as they are found growing here; but in the leaves and in the fruit they are clearly distinct, as will be seen from an examination of the figures upon pages 256 and 257, drawn by Mr. Faxon from specimens cultivated in the neighborhood of Boston, where, at least one species is common.

The following characters, therefore, may be found useful in enabling cultivators who cannot always readily refer to the old figures to distinguish the different species.

CONSPECTUS OF THE SPECIES

Leaves pubescent: fruit prominently four-ribbed at maturity 1. *T. platyphyllos*.

Leaves naked, except in the axils of the principal veins: fruit destitute of wings.

Leaves ample, the base more or less oblique, green on both surfaces: tufts of hairs pale: shell of the fruit thick and tough. 2. *T. vulgaris*.

Leaves small, sub-cordate or rounded at the base, pale on the lower surface: tufts of hair, rusty brown: shell of the fruit thin and brittle. 3. *T. ulmifolia*.

Tilia platyphyllos, Scop. Young shoots and petioles hairy-pubescent; leaves large, four and a half to five inches long by four inches broad, thick, distinctly yellow-green, cordate, or, sometimes, slightly oblique at the base, coarsely and sharply serrate, softly puberulent on the upper, densely pubescent on the lower surface; fruit top-shaped or oval, prominently four-ribbed at maturity, and coated with pale brown tomentum.

This tree may always be easily distinguished, even at a considerable distance, by the marked yellow tone of the green of its foliage. It is the first of the Lindens to bloom, the flowers appearing here sometimes as early as the middle of June; and the first to lose its leaves in the autumn. In dry seasons the leaves, even in Europe, begin to shrivel and turn brown in August, and sometimes fall in September—peculiarities which make this species the least desirable of the Lindens for ornamental planting.

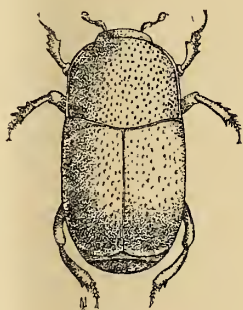
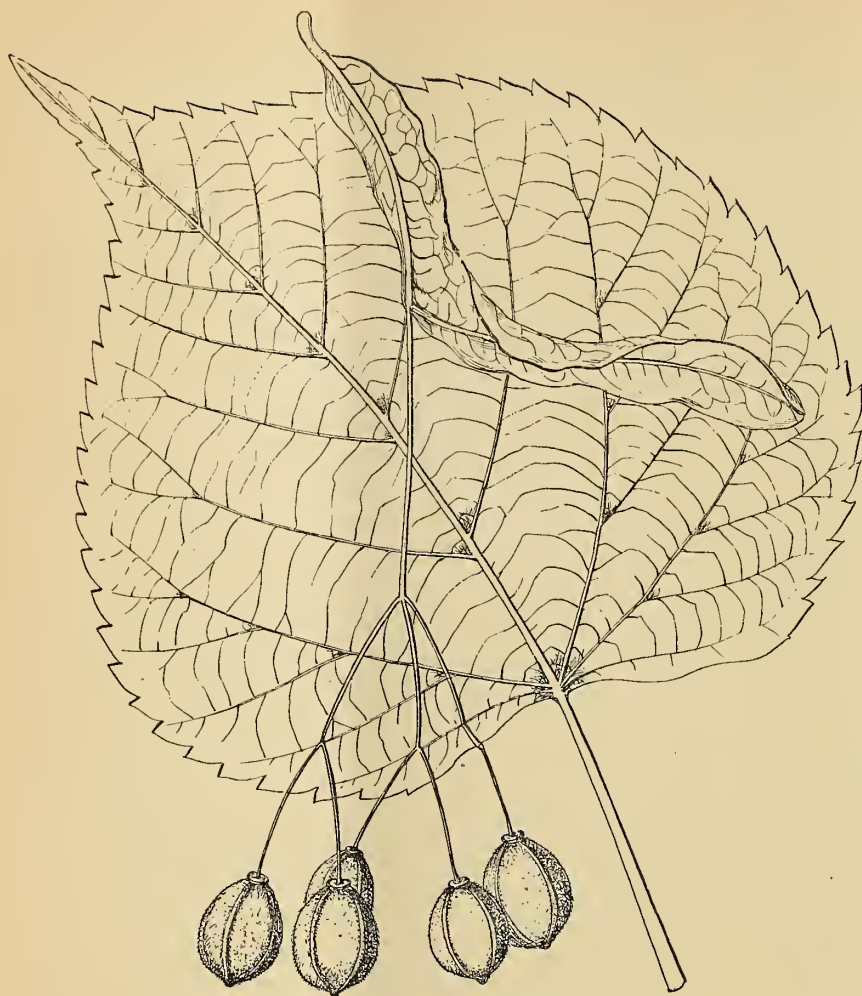


Fig. 108.—*Teretrius Americanus*, Lec.

Fig] 109.—*Tilia platyphyllos*, Scop.

It is widely distributed through central and southern Europe, and is a southern rather than a northern tree, although, according to Dr. Bolle, who has favored me with some interesting notes upon European Lindens, it occurs sparingly in Denmark, western Sweden (where he has found it forming small groves on several islands in the neighborhood of Strömstad), in Poland, and eastward as far as the Ural Mountains. It is the "Grossblättrige Linde" of the Germans. This tree appears to have been a favorite with Le Notre, who planted it largely at Versailles, and it is the tree which forms the clipped alleys in the garden of the Tuileries in Paris. It is not very often seen in this country.

Tilia platyphyllos has produced more varieties than the other species, either from a greater tendency to sport, or because it has been cultivated longer and more generally. Ten or fifteen varieties, of no particular value, are met with in nurseries, the most distinct, perhaps, being *T. vitifolia*, *T. asplenifolia* and *T. corylifolia*.

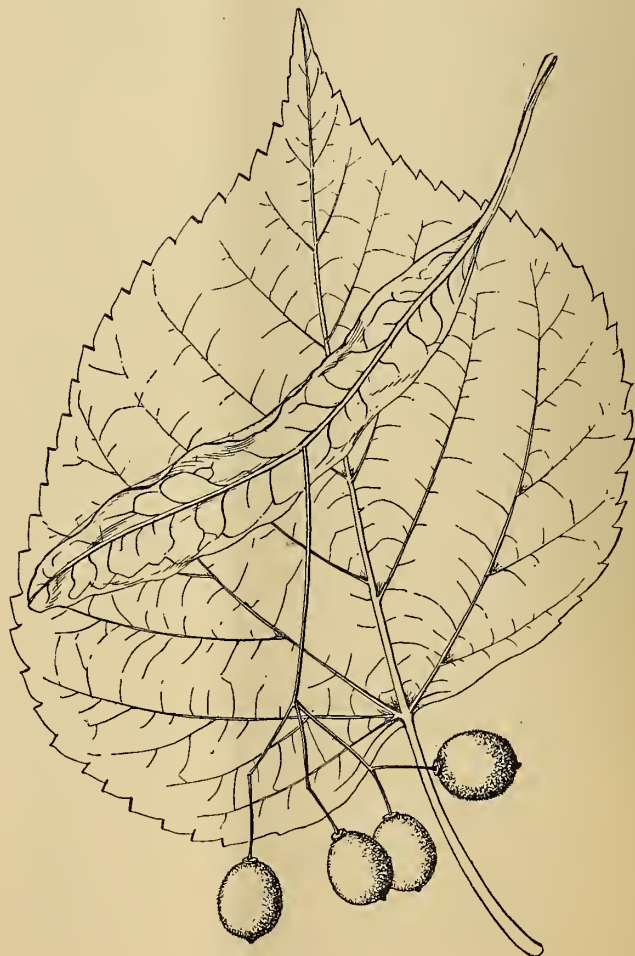
2. *Tilia vulgaris*, Hayne. Young shoots and petioles glabrous; leaves ample, three and a half to four and a half inches long by three to four inches broad, thin, cordate or often oblique at the base, sharply serrate, green on both surfaces, and quite naked, with the exception of the tufts of pale hairs on the lower surface in the axils of the principal veins; fruit oval or sometimes nearly round, coated with dense, short tomentum, the shell thick and tough.

This is the "Zwischenlinde" of Karl Koch, and it is often called the Dutch Linden from the fact that it was early and largely propagated in Dutch nurseries. It appears to be the largest of the European Lindens, and the most generally cultivated, although the least frequently seen in a wild state. Nyman credits it to the countries of central and south-eastern Europe; but Dr. Bolle writes, "I can only remember to have seen this tree once myself growing

wild—a single specimen in the rocky chasm of the Virga Valley, near Botzen, in the Tyrol, where it seemed to be growing spontaneously. If its native locality is doubtful, however, it is certain that it has been cultivated as a park and avenue tree for nearly three centuries. The rows of trees which have been planted in our cities since the seventeenth century are comprised, almost without exception, of this species." It is the *Tilia vulgaris* which gives its name to the most famous street in Berlin, and which is so often seen in English parks and gardens; and it is the species—so far as I have been able to observe—which has been planted the most frequently in the United States. The old, and sometimes very large, Lindens which are still found in the suburbs of Boston and New York belong to this species, which is the one commonly planted on Boston Common. It flowers here during the last week of June, or nearly ten days later than *Tilia platyphyllos*.

3. *Tilia ulmifolia*, Scop. Young shoots and petioles glabrous; leaves small, two to two and a half inches long by nearly as much broad, thin sub-rotund or cordate at the base, sharply and minutely serrate, green on the upper, pale, or often nearly white, on the lower surface, which is conspicuously marked with large tufts of rusty brown hairs in the axils of the principal veins; fruit oval, obovate, or sometimes nearly round, the tomentum with more scattered and longer hairs than in that of the last species, the shell very thin, papery and brittle.

I retain for this species Scopoli's name of *T. ulmifolia* because it is the oldest (1772). The leaves, however, do not resemble those

Fig. 110.—*Tilia vulgaris*, Hayne.

of an Elm-tree in any particular; and the name is a much less appropriate one than *T. cordata*, Moench (1785), or *T. parvifolia*, Erhardt (1794), which is the best and the one now most frequently used by botanists, although De Candolle adopted for it Ventenat's name of *T. microphylla*, which was not published until 1803.



Fig. 111.—*Tilia ulmifolia*, Scop.

Tilia ulmifolia is the common Linden of northern Europe, although it is found, apparently, all over the Continent, especially at high elevations. In southern Italy, according to Bolle, it is more common than *T. platyphyllos*. "Both species," he says, "grow wild in the wooded regions of the Apennines, and both are very commonly cultivated in the Mediterranean countries. I must be pardoned for disagreeing with Karl Koch when he says 'this tree never grows so old or so large as *T. vulgaris* or *T. platyphyllos*,' now that I have seen the beautiful great Lindens at Paelitzaerder on the Paarstein Lake at Uckermark. There enormous trees, which all belong to *T. ulmifolia*, are scattered in isolated specimens over the whole island and shade the ruins of an ancient abbey built in the thirteenth century. The trunk of the largest of these old trees, which are still in an excellent state of preservation, girths nearly twenty-three feet; and there are many others scarcely inferior to it in size."

Tilia ulmifolia, although perhaps the most commonly and widely distributed of the European Lindens, has been, so far as my own observation goes, much less frequently planted in central Europe than either of the other species, and I do not remember having seen anywhere a very large or remarkable specimen. It is seen in this country more rarely even than *T. platyphyllos* and we have succeeded in finding only two or three small trees in the neighborhood of Boston. It does not flower until towards the middle of July or nearly a month later than *Tilia platyphyllos*. It would be interesting to know if there are anywhere in the United States large specimens of the small-leaved Linden.

C. S. S.

Cultural Department.

Some Iron-clad Pears, Plums and Cherries.

ALTHOUGH the very large number of varieties of Apples, Pears, Plums and Cherries imported by Professor Budd and Mr. Charles Gibb from north-eastern Europe will require the experience of a great many years before we can determine their exact value and relative importance for all

sections of our cold North, one thing, at least, has already been settled in the last five years in regard to them. They are, in their earlier years, to a very marked degree more hardy against winter's cold than any we have before had in cultivation, except the few estrays which had already reached our shores from the same regions. It is only necessary to plant an Apple-tree like the Duchess of Oldenburgh, in a locality where the winter's temperature frequently touches the freezing-point of mercury, to become satisfied that here is a class of Apples entirely unlike those we possessed previously. The cheerful indifference with which such temperatures are endured by these trees is entirely unlike the woe-begone results seen upon many of the varieties which are classed among our hardy Apples.

This is the result, at least, of five years' experience with the Pears, Plums and Cherries brought to us by Messrs. Budd and Gibb from Baltic Germany, Poland and Russia. They are nearly all as indifferent to extremes of minus temperature as our native Plums and Cherries, while we find in them the ameliorations consequent upon centuries of cultivation and selection. Among upwards of 100 varieties of Apples, thirty-one of Cherries, seven of Plums and sixteen of Pears, selected from the most promising sorts for trial on my own grounds, it is yet premature to pass judgment upon any except as to the hardiness and vigor of growth exhibited by them for the four or five years that I have had them, which include two winters never exceeded, if ever equalled, for severity since thermometrical observations have been recorded in north-eastern Vermont and the Province of Quebec. A few of the Apples, Plums and Cherries have given me specimens sufficient to justify a strong belief that these fruits are likely to meet reasonable expectations as to their size, beauty and quality. The Plums are in color red, white and blue of varying sizes and seasons from early to late. The Cherries that have fruited belong to the Girotte or Morello class, variously crossed upon, and varied under culture, so that among them are several that approach closely to the Hearts and Bizarreaus in size and sweetness. Many are remarkable for the relative smallness of their pits, and the juice of some is deeply colored. Others, such as the heart-shaped Weichsel, show a cross between the sweet Mirello and the Dukes. This variety is used in east Europe as a lawn-tree on account of its symmetrical growth and its handsome striped leaves. The fruit is large, heart-shaped, purplish-black, and nearly sweet. Nearly all these Cherries are distinguished from our hardiest common sorts (Pie Cherry, etc.) in being hardy both in tree and in blossom-buds, so that they not only live and grow, but bear plentiful crops of fruit. There is a large family of these Cherries, classed together as Amarells, embracing a considerable variety, along with family likeness. The trees are rather small, and heavy bearers while quite young. The Astherm family is also an interesting one, numbers of which were brought into Iowa and Minnesota by German immigrants some twelve or fifteen years ago, and have proved reliable bearers in those states where all other sorts failed. The fruit of these varies, yet a family resemblance is seen in all of them. The Vladimir race, from the Russian province of Orel, is quite dwarf, with mild, sub-acid fruit, larger than Montmorency, and in some varieties nearly black, with a mild, sub-acid flavor.

Of the Pears I can only as yet report a most vigorous growth, so that some of my trees, five years planted (twelve to eighteen inches high at the start), are now fully nine feet high. They are evidently early bearers, as one showed a cluster of flowers last year, and two are this season crowded with fruit-buds. If the omnipresent small boy will allow them to mature I shall be glad to send specimens to GARDEN AND FOREST.

Newport, Vt.

T. H. Hoskins

Orchid Notes.

Epidendrum prismatocarpum.—Of the three hundred and more species which constitute the genus *Epidendrum*, by far the greatest number of them possess inconspicuous and dingy colored flowers, which render them only valuable to botanical collections. There are a few, however, whose flowers have sufficient beauty to make them favorites with cultivators, and among these must be classed the subject of the present note.

Although *E. prismatocarpum* is a very old inhabitant of our Orchid-houses, it is, nevertheless, by no means plentiful, which explains why it is heard of so seldom. As far back as 1852 it was described by Professor Reichenbach in the *Botanische Zeitung*, but it did not make its appearance in cultivation until about ten years afterwards, when it was sent to Europe from Veragua and Chiriqui, where it was first discovered by War-sewicz.

This species may be readily recognized even when not in

flower, by means of its long, deep-green, flask-shaped, pseudo-bulbs, from the apex of which are given off two shining, green, strap-shaped leaves, gracefully recurved, and an erect peduncle, bearing from fifteen to twenty large flowers, the sepals and petals of which are pale yellowish-green, covered with large blackish blotches, which give them a very bizarre appearance. A striking contrast is presented to the sepals and petals by the long, triangular lip, which is generally of a warm rose color. There is great variation among the flowers of this species, caused, no doubt, by different treatment and conditions. In some the blotches are pale and the flowers few and small, while in others the flowers are large and plentiful and richly colored. They are produced during April and May and will last for several weeks, so that the plant might be used with advantage as for exhibition purposes.

It should be potted firmly in peat and sphagnum moss, and as it grows during the winter months—a fact worthy of notice—water should be given freely according to circumstances, as well as frequent syringings, which keep pests away. The plants, although at rest during the latter part of the summer and autumn, must nevertheless receive enough water to keep the pseudo-bulbs and leaves in a plump condition. A temperature of about 60°-70° Fahr. suits it admirably.

Maxillaria Sanderiana.—The genus *Maxillaria*, although a tolerably extensive one—comprising upwards of 100 named species—cannot be said to be much of a favorite with Orchid growers. There are a few, however, which are always considered to be of sufficient value to find a place in every collection, and among these it is universally acknowledged that *M. Sanderiana* is the finest representative of the genus yet known. It was introduced to cultivation about four years ago by Messrs. Sander & Co., St. Albans, England, whose collector found it growing on the Cordilleras of Ecuador and Peru at an elevation of about 4,000 feet. Unfortunately, most of the plants sent home at that time had perished during the voyage, notwithstanding the care taken of them, consequently, there are as yet very few plants to be met with under culture.

A good specimen is now in flower here. It has ovoid, compressed pseudo-bulbs, and dark-green, elliptic-oblong leaves. The flowers, which are as large as those of any ordinary *Lycaste Skinneri*, are borne singly on the end of short scapes, which spring from the base of the previous year's pseudo-bulbs, and are covered with large, dull brown bracts. The upper half of the large sepals is pure white, the lower half being washed and blotched with very dark crimson. The petals are similarly marked, but are much smaller in size. The side lobes of the lip are erect, while the middle one is slightly recurved and crisped around the margin. The color is dull buff-yellow on the inner surface, with a brighter yellow callus on the disc, while the outer, or under, surface is blotched and stained with blackish-crimson. The flowers of this species present very little variation, although a faint, rosy tinge may sometimes be observed at the tips of the sepals and petals.

Taking into consideration the elevation at which this *Maxillaria* grows in its native country, it must not be regarded as a hot-house Orchid; and it will thrive in a house with a temperature ranging from 60°-65° F. When once established, this species may be as easily grown as some of its better known congeners. It is rather difficult, however, to get imported plants to begin to grow, and, in order to bring this about, the plants should be placed among broken crocks in a house with a warm and moist atmosphere until they begin to make new growths. They may then be put into baskets, in a compost of fibrous peat and sphagnum moss, and placed in such a position as to obtain an abundance of light and air during the summer months, which is the season when they make their chief growths, and during which period they may receive plenty of water. The plants require very little water in the winter, which is the resting period, and hardly any water at all is necessary during the flowering season, which is usually in April and May.

St. Albans, May, 1889.

John Weathers.

The Irises.—The new *Iris tenuis*, figured in an early issue of GARDEN AND FOREST, has proved hardy here during the past winter. The plants received last spring were planted under Pine-trees, the needles of which provided a good winter covering. Plants that were left out are coming up strong, and others lifted flowered nicely in pots. *I. tenuis*, as a decorative plant, has no greater value than many of the older sorts. *I. Douglasiana*, a pretty Californian species, is now in bloom, and is a very showy plant. We have had no experience as to the hardiness of this species, but it is well worthy of pot-room in winter. *Iris verna*, another native species, is now at its best, the perfume of its delicate blue flowers reminding one strongly of

Violets. This *Iris* does well in all kinds of soils and makes a good border-plant. *I. tenax* and *I. Missouriensis*, two species somewhat alike, are also in bloom, to be followed later by *I. oxypetala*, which is, perhaps, the best of all native *Iris*. *I. pumila* and its many varieties are, and have been, making a fine display. These were the first to bloom in the open ground, followed closely, however, by *I. arenaria*, a charming European species, with narrow grass-like foliage, almost hidden by the bright orange-yellow flowers, which are fragrant. This plant succeeds best in a sandy soil or when planted in the rock-garden. *I. Cengialti* is another comparatively new plant, and one which no lover of this beautiful family should be without. In general appearance it resembles *I. Germanica*, the flowers being fully as large, dark blue, with an orange blotch on each petal. The plant, however, is quite distinct, flowering two weeks earlier, and being dwarf, not exceeding one foot in height. *I. Sibirica hamatophylla* is now at its best. This plant has blood-red leaves, with blue flowers, and has the special value of producing a second crop of flowers later in the season.

Aquilegia Canadensis aurea.—We do not know if yellow forms of *Aquilegia Canadensis* are common, but we received, some three or four years ago, one plant which has proved to be sufficiently distinct and fixed to warrant the varietal name *aurea*. The flowers are pure yellow without a trace of red. We had thought it might probably be referred to one of the yellow species, but find that of the seedlings raised from isolated plants, about ten per cent. show a reversion to *A. Canadensis*. The plant under note does not exceed a foot in height, and is completely covered with its pretty flowers, resembling in color those of *A. chrysantha*.

Camassia Cusickii.—This species, figured in GARDEN AND FOREST, last year (i. 174, fig. 32), is again in flower, and gives promise of becoming a valuable addition to our hardy flower-garden. The whole plant is much stronger and larger than any other species with which we are acquainted. The flowers when first expanded are white, changing to pale blue after they have been open a few days. All the *Camassias* are perfectly hardy in the eastern States, but, like most bulbous plants, thrive best when planted in a porous soil. E. O. Orpet.

Passaic, N. J.

Setting Plants and Trees is not necessarily a laborious operation. I am surprised how little one need use a spade in the work. In fact I use the spade in garden work less and less each year. For setting all bush-fruits we plow a furrow with an ordinary winged potato-plow. Set the wings at their widest; they will then throw out a lot of loose earth which is easily used by the hands. Then return in the same furrow with the wings closed, plowing deep, so as to make mellow ground for the roots of plants. In nice garden soil, not too wet, we then discard tools and put in the plants with our hands. If the soil is too heavy or wet for this, one man uses a shovel while another places the plants. Yesterday we set a lot of Service Berries in a clay soil in this manner, one man shoveling in the furrow and another handling the plants, and did it so rapidly that I had difficulty in clipping the single shoot of the plants and dropping them as fast as they were wanted. The plow can be used to good advantage in setting orchards.

Digging big holes for trees should be unnecessary. Dr. Warder said that the hole for a tree should be as large as the orchard. This is the best of advice. It means that the ground should all be well prepared before a tree is put into it. Then one needs to dig only far enough to allow the roots to fall in easily. But the hole must be big enough for the roots. Do not twist or crowd them; and here is where the ordinary tree-planter will shirk. Before you know it he will stick in a tree with the ends of the roots all but peeping through the ground. "Don't be stingy with your holes," is advice which I have to give almost every day in planting-time. Get the fine earth firmly in and about the roots. This usually requires the work of the fingers, but it can be done without fussing.

Grafting.—All the kit of glue-pots and brushes and elaborate mastics are a nuisance in the top-grafting of an orchard. The only use I could ever find for hot wax was when grafting was so abundant that some of it had to be done in March and early April. Hard wax that will warm up in the hands and has grain enough to stretch is much superior to any other. Of course the hands must be greased, but the work is by no means disagreeable. The wax one buys of dealers is nearly worthless, so far as my experience has gone. It has not been worked by hand, "pulled," and has no fibre. It breaks.

Cornell University.

L. H. Bailey.

Chrysanthemums for the Border.—There are some varieties which are handsome as well as early, and they can be trusted to make a good display before frost. It must not be expected, however, that the individual flowers will be as large as those of later flowering kinds. It must be remembered, too, that, in order to have good Chrysanthemums anywhere or at any time, the plants must be well fed and they must not be crowded—two feet square is the least space in which they will thrive. Here are a dozen good, early varieties: The two forms of Madame Desgranges, yellow and white; Madame Domage, bluish; Chevalier Domage, yellow; Précocité Japonaise, red; Blanc Précoce, white; L'Ami Couderchet, lilac; Fiberta, yellow; Salter's Early, bluish; Roi des Précoces, red; Mandarin, pink; La Vierge, white.

Pearl River, N. Y.

John Thorpe.

Notes from a Northern Spring-Garden.

Corydalis nobilis is a handsome Siberian species, and a real acquisition to the list of hardy rock-garden plants. It grows some eight or nine inches high, with bi-pinnate, delicate leaves, with rather broad cuneate divisions and large, broad racemes of pale yellow flowers, tipped with green. It has been grown in gardens for more than a century, but is rarely met with in those of this country. It thrives in all soils and positions, and demands no special care or attention.

Clintonia borealis is at its best, and an attractive plant, with its yellow, nodding, Lily-like flowers, borne on slender scapes above the broad, strap-shaped leaves, which lie close to the ground; and still more attractive, perhaps, in August, when the flowers are succeeded by large, bright blue berries. It grows naturally under trees in rather dense shade, and in such positions, when it is transferred to the garden, it will be found to flourish, although we have not succeeded yet in inducing it to spread very far; and seedlings have not appeared yet. The Podophyllum or Mandrake (*Podophyllum peltatum*) is an easier plant to establish, and one of the most effective in foliage, with its broad, round, five to seven parted leaves, eight or ten inches across, raised a few inches above the ground on stout stems inserted in the centre. They look like miniature umbrellas, and quite hide the handsome, solitary, nodding, white flowers, which grow on separate bi-foliate stems, and the large fruit, which ripens in early summer—the May Apple, well-known to country boys. This plant is found in the low, rich woodlands of the middle and western States, where it is everywhere common. It spreads rapidly from underground creeping root-stalks, and will soon extend far beyond the place allotted to it in the garden.

Iris cristata, the crested Iris of the Allegheny Mountains, with its lovely pale blue, long-tubed flowers, is in full flower, and certainly one of the most beautiful of all the dwarf species. It spreads almost too rapidly, however, in the border or in the rock-garden, and it has now been transferred to a half-sunny slope on the edge of a wood, where it has already spread quite widely through a thick sod of Grasses and Sedges, which are unable to greatly retard its growth or to prevent it from flowering freely. It is one of the best plants which has been tried here for naturalizing in such situations, which can often be greatly improved by a cautious introduction of many plants chosen with reference to harmony with their immediate surroundings.

The rare and remarkable *Carex Fraseriana* is well established, and has been in bloom for several weeks in the dense shade of an over-spreading bush. It would hardly be taken for a *Carex*, with its broad leaves and globular heads of flowers, on slender scape-like culms. It is a plant not without beauty when in flower, but its interest is rather botanical than horticultural. It is one of the rarest of the genus in America, and is confined to the mountains of Virginia and Carolina.

There is a little prairie flower, very familiar to the inhabitants of the West, and a pleasant remembrance always to people who have traveled over the grass-covered plateaus beyond the Mississippi, known as the Shooting-star from the peculiar form of the flowers. It is the *Dodecatheon Meadia* of the botanists, a member of the Primrose family, and a beautiful plant in cultivation, with Cyclamen-like flowers, borne in ample umbels at the summit of a stout scape, about a foot high, springing from a cluster of oblong leaves. The corolla is rose-colored or sometimes white, with a very short tube, a thickened throat and a large, five-parted, reflexed limb, giving to the flower a fanciful resemblance to a comet or shooting-star. The *Dodecatheon* has been a popular plant in cultivation for many years, and many varieties have been raised by gardeners with enlarged flowers of different shades of color, but it is doubtful if any of them are superior in beauty to the wild form of the prairie. It flourishes in full sunlight, is easily

raised from seed, like most of the other plants of its alliance, is easily transplanted and fairly durable. Just now several masses are in full bloom, and are beautiful and attractive.

Aubretias are, so to speak, conventional rock-garden plants; that is, they are always included in lists of these plants, and if a beginner in this sort of gardening orders rock-garden plants from a dealer he is pretty sure to find some Aubretias in his order. They are natives of southern Europe, and several species and a number of varieties of the best known of these, *A. deltoidea*, are in cultivation. This is a charming plant, admirably suited for the margins of rocks, where it can spread and send its slender, trailing stems through the crevices, making a wide, moss-like mass of pale green, persistent foliage, which is now covered with a sheet of pale purple flowers, large in proportion to the height of the plant, being half an inch across. Not quite hardy here, it requires careful protection in the winter and an open, sunny position. The Aubretias may be readily increased by cuttings, or young plants can be raised from seed.

There are a number of dwarf shrubs now in flower well suited to embellish the rock-garden, where, owing to their dwarf size, they can be seen to better advantage than in the shrubbery, where, too, they are liable to be overcrowded and finally destroyed by more vigorous plants. The best known of these, thanks to Emerson's poem, is the Rhodora (*R. Canadensis* or *Rhododendron Rhodora*). It is a low, deciduous shrub, growing to a height of two or even three feet, with rosy-colored flowers, which appear before the leaves. It is easily cultivated, and can be readily transplanted from its native swamps into the garden, where it will grow and spread quite quickly if deep, peaty soil and an open position are provided for it. The flowers are very short-lived, and two or three days of hot sun quite finishes them. It is one of the plants which looks well only when seen in large masses, as it may be in some parts of northern New England, where sometimes covering acres of bog, its flowers look like a soft, rosy flush of light thrown over the ground. A far more beautiful plant in flower, and one of the most beautiful of all our native shrubs, is the little bog Kalmia (*K. glauca*), a delicate plant not more than a foot high, with wiry branches and straggling habit, narrow, revolute leaves, quite white on the lower surface, and few-flowered corymbs of very large, rosy-purple flowers, which make a great show just now. It is not a very easy plant to establish, and it is fastidious always and liable to die if exposed to too great summer heat, but the beauty of the flowers is so great that they are worth a real effort to obtain in good condition.

Daphne Genkwa is very fine this year, finer than I remember to have seen it, the mild winter having been, no doubt, favorable to the good development of the tubular, lilac-blue flowers, which in color have no counterpart among those of shrubs which are hardy in this climate. It is to be regretted that it is not more hardy here, for it is certainly one of the most attractive of the dwarf shrubs of Japan, where it is highly prized as a garden-plant and for its reputed medical properties.

The earliest of the Blueberries are in flower, and few shrubs are more beautiful than some of the dwarf species, like *Vaccinium Pennsylvanicum* and *V. Canadense*. They make a charming carpet under trees, where they are found growing naturally in half open situations. None of the *Vacciniums* are very easy plants to manage, but they can be grown by any one who will pay close attention to Mr. Dawson's directions for the management of these plants published upon page 183 of volume i. of this journal. They have many claims upon the lovers of beautiful plants—good habit and foliage, handsome flowers and fruit and brilliant autumn coloring.

Boston, May 11th.

C.

Notes from the Arnold Arboretum.

THE Peach is not in this latitude a very reliable flowering tree, the buds being often destroyed in winters of even ordinary severity. This year, however, Peaches are exceptionally fine, and trees of some of the double-flowered varieties have been objects of wonderful beauty. There are a number of these varieties in cultivation, and new ones appear from time to time; but the three best worth growing have been known for many years—they are the double pink, the color of the flowers being almost identical with that of the common Peach of gardens, the double white and the double scarlet, on which the flowers are blood-red. A fourth variety, in which the color of the flowers is intermediate almost between those of the pink and of the scarlet varieties, although showy and conspicuous, is perhaps a less desirable plant than either of the others. The double scarlet Peach, in

flower, is one of the most striking, almost startling, objects imaginable, while the double white, owing to the profusion of the flowers, when the buds are not destroyed by frost, is for a few days one of the loveliest of all spring-flowering trees. These double-flowering Peaches are in bloom generally a week or ten days later than the common Peach. Like them, they are subject to the attacks of fungus and of borers, and are short-lived, and must, therefore, be often renewed. Their beauty as ornamental trees is confined to the short flowering time, so that, in spite of the loveliness of the flowers, they should not be planted here as freely as some other showy-flowered trees, especially as the climate does not suit them particularly well. The variety with blood-red flowers may be seen in some of the public squares of Washington, where there are many fine specimens, in very great perfection, and it is doubtful if any one seeing this tree there in flower for the first time passed it by without an exclamation of admiration or without asking what it was.

A large number of the so-called "flowering" Apples are now at their best. They flower usually ten days later, but the unprecedented heat of the last few days has forced many plants into bloom long before their time. These small Apples, taken as a whole, surpass all other trees here in floral beauty at this particular period of the year, and there are no more satisfactory plants for the May decoration of the lawn or the shrubbery. They flower profusely, at least most of the varieties do, year after year; they are indifferent to cold, to heat or to drought, and they do not grow unmanageably large. They like rich soil, and well repay generous treatment.

It is hopeless, and certainly not necessary, in these notes, to try to unravel the intricacies of the synonymy of the Apples, or even to refer in every case the cultivated forms to recognized species. The species of Apples, their origin and distribution have puzzled the best-equipped botanists, and no two of them have ever held quite the same views with regard to these plants.

There is a very large number of these Apples in the Arboretum, gathered during many years from the best European collections and raised from seed obtained from all available sources. Speaking broadly, they may be referred to four types. There are, first, the varieties of the common Apple (*Pyrus Malus*) which are generally recognizable by the light gray bark, pale leaves, which are, with the petioles and shoots, woolly-pubescent on the lower surface while young, and by the minute, scale-like bract on the peduncle. There is a handsome variety with double flowers; others with pendulous branches or with dwarf habit, and one curious one with shrubby habit, narrow leaves, and small fruit less than an inch in diameter, and persistent upon the branches until after the flowering-time the following year.

Next should be mentioned the Chinese Apple (*Pyrus spectabilis*), a well marked species not difficult to distinguish, at least in the double or semi-double flowered form—the only one apparently now known in cultivation. The flowers were figured in this journal last year (i. 272, f. 214), and there are colored plates in the "Nouveau Duhamel" (vi. t. 42, f. 2) and in Watson's "Dendrologia Britannica" (i. t. 50). It is one of the handsomest of the whole race, and one of the most profuse and persistent bloomers. It is a shrub-like tree, reaching a height of twenty feet, characterized by the upright habit of growth of the branches, which give to fully grown specimens a sort of vase-like form, reddish-brown bark, oblong-ovate leaves, which, like the peduncles, are covered, while young, with fine, short tomentum, which disappears before the leaves reach maturity, when they are dark green, thick and leathery. The flowers are rose-colored or pink and white, and delightfully fragrant.

A large proportion of the Apples in the collection produce fruits, for which the lobes of the calyx fall off before it is ripe, and often before it is fully grown, and therefore are best referred to *Pyrus baccata*, in which this peculiarity is the most constant and most apparent character. These plants vary, except in the deciduous calyx, remarkably among themselves, and in looking at some of the extreme forms it is hard to realize that they may be referred to a single species. The habit, flower, foliage and fruit are all different, the last varying in size from a diameter of nearly three-fourths of an inch to one of less than one-eighth of an inch. But with all the forms before me it is impossible to find any real distinguishing characters in them, except the deciduous calyx. *Pyrus baccata* is itself a widely-distributed species in Siberia, through northern China to Japan and in the Himalayas. It has long been cultivated not only in Europe, but from time immemorial by the Chinese and Japanese, so that it is not surprising that innumerable forms have been developed, especially as all the *Pomaceæ* show a remarkable tendency to

seminal variation. The most beautiful of the various forms, referred here to *P. baccata*, are those of Japanese origin, known in gardens as *Pyrus Malus floribunda*, and its double-flowered variety (see this journal, i. 152, f. 30) introduced into this country by Dr. Hall, and variously known in American gardens as *P. Parkmanni* or *P. Halleana*. It seems identical with the plant grown in Europe as *P. spectabilis* Koido. These Japanese Crabs are low, bushy trees, with dark brown bark, branching from the ground, growing to a height, perhaps, of twenty feet, and spreading to a breadth of twenty or twenty-five feet. When they are in bloom they are wonderful objects, the branches being entirely covered with the flowers, which individually are not large and barely more than an inch across when fully expanded. The buds are crimson and very showy, so that the plants are perhaps more attractive just before the flowers open than at any other time. The flowers, when they expand, are pink, and then gradually fade to white before the petals fall; the effect of the white masses of flowers being often set off by a few unopened buds near the ends of the branches. Their fragrance is powerful and delicious, and may be perceived for a long distance when a large plant is in bloom. The fruit is minute, the size of a pea, dull-colored and devoid of beauty. In the semi-double form the petals are deep rose-colored, the calyx dark red, and the young leaves purple.

Among other forms of what are taken here to be varieties of *P. baccata* are several plants of very great ornamental value, with yellow-brown bark, symmetrical, arborescent habit, rather thin, glabrous acuminate leaves, and large, pure, snow-white, fragrant flowers, nearly two inches across when expanded, and small fruit. They have been raised principally from seed derived from the St. Petersburg Garden, and sent under several different names. There are in the herbarium wild specimens gathered in the northern island of Japan, which are identical with some of these forms.

Pyrus Toringo is a Japanese shrubby species which grows well here. The leaves are sharply and deeply incised, and often three-lobed; they are woolly-pubescent, as are the shoots when young; the flowers are smaller than those of the other Apples, and the fruit is minute, with deciduous calyx-lobes. *Pyrus Sieboldii* of gardens seems to be a form of this, still smaller in all its parts. Neither of these plants, except in this pubescence and in the shape of their leaves, are readily separated from *Pyrus baccata*.

Pyrus prunifolia, or a number of plants, which seem more readily referred to that species than to any of the others are the last of the series. *Pyrus prunifolia* is itself a doubtful plant, doubtfully known in a wild state, although generally credited to Siberia. According to Regel it is found in the Baikal, and to Karl Koch in north China, Tartary and southern Siberia. It has been cultivated for more than a century, and is the original of the garden Crabs; and if really a wild plant, it has been greatly changed by cultivation and by crossing with varieties of the common Apple. What are considered here forms of this plant are stout bushy trees branching from the ground and forming broad masses of foliage some twenty feet high by as much through. The bark is brown or gray-brown, considerably darker than that of the common Apple-tree. The leaves are broadly elliptical, sharply serrate, with long petioles, and, like the shoots, pubescent when young, especially on the lower surface. The flowers, with pubescent calyx-lobes and hairy styles connate to the middle, are larger than those of the other Apples, being fully two and a half inches across the expanded petals. They are pure white in some individuals, rose-colored fading to white in others, and very fragrant. The fruit has persistent calyx-lobes, is from half an inch to an inch in diameter, bright scarlet on some individuals, clear yellow on others. It retains its shape and color until winter, and remains upon the trees until the following spring. These trees flower much less freely than the varieties of *P. baccata*, and do not flower equally well every year, owing, perhaps, to the presence of some *Malus* blood, which it seems possible to trace also in the character of the pubescence and the coloring of the young leaves.

Considered from the point of view of ornament, the most valuable of all these Apples, as flowering trees, are the Japanese Crab (*Pyrus Malus floribunda*, of gardens) and its double-flowered variety (*P. Parkmanni* or *P. Halleana*, of gardens); next in value is the Chinese Crab (*Pyrus spectabilis*), then various large-flowered varieties of *Pyrus baccata*, the varieties of *Pyrus Malus*, *Pyrus prunifolia*, which is the only species with ornamental fruit, and the only one, therefore, valuable for autumn effects, and lastly *Pyrus Toringo*, which is rather curious than really beautiful. The North American Crab *Pyrus coronaria* does not flower until several weeks later, but

flowers here profusely. The flowers are individually very large, pale rose-colored, and more fragrant than those of the other species. The fruit which hangs from long, slender stems is ornamental, high colored, and very fragrant. *Pyrus coronaria* is a desirable plant for the garden, both for its flowers and its fruit.

May 11th.

J.

The Forest.

A Word for the Jack Pine.

M. R. H. B. AYRES, of Minnesota, who is familiar with forest-conditions and the necessity of forest-preservation, sends us, at our request, the following note upon the proper use of the "Jack Pine" (*Pinus Banksiana*) lands so common in the north-central part of the state:

"In looking over the region the importance of keeping out fires is very evident. This sandy soil is not adapted to farming. People will be moving out of the country as soon as the timber is gone. It is therefore important to keep a growth of timber on that land which is not fertile enough to command sale to farmers.

"If fires can be kept from running over the land, timber will continue to grow, and will furnish repeated cuttings of log-timber, piles, ties, cordwood and material for wooden-ware, matches, paper, dyes, acids, tanning, etc. Even the very sandy lands that are cut clean and burned over, and are now worthless, will, if kept from fire, be seeded during the first year, and in a few years be covered with a dense growth of young Jack Pine, with many Norway and some White Pine scattered through them.

"I am aware that most Minnesotians would laugh at the idea of encouraging a growth of Jack Pine; but during a number of years I have given the subject careful attention, and am now convinced that this little, persistent, mean-looking and despised Jack Pine has duties as important and performs them as faithfully as the much sought White Pine. If there were no Jack Pine, I believe a large area in the state would be practically desert to-day, and in proportion as fires are permitted to destroy the young growth, the sandy and rocky land will become desert-like.

"When a tract of Norway Pine timber has been cut clean, and fire kept out, a dense growth of Jack Pine will spring up first; then young Norway Pine will be able to start in the shelter thus formed. As the Norway grows more rapidly, the Jack Pine is soon left as an undergrowth, which serves to prevent the growth of limbs on the trunks of the Norway. In about thirty years the Norway Pine will be large enough to do without the nursing of the Jack Pine, which may then be cut for cordwood, and the Norway, where too thick to leave for log timber, may be thinned for piles and ties, leaving the remainder a tract of clear timber to be coveted by every lumberman, and a good return for reasonable care to encourage tree-growth on land otherwise worthless and unsalable.

"I would earnestly recommend that the existing laws concerning forest fires be rigidly enforced, and such other measures taken as to keep the poor land in timber, thus holding what population there may be now, and even furnishing employment for a greater."

Felling Trees by Electricity.—Hitherto machines for felling trees have been driven by steam-power, but this is often inconvenient, especially in thick woods, because the heavy machinery, including a boiler, must be placed near the tree to be cut. These machines, therefore, can only be used on the borders of forests or in open spaces readily reached by good roads. The *London Times*, however, reports that electric power has been adopted in the Galician forests. Usually in such machines the trunk is sawn, but in this case it is drilled, with a series of holes close together. When the wood is of a soft nature the drill has a sweeping motion, and cuts into the trunk by means of cutting edges on its sides. The drill is actuated by an electric motor mounted on a carriage, which is comparatively light and which can be brought up close to the tree and fastened to it. The motor is capable of turning around its vertical axis, and the drill is geared to it in such a manner that it can turn through an arc of a circle and make a sweeping cut into the trunk. The first cut made, the drill is advanced a few inches and another section of the wood is removed in the same way, until the trunk is half severed. It is then clamped, to keep the cut from closing, and the operation continued until it would be unsafe to go on. The remainder is finished by a hand-saw or an axe. The current is conveyed to the motor by insulated wires brought through the

forest from a generator placed at some convenient site, which may be at a distance from the scene of operations. The generator may be driven by steam or water power and does not need to be transported from place to place.

Recent Publications.

The Book of Sun-Dials, compiled by the late Mrs. Alfred Gatty. New and enlarged edition, edited by H. K. F. Gatty and E. Lloyd. Messrs. Bell, London, 1889.

"Whoever loves a garden," it has well been said, "loves a sun-dial," and we need no further apology for introducing this book to our readers. The first edition was published in 1872, and has remained the standard authority on its subject. Now it is republished in a much enlarged shape, the number of dial-mottos quoted being increased from 377 to 728, and an appendix on the construction of dials being added.

The earliest form of sun-dial was an isolated column or obelisk, which served as the "gnomon," and threw its shadow upon the ground. Such an arrangement could not be scientifically accurate in its measurements, for, as the book before us explains, "the gnomon that indicates the time of day must slope to the horizontal plane at an angle equal to the latitude of the place, and must also lie due north and south." Despite the astronomical lore of the Chaldeans their dials were probably of the primitive columnar kind, as we know to have been the case with the one which Ahaz, king of Judea, set up in the eighth century B. C., probably having got the idea for it from Babylonia. Dials more nearly approaching to the modern kind were known in classic Greece and Rome; but it seems to have been a late day when their function was universally understood, for during the first Punic war a dial captured in Sicily was set up in the Roman forum, where, of course, it could not tell the hours with exactness. All through the middle ages the sun-dial was the usual, almost the only, instrument for marking the time, and it was not abandoned even when clocks and watches became cheap and common. Almost every old church once had its dial, and the clock which now appears on so many English churches usually shows the station formerly held by the gnomon and circle. A national English custom—shown in some of the great cathedrals as well as in very many parish churches—was to make the south door, not the one in the west front, the chief place of entrance; and over this door the dial was usually set upon the wall. In the early days of the Reformation, when so many mortuary crosses were injured or defaced as bearing superstitious emblems, it was common to turn them into sun-dials, cutting off the top to secure a level space where the gnomon and its brass plate might stand. The finest standing dials in Great Britain seem to date from the period when the classic style of gardening ruled—the seventeenth and the early eighteenth centuries. The most stately of all is perhaps the one which stands at Glamis Castle (famous through its connection with Macbeth), near Forfar in Scotland, which is an elaborate architectural construction bearing no less than eighty dial-faces. Pretty conceits are sometimes found in which the service of a true dial is simulated by growing plants. At Wentworth Castle, near Barnsley, for example, a tall Yew-tree serves as a gnomon, while an encircling plantation of Box is cut into the form of a dial-plate and its figures. In southern countries, where there is a more constant sun, dials are still more frequently found than in England, and every traveler will remember them as forming, very often, the quaintest and most suggestive feature in an ancient garden. Mrs. Gatty and her editors have covered a wide field in searching for the inscriptions which were almost invariably placed upon the sun-dial; and the large collection of mottoes given in the new edition now before us is both instructive and amusing. Of course brief familiar mottoes such as "Tempus Fugit," "Improve the Time," "Fugit Hora," "Docet Umbra," "Così la Vita," "Carpe Diem," *Brevis Hominum Vita*, "Via Vita," "Vigilate et Orate," *Vita Sic Transit* and "Work While it is Day," represent the most common class of inscriptions, but there are many in various languages which are much longer, and are either quotations from some poet or original exhortations to improve the passing hour and remember the coming of the night wherein no man can work. "You may waste but you cannot stop me" is one, and another is "Life is Short, Time is Swift, Much is to be done." From among the longer English verses we select a few, although choice is difficult where so many are interesting, and foreign languages are still richer in epigrammatic examples.

"Time's glass and scythe
Thy life and death declare;
Spend well thy hours and
For thy end prepare."

"Give God thy heart, thy hopes, thy gifts, thy gold;
The day wears on, the times are waxing old."

"Haste, traveler, the sun is sinking low;
He shall return again, but never thou."

"May the dread book at our last trial,
When open spread, be like this dial;
May Heaven forbear to mark therein
The hours made dark by years of sin;
Those only in that record write
Which virtue, like the sun, makes bright."

For Lady Abney at Newton, Dr. Watts wrote the following:

"So rolls the sun, so wears the day,
And measures out life's painful way
Through shifting scenes of shade and light,
To endless day or endless night."

But much prettier is the following, a modern imitation of the style of old mottoes, designed for a dial in a flower-garden, with which we must close our brief list:

"I stand amid the summere flowers,
To tell the passage of the houres;
When winter steals the flowers awaye,
I tell the passinge of their daye.
O man, whose flesh is but as grasse,
Like summere flowers thy life shall passe.
Whiles tyme is thine laye up in store
And thou shalt live for evermore."

Here and there in old American gardens sun-dials may still be seen, although it is doubtful whether any are erected at the present day or whether a skillful professor of "gnomonics"—the art of dial-setting—could be found in America. It would be interesting to know whether any inscriptions worth quotation exist on this side of the ocean.

Correspondence.

Arbor Day at Michigan Agricultural College.

To the Editor of GARDEN AND FOREST:

Sir.—I have been much interested from time to time in the sensible comments of GARDEN AND FOREST on the modes of observing Arbor Day. Where a programme is devised by persons who have little knowledge of botany, horticulture or forestry in its true and broad sense, there is great danger that the exercises may accomplish as much harm as good. We have had quite enough of mere unadulterated sentiment on this very important subject.

After such comments it may be venturesome to send a few notes on the observance of Arbor Day at this place. One hour was occupied by the writer and nearly sixty students who were introduced one after the other, each to present some selection from a reliable source, or to produce original notes:

(1) Reading the Arbor Day proclamation; (2) the origin of Arbor Day (in Nebraska); (3) verses from the Bible on trees, by the President of Y. M. C. A.; (4) quotations from Shakespeare; (5) uses of Arbor Days, GARDEN AND FOREST, p. 13, vol. ii.; (6) selection from Nebraska's Arbor Day book, B. E. Fernow; (7) "The Planting Season is at Hand," A. J. Downing; (8) "Cherish Trees," A. J. Downing; (9) "Plant Trees," A. J. Downing; (10) "What to Select," A. J. Downing; (11) "Plant Home-grounds," from Nebraska's Arbor Day book, Professor L. H. Bailey; (12) "Plant School-grounds next," L. H. Bailey; (13) "Plant the Roadsides," L. H. Bailey; (14) "What Shall We Plant?" L. H. Bailey; (15) "Plant Many Shrubs," L. H. Bailey; (16) verses; (17) "Plant a Tree," verses by Edith M. Thomas; (18) "Plant a Tree," Ex-Gov. Larrabee, of Iowa; (19) "Plant in Memory of Some Friend;" (20) "A Tree is a Valuable Possession," GARDEN AND FOREST, p. 37, vol. ii.; (21) "A Love for Trees," A. J. Downing; (22) "Tree-planting," Dr. O. W. Holmes; (23) "How to Take up a Tree;" (24) "How to Set a Tree;" (25) "Don't," a series of precautions; (26) "Value of Trees," Whittier; (27) "Beautiful Trees," A. J. Downing; (28) "The Beautiful in an Ornamental Tree," A. J. Downing; (29) "The Tree as Improved (?) by the Tree-pruner," A. J. Downing; (30) "Beauty of Autumnal Foliage," A. J. Downing; (31) "Proud Monarch of the Forest," verses; (32) "The White Oak," Dr. O. W. Holmes; (33) "Peculiarities of the American Elm;" (34) "Management of our Forests," GARDEN AND FOREST; (35) "Needs of American Forestry," GARDEN AND FOREST, p. 13,

vol. ii.; (36) "Needs of American Forestry," GARDEN AND FOREST; (37, 38 and 39), extracts from GARDEN AND FOREST, on "Providing for the Conservation of our Forests."

Two years ago a portion of the day was given up to comments by some of the professors in a lecture-room, where students and others had assembled. Each class and society, including the girls, planted a tree with some ceremony. The trees were publicly accepted by the president of the college, and good care guaranteed. At the last Arbor Day, reports were made stating the species of the tree, where it was located, how much the upper branches had grown last year, what care it had received and whether any insects had injured it. The statements brought out facts, showing that it is vastly easier to plant trees than to give them proper care afterwards. Not one of the entire number had made satisfactory growth, and only one had received any cultivation; none had been mulched, but they were left in the grass where, in several cases, the soil was too thin to guarantee thrift. Of the twelve trees one was dead, two others nearly so, one had been cut down and was sprouting up again, several others were having a severe struggle with grass and a thin soil and a lack of moisture. Several had been damaged by borers.

The last two classes planted trees this year and made reports.

The quotations above indicate that your journal is making some impression in at least one school of agriculture.

Agricultural College, Mich.

W. J. Beal.

The Newtown Pippin.

To the Editor of GARDEN AND FOREST:

Sir.—I was much interested in the letter of Mr. Robinson, the editor of *The Garden*. He had evidently been eating an Albemarle Pippin, a strain of the yellow Newtown Pippin, which the Americans, he quotes, probably never saw, for few of them stop on this side of the water. Doubtless the great majority of American Apple-growers have Apples better than the Newtown Pippin is with them, for there is no Apple grown which is so fastidious as to its location. Even here, where it reaches its highest perfection, it is utterly worthless a mile away from a mountain-side. And yet the lands, which of all others, produce this Newtown Pippin in the highest perfection, the mountain coves and slopes of the Blue Ridge in Albemarle, Nelson and Green Counties, of Virginia, can to-day be bought at very low figures. Here in Albemarle few growers of Mountain Pippins ever think of gathering and packing their own fruit. The agents of the English shippers come all through the hills, buy all the Apples at a set price, and at the proper time bring their barrels, gather and ship the fruit. Occasionally a large grower packs and ships his fruit direct to Liverpool, and makes largely by so doing. Last fall Apples of all kinds were very abundant and low in price, and yet the Liverpool shippers paid here for the fruit on the trees \$2.50 a barrel and furnished the barrels and packed them. The year before the price was \$4.50. It is well known that the Albemarle Pippin always leads in price Pippins grown elsewhere, and some are disposed to question its identity with the yellow Newtown Pippin. The great majority of us, however, are willing to admit their identity, but adhere to the name of Albemarle Pippin as expressive of the choicest Pippins sold.

Crozet, Va.

W. F. Massey.

To the Editor of GARDEN AND FOREST:

Sir.—I do not think the Newtown Pippin is unduly neglected. It is not a profitable market variety for the northern States, and is entirely eclipsed for profit by the Baldwin at the East and by the Ben Davis at the West, both of which are inferior in quality, especially the latter. Our people in this country well understand where to find the best returns, and with this view the Newtown Pippin has been generally discarded at the North as a market fruit. It is still cultivated both East and West as an amateur variety.

I have not had an opportunity of comparing the Albemarle with the Newtown Pippin, but have always taken it for granted from the examination of others who are competent pomologists, that they are identical.

In some localities further south the Newtown Pippin succeeds better than here. I have examined specimens from the neighborhood of Cincinnati which were larger and smoother than we have them. In some parts of Virginia (not on the lowlands) it has succeeded well and has been largely raised for market. In other places it has entirely failed. It was formerly more extensively raised in New York than at present, but its liability to become scabby was a severe drawback. R. L. Pell, who formerly had a large orchard of this Apple in Ulster

County, with all his care in cultivation, had to throw out many defective specimens in sorting for English markets. He informed me that in making an extra selection of the very finest he took at the rate of about one specimen in a half bushel, and these sold for about double the usual price—nevertheless, they did not pay cost. This was some forty years ago.

I never quite agreed with A. J. Downing that the Newtown Pippin stood at the head of all Apples, and was "unrivalled in all the qualities which constitute a high-flavored dessert fruit." Different individuals have varying preferences, and I have known a person who from early association preferred the coarse Pennock to all others. I would place such Apples as Northern Spy, Swaar, Red Canada and Jonathan, as quite equal in quality to the Newtown Pippin, while Esopus Spitzenburgh is hardly equalled in high flavor by any Apple. The Newtown Pippin loses less by shipment across the ocean than most others, which is doubtless one reason why it is so highly esteemed there.

I have no doubt that this fruit, as grown in favorable localities in Virginia, is better than in New York, judging from the fact that the Cincinnati specimens which I have received were larger and fairer than our spotted and defective ones here.

Union Springs, N. Y.

J. J. Thomas.

[The letter above was not written for publication, but every statement or suggestion made by Mr. Thomas in relation to our fruits is worth preserving.—Ed.]

The Germantown Nurseries.

To the Editor of GARDEN AND FOREST:

Sir.—These nurseries are situated within the limits of the city of Philadelphia, where land is worth four or five thousand dollars an acre, and when I asked Mr. Thomas Meehan, the senior member of the firm, if he was not cultivating rather expensive soil, he replied that he could not afford to conduct his business on cheap land. He went on to say that if his nurseries were moved back into the country the money saved by reduced interest on the price of land would be more than counter-balanced by the increased cost of labor and manure, of transportation, and, in short, of everything he had to buy for his business. As a matter of fact he sells hundreds of thousands of Osage Orange plants, raised on this city property, for hedges on western farm-lands. He added that in a remote location his business could not advertise itself as it now does so cheaply and to such advantage, and he considers this effective advertising an important factor in the success he has achieved. And really there are few places in the United States where a fine collection of ornamental trees and shrubs would attract so many interested and appreciative visitors. Germantown is as old as the big city, which absorbed it more than thirty years ago, and it has always been the home of wealth and refinement. Here lived noted botanical collectors early in the century, and rare and beautiful trees were planted on most of the old estates. Although these estates have been cut up, many of the venerable trees have been carefully preserved. A drive through the town will take one by a Pecan-tree, for example, a hundred feet high, which, by the way, bears fruit about every other year. Not many Pecan-trees were growing in the Middle States when the nut was planted, or the seedling set, which has developed into this superb specimen. Here, too, is a *Magnolia Fraseri* fifty feet high, which was certainly one of the first ever brought to the North, and a Yellow-wood, which Audubon probably brought here on horseback. Magnificent English Elms, and Yews unmatched in this country, not to speak of countless grand old native trees, testify that the people of Germantown in the first half of this century had learned to select good trees, and knew how to plant and how to care for them after they had been planted. Under the influence of such traditions and such living examples, the new-comers who have been drawn here to find a country life in the city are lovers of trees and shrubs, and Thomas Meehan & Son stand ready to satisfy their longings.

It was on the 22d of May when I reached Germantown, but the trees seemed already dressed in the full foliage of June. The Tulip-trees, which are very abundant here, were covered with flowers, and the White Fringe was blossoming on the lawns. On either side of the entrance to the Nurseries I found a Weeping Elm, and the pair bear witness to the genial conditions of soil and climate here, standing some forty-five feet high—a growth made in twenty years. These trees have a distinctively pendulous habit, and were among the earliest planted of the variety which has been sold as the Weeping, Red or Slippery Elm. The seed this year, however, makes it plain that this form is really a variety of the White or American Elm. Other trees besides the Elms grow here with notable

rapidity, and one of the most interesting studies is a long row of various kinds which were set out fifteen years ago when less than an inch in diameter. Of all these, a *Celtis* now takes the lead with a diameter of about ten inches, but many of the Oaks are following close after, among them a Red Oak, a Chestnut Oak, a Black Oak and a beautiful Swamp White Oak. These specimen Oaks reminded Mr. Meehan to say that he finds the Oaks, as a class, among the easiest to grow, and he has no difficulty in transplanting even large specimens. He added that if his business had developed in the direction of any specialty it was towards the sale of large trees. A man who moves into Germantown and builds a house insists on planting some trees about it that are big enough to drop a shadow on his lawn. He wants a tree which he can see now, and not a little seedling with only the hope of a tree in it. He asks for trees twenty-five feet high and he gets them. In Mr. Meehan's practice, that much-talked-of ball of earth about the roots is dispensed with, and yet large trees are rarely killed or severely checked by removal. His process is to spade out a circular ditch two feet deep, with a radius of six feet, say, from the centre of the tree—greater or less, according to size—and then to carefully throw back all earth from the roots within the circle with a fork. The saving of all the smaller roots he considers useless. No root carried away with the tree takes up any food or moisture. This work is done by the fine root-hairs that are thrown out after the tree is set. The best time to take up the tree is after the leaves have ripened in autumn, but before they have fallen; and this gives time to make working roots before frost, so that the tree can be supplied with moisture to protect it against excessive drying out in winter. Of course the earth should be packed tightly about the roots. Mr. Meehan's directions are to plant the tree as you would set a post—ram very firmly, and then a big tree will need no staking.

A walk through the sixty-five acres devoted to ornamental trees and shrubs showed that something like a thousand varieties are grown here, mainly for a retail trade. Among our western conifers I noticed thrifty specimens of Lawson's Cypress and *Thuja gigantea*, while *Pinus contorta*, which is often a disagreeable subject to handle, did not seem at all unhappy, a result which Mr. Meehan attributed to the fact that it was grafted on Scotch Pine stock. But space would fail if even the names were given of all the interesting conifers which are grouped here in the specimen grounds. One, however, must not be omitted—a *Thuja (Retinispora) squarrosa* which set out in life with the bluish-gray and closely-massed foliage of this variety. But after a year or so the tree saw fit to abandon this juvenile form, and it forthwith assumed another, throwing out the soft green, feathery spray of *T. plumosa*, and so it stands to-day, with the upper branches as distinct from those near the ground, as if one belonged to a graft and the other to the stock. Many other eccentricities were pointed out, as, for example, a seedling *Halesia*, which differs from the type in characters strong enough to place it in a distinct genus, while seedlings from it have reverted to the original form. I observed that our native shrubs were grown in great abundance, and Mr. Meehan said that for planting large places especially, there was a rapidly increasing demand for them, and, in fact, for native trees as well. Foreign shrubs, however, are not neglected, as a block of two or three acres of *Viburnum plicatum* testified. These plants were all white with snow-balls, and made a pretty sight; nor were they unprofitable, for every one had been spoken for by a city florist, and the money received for the crop would go far towards paying for the production of the plants. This was noticed as another advantage of tilling an urban farm.

Upon the lawn about Mr. Meehan's house are many trees of exceptional beauty and interest. The original Weeping Dogwood stands here, and no tree with pensile branches can be more graceful. Near it is a perfect specimen of the lovely Oriental Spruce, and not far away is a very large *Picea pungens* which has a softness of outline unusual in this somewhat rigid tree. The largest Golden *Retinispora* I have ever seen is here, and is, I believe, one of the first four which came to this country, having been presented to Mr. Meehan by Mr. Francis Parkman. A large specimen of the dark-leaved Japanese Maple was pointed out as an example of the vigor and health which characterize these trees when grown on their own roots, and nearly every other tree had some special interest from its history or from the lesson it taught. After the instructive walk through these grounds, a delightful hour was spent in the library, which contains a remarkable collection of works on horticulture and the sciences related to it. Many of the books are presentation copies from such authors as Darwin, Hooker, Gray and Engelmann. One little manu-

script volume contained a complete list, by Mr. Meehan, of all the evergreens growing in the plant-houses at Kew Gardens in 1845, and it is on record in Bromfield's "Flora Vetcensis," edited by Hooker & Salter, that at a period still earlier than this a new variety of *Veronica Chamedrys* had been detected in the Isle of Wight by Thomas Meehan, aged fifteen years. The eye of the botanist is still undimmed and his natural force is not abated, but these glimpses of his early life remind us how many years have been industriously given to his favorite pursuit. The city of Philadelphia now claims his services, and has for several successive terms, as Councilman. He has been active, among other things, in securing the purchase of Bartram's Garden and other land for small parks, and these will, no doubt, prove a source of health and refreshment to the thronging population of the great city of the future. Let us hope, however, that he will undertake no labors which will interrupt his studies or quite deprive the horticultural world of such instruction as he imparted for so many years in the columns of the *Gardeners' Monthly*.
Philadelphia.

S.

Notes.

An International Congress of Agriculture and Forestry will be held in Vienna during the summer of 1890.

The famous Botanical Gardens at Edinburgh are now for the first time opened to the public on Sundays.

Myosotis alpestris, Victoria, proves to be a perfect border-plant in this latitude, hardy without protection and easily multiplied by division or from seed.

The Cucumber Flea Beetle, which did so much damage to Potatoes in many places near this city last year, has again attacked the leaves of these plants, and the remedies so far tried have not been able to check its ravages.

Concerning *Magnolia Campbellii*, of which mention was made in this journal last week, Mr. S. B. Parsons writes that twenty years ago he imported a plant two and a half feet high, for which he paid five guineas. It grew well, but was not hardy in the open air.

Mr. Josiah Hoopes sends us some immense, snow-white clusters of the sterile flowers of *Viburnum macrocephalum*, with the note that it is one of the most conspicuous plants on his grounds, and the shrub is flowering better than ever before at the Arnold Arboretum. This *Viburnum*, which was mentioned in this journal last year (vol. i., p. 226), seems much more vigorous about Philadelphia than it is further north.

The crop of "May Haws," as the beautiful fruit of *Crataegus astivalis* is called, has been very abundant the past spring in western Louisiana. It ripens there in the latter part of April or early in May, and is gathered in great quantities and brought into the towns and sold for making jellies, jams and preserves, for which it is well suited. This is one of the most beautiful of all the Hawthorns, and would be a desirable ornamental tree in the South, although it is doubtful if it has ever been cultivated.

A report that will prove of special interest to residents of the territory drained by the Rio Grande has lately been made by Professor G. E. Curtis, of the United States Geological Survey. The report contains information as to the amount of snow which fell last winter along the tributaries of the Rio Grande, and this amount is used as a basis for estimating the probable amount of water which will be available for use by farmers and stock-raisers during the coming season. Questions as to the depth of snowfall were answered by 120 persons, and the general amount and distribution of the snow were clearly indicated. As a whole, the snowfall seems to have been above the average, although in one considerable region it was much less than usual. It will be interesting to observe how far the predictions as to the water-supply will be fulfilled.

During the week past the United States Nurseries, at Short Hills, New Jersey, have been thronged with visitors to see the remarkable display of rare Cypripediums now in bloom, as well as many other choice Orchids. The most wonderful specimen of all is a new *Cattleya*, belonging to the *Gigas* type. The stout pseudo-bulbs are between nine and ten inches long, and the leaves are very thick, one foot long by nearly five inches broad. The plant carries two spikes of flowers, one with six, the other with four flowers. The individual flowers are of enormous size, each of the petals being five and a half inches long by three broad, and the sepals are of the same length, the whole being a deep lake color. The lip is three and a half

inches broad, rich purple, with two yellow eyes. This is the first time the plant has flowered since its importation, and it is pronounced by enthusiastic Orchid-growers the grandest *Cattleya* they have ever seen.

The centre of bulb-culture in Holland, says *Gartenflora*, is still at Haarlem, as it has been during two centuries and a half. Hyacinths are especially in favor just now, and ground suitable for their cultivation has sold for as much as \$13,500 an acre, as against about \$1,000 given for land of other kinds. The expense of cultivation is placed at about \$300 an acre for Hyacinths and \$160 for Tulips; and it is noted that artificial manures are never used. Narcissus is also grown in vast quantities near Haarlem, chiefly for exportation to England. Formerly the export trade in cut flowers was enormous, one Haarlem firm having exported in a single season 10,000 cases; but an agreement was last year entered into by a majority of the Dutch florists to abandon the sale of cut flowers as competing with the interests of purchasers of bulbs. Attempts have been made to extract the perfume of Hyacinths, but only with moderate success, especially from the commercial point of view.

The *American Florist* recently published a picture of a very pretty basket of flowers in which Roses, Orchids and Carnations were disposed in a loose and graceful way, and so massed that both contrast and harmony were secured. Sensible words were spoken in the accompanying text where it was hoped that the sight of so charming an arrangement "will result in converting to more natural methods some of that altogether too numerous class who turn out those stiff, formal arrangements in which the grace and loveliness of each flower is annihilated by crowding together as compactly and evenly as the blades of grass in a smoothly-shaven lawn. In the 'elevation of our profession' the retail florist has a grand opportunity here to do his share. The better class of flower-buyers—people of wealth and taste who are large buyers—are quick to appreciate a really artistic arrangement and will pay well, not only for fine flowers, but for the taste and skill displayed in their arrangement."

A late number of the *Popular Science Monthly* contains a sensible letter on "Silk Culture in the United States" by Mrs. M. W. Brooks, of Salem, Massachusetts. This letter clearly shows, by quotations from various authorities, that the risks of this business are too great and the competition with Chinese labor too close for it to afford American women any fair chance of earning a livelihood. "The raising of silk-worms involves a minute and incessant labor such as Orientals appear to be alone thoroughly fitted for, and it is not at all adapted to the capacities of American women. . . . Silk culture is no experiment, even in this country; it simply does not pay a people who want to earn more than one cent per hour." An example is given of a case that has been quoted as "successful." In Johnson County, Missouri, two women and four children "tried the experiment for two years." The net profits at the end of the two years were \$57.90. It is no wonder that Mrs. Brooks thinks that the Department of Agriculture in Washington might do better work than that distribution of silk-worm eggs, in which it is still engaged.

On the 4th of May Professor Bickmore delivered at the Museum of Natural History, in this city, the last of the series of one hundred lectures to the teachers of New York City and State, which he has given under the direction of the State Department of Public Instruction. His subject was "The Forests of America," and, with the help of excellent stereopticon slides, he showed how the three main currents of wind which perpetually encircle the globe have governed the distribution of its forests. South of the Tropic of Capricorn, he explained, the wind blows continuously from the west, and is deprived of its load of moisture by striking the mountains near the western coast. Here, therefore, one finds a rich forest-region, while the dry pampas of Buenos Ayres stretch between the mountains and the Atlantic. In the equatorial regions, between the Tropics of Capricorn and Cancer, the wind blows steadily from the east; hence the enormous forests of Brazil and, across the Andes, the desert, because rainless, region of Peru. North of the Gulf of Mexico the current of wind is again from west to east, producing the heavy forests of the Pacific slope; and beyond the Rocky Mountains, which have condensed all moisture on their western sides, lies that vast interior region which, dry and unpromising as it seems, needs only water to make it blossom as the rose. The verdurous tree-clad condition of the eastern coast region is owing, of course, to the fact that local winds bring them moisture from the Atlantic Ocean.

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Fairmount Park.

FAIRMOUNT PARK in Philadelphia illustrates two things: the importance of careful preliminary studies of the ground on the part of a landscape-gardener of experience and training before an urban park is located, and the necessity of devising some better method than now exists for the permanent management of parks in American cities.

Fairmount Park is one of the largest urban pleasure-grounds in the world. The site along the banks of the Schuylkill River is in itself beautiful; the surface is undulating and diversified, the soil is excellent, and there is no American park, with the exception, perhaps, of Druid Hill Park in Baltimore, which can show such noble trees—some natural, especially Tulip-trees and White Oaks, and some planted, for several fine old country places were embraced in the park. The drive along the Schuylkill in the East Park is certainly in itself, in spite of many disfigurements, one of the noblest pleasure drives in existence, while the narrow gorges of the Wissahickon supply much that is charmingly natural and delightful. But Fairmount Park, in spite of its great size and of all these natural advantages, cannot be considered successful, either from a practical or from an artistic point of view; and no trace of a master mind can be found in its location or in its treatment. Much of its value to the people of Philadelphia is lost, because of its remoteness and difficulty of access from the centre of population; and the inadequacy and inconvenience of all the park approaches are serious injuries to the appearance of the city and a real drawback to the proper enjoyment of the park. The great drive in the East Park is reached through a narrow and rather obscure street filled with the tracks of a surface road, the immediate entrance to the drive itself being through the narrow arches of a railroad bridge. Railroad lines skirt the park in all directions. One of the main drives from the West Park to the Schuylkill plunges down a steep hill to a railroad grade-crossing of the most dangerous character, while the entrance to the beautiful Wissahickon drive is under a railroad bridge. Rail-

road tracks separate the West Park from the banks of the river, which is crossed by a railroad bridge within the park limits.

Had the people of Philadelphia when the spirit first moved them to possess a park called upon some man of experience and ability to advise them about its location and to propose a scheme of approaches and a system under which extensions of the city should be built, it is safe to say that they would have had a much more convenient and satisfactory park than they have at present; and that the cost of the advice would have been saved many hundred times over. The greatest landscape-gardener might not have succeeded in overcoming all the railroad difficulties in the situation, but it is safe to say that a man of adequate experience in the treatment of such problems could have brought the park into closer and more satisfactory relations with the centre of population than now exist and thus increased its value and usefulness. The mistake of not taking proper advice in the location of the park lands was repeated when it came to construction; and much of the work done within the park is not of a character to develop all its great natural beauties.

But Fairmount Park as it is now located cannot be changed, and it is not probable that the general scheme long ago adopted for laying it out will ever be greatly modified. Of the past history of the park, except as a warning to other cities, it is therefore less important to speak than of its present and future condition. The most casual examination shows that Fairmount Park is in a miserable and alarming condition. The roads are neglected and often badly gullied; the grass is totally uncared for, uncut, filled with weeds, and often killed out over considerable areas. The young plantations are choked with weeds and apparently abandoned to their fate. Old trees are perishing through neglect. The pretentious gardens in the neighborhood of Horticultural Hall show what a few years of neglect can accomplish, and how much out of place such gardens are in public grounds. Horticultural Hall itself, which contains some of the largest tropical plants which can be seen in the United States, would delight the enterprising and curious entomologist more than it can the lover of plants.

The condition of Fairmount Park shows what effect unrestricted political influence must have upon an organization requiring such careful, intelligent and sustained management as a great city park of rural character. It is merely a question of time, unless the management of city parks can be divorced from politics, when all their rural character and real value will be destroyed. The politicians have their grasp already firmly fixed upon Prospect Park in Brooklyn, and it is hoping beyond hope to believe that it can be rescued from their clutches. The Central Park in this city has been saved because there happens to be two or three men able to realize what the park is, and what its value to the community consists in, who have sufficient public spirit and sufficient ability to enforce their views upon the public. But new dangers threaten Central Park from all sides, and nothing but extreme vigilance can ward off the attacks of selfish and unscrupulous men.

There is, however, a ray of light in the east, when Mayor Hart's gallant and successful fight to take the Boston Park Commission out of politics and to place it in the hands of experienced men of affairs, brings hope to all interested in the development of the new park system. But even in Boston this change for the better cannot be permanent under existing political methods, and there can be no improvement in the management of American urban parks until they are placed under the control of bodies of men who are not dependent upon political patronage or political influence for their appointments, and who will manage this trust in the interests of the public, and not for the advancement of one or of the other political party. Fairmount Park is a lamentable spectacle, but it may be made to point a moral, and to illustrate the dangers of political influence in the management of parks.

Heinrich Gustav Reichenbach, for twenty-six years Professor of Botany and Director of the Botanic Garden at Hamburg, and the most learned orchidographer, is dead in his sixty-seventh year. It was as a student of Orchids that Professor Reichenbach was best known to the present generation of botanists and horticulturists; his earliest labors, however, were devoted to general botany; and he did good service in assisting his father in the preparation of his now classical "Icones Floræ Germaniæ et Helvetiæ," drawing with his own hand no less than 1,500 of the plates, and editing the final volumes after the death of the elder Reichenbach. The first of these devoted to Orchids was published in 1851—the result of ten years study of the family—and was his first important work upon the subject. He contributed the Orchids to Walpers' "Annales;" and in the "Xenia Orchidacea," a work which has appeared irregularly in parts since 1851, nearly a thousand figures of Orchids from his pencil have been published.

On the death of Lindley, in 1865, Professor Reichenbach became the recognized authority on Orchids, and his time has ever since been occupied in determining and naming the immense numbers of new species which have poured in upon him from all sources, and from all parts of the world. He was overwhelmed with material which he was never able to reduce to systematic order and make really available. His knowledge of details was enormous, but his mind was hardly a logical one in the broadest sense, and lacked precision and the power of grasping clearly the material at his disposal. Knowing Orchids as no one has ever known them, he never produced the systematic synopsis even of the genera and species which the world expected from him. But if the crowning work was left unfinished by Reichenbach, his labors have made its accomplishment by his successors possible, if not easy.

He realized fully the value of the garden collections of Orchids in their influence upon his studies, and there has not been a prominent grower in Europe of these plants during the last forty years whom Professor Reichenbach has not aided with sound information and friendly counsel. His sympathies and interests were broad as the surface of the globe; and not long ago we received a number of letters from him deploring the excessive importation of our hardy Orchids and other delicate herbaceous plants into Europe, and urging us to cry a halt upon this wanton and unnecessary destruction, which he felt could only end in utterly eradicating some of the most charming plants of the American flora.

It is not evident upon whom the Orchid mantle transmitted by Lindley to Reichenbach will now descend, or who there is that can take up the tangled web which has fallen from the hands of our learned and kind old friend.

Recent Botanical Discoveries in China.—III.

Gymnocladus Chinensis.—Easily distinguished from the North American species by its smaller, oblong and more numerous leaflets and much thicker pod. It is the Soap-tree of China, the beans of which are used by the Chinese women to wash their hair. Described as a very handsome tree, growing in the provinces of Anwei, Chekiang, Kiangsi and Hupeh; figured in Hooker's *Icones Plantarum*, t. 1412. It is in cultivation, I believe, in England and France.

Viola.—Violets abound in China, though recent collections have no new, specially ornamental species. *V. Websteri* is a very distinct plant with long, unbranched stems, furnished in the lower part with membranous sheaths in the place of leaves, and those on the upper part of the stems are long and narrow. The flowers are small.

Impatiens.—Several new species of this genus have been discovered, and, as far as one can judge from dried specimens, some of them are very pretty, notably *I. tubulosa*, described in the "Index," i., p. 102. Since the description was drawn up much better specimens have been received from Dr. Henry.

Psilopogonum Sinense.—An interesting new genus of the *Rutaceæ* allied to *Bœninghausenia* and the American genus *Thamnosma*, figured in the "Index," i., t. 3, p. 103. It is a

dwarf, herbaceous plant, with numerous, slender stems springing from a common stock, trifoliate leaves, and small yellow flowers arranged singly nearly opposite the leaves; mentioned here on account of its botanical features, though horticulturists no longer concentrate all their care and thoughts on showy subjects.

Xanthoxylum.—About fifteen species of this genus are now known to inhabit China, and some of the northern ones are certainly worthy of the attention of persons desirous of cultivating variety in shrubs. There are four or five from the extreme north, and *X. dissitum* from the neighborhood of Ichang, is a handsome shrub, or small tree, with ample pinnate leaves.

Kœlreuteria bipinnata.—Described as a very ornamental tree, from the hills near Ning-Po. It is figured and described in the *Revue Horticole*, 1888, p. 393. In foliage it is more like *Ailantus* than that of the old *K. paniculata*, that is to say, in the shape and size of the separate leaflets. Judging from dried specimens, the flowers are very similar. This tree is in cultivation in Europe. In the Kew Herbarium are specimens from Kwangtung of what appears to be a third species of this genus, with foliage almost exactly like that of a *Gleditschia*.

Mucuna (? *Stizolobium*) *sempervirens*.—This is a new shrubby evergreen climber or trailer, producing branches of enormous length, like *Wistaria Sinensis*; but it is doubtful whether it would bear the same amount of cold. *Wistaria Sinensis* ranges from the mountains near Peking to Ning-Po, and Kinkiang and Ichang, if not even further south. Indeed there is a specimen in the Kew Herbarium from Hong Kong, collected by Wright, though without any indication of its origin, whether wild or cultivated. When this beautiful shrub was introduced into England, about the year 1816, it was nearly killed by being placed in a hot-house. At the same time *Rhynchospermum*, or *Trachelospermum jasminoides*, will flourish in a hot-house and flower abundantly, and almost equally as well out-of-doors in the south-west of England. Of this I have seen specimens from the hills near Shanghai, as well as from Formosa and Hong Kong and Ichang, and Maximowicz reports it from the north-west provinces of Shensi and Kansuh. Therefore, *Mucuna sempervirens* may prove hardy in the south and west of England and in similar climates. Respecting the climate of Ichang, Dr. Henry says that it is considerably milder than that of Shanghai, especially in the winter, and that very good Oranges are grown there. As there is not more than a degree of difference in the latitudes of the two places, one would have supposed the contrary to be the case, Shanghai being on the coast and Ichang between four or five hundred miles inland. Dr. Henry describes the flowers as very large, purplish and somewhat fleshy, but when I described the plant, we had only quite young flower-buds, though flowers from Ning-Po were suspected to belong to this species. This point has not yet been settled, and later consignments by Dr. Henry are not accessible at the present moment. On the other hand, M. Franchet, who is elaborating the magnificent collections made by the Abbé Delavay, sends to Kew, flowers from the much more elevated region of Yun-Nan, which he identifies with *Mucuna sempervirens*, after having seen authentic fruiting specimens. These flowers are not more than half the size of those alluded to above from Ning-Po, which are two and a half to three inches long, and certainly do not belong to the same species; yet, the Yun-Nan flowers may belong to *M. sempervirens*, and their relatively small size be due to a colder climate. It seems unlikely that Dr. Henry would have described the Yun-Nan flower as very large. Be that as it may, there is a living, flourishing plant at Kew, and we may not have long to wait for fresh flowers. Dr. Henry writes to the effect that the creeper from which specimens were taken occurs on the banks of the Yangtse, and is remarkable for its size and beauty. It extends along the face of the bank, and is supported by trees and rocks. The diameter of the main stem is sometimes as much as a foot. The flowers are succeeded by pods a foot long constricted between the seeds.

Gleditschia.—Further material is still required for the exact delineation of the Chinese species of this genus. One thing is clear, the Hong Kong species, formerly associated with *G. Chinensis*, is quite distinct, and has been described and figured under the name of *G. australis*. It is remarkably different in the pod, which is sessile, relatively short, more or less curved, very much compressed, except where distended by the seeds, thus having a bullate appearance. *G. Chinensis* and *G. macracantha* are apparently distinct species. The latter differs from the former, not only in its larger spines and larger leaflets, but also in having a very hairy ovary, and a long, straight, flat, nearly sessile pod, containing nearly quadrate, flat seeds, about a third of an inch long. Only cultivated specimens of *G.*

macracantha are known, and of these there are some in the Kew Herbarium from Calcutta, St. Helena and European gardens. What has been taken as true *G. Sinensis* has a much longer-stalked pod, and the ovary is glabrous. The leaf characters offered by herbarium specimens afford little aid in the elucidation of the species. *G. Japonica*, as represented in our herbarium, has oblong, scarcely at all oblique leaflets, and only very young pods, so that no correct idea of the species can be formed therefrom. Both *G. Chinensis* and *G. macracantha* were founded on garden specimens, hence the confusion and difficulties that have arisen. *G. heterophylla* is a very distinct, shrubby species, from north China, having small leaflets, and a very short, thick pod. I am not aware that this is in cultivation.

Æsculus.—Until quite recently it was supposed that *Æsculus Chinensis* was in cultivation. In 1887 a young tree bore fruit in the celebrated arboretum at Segrez, and on comparison with type specimens it proved to be the Japanese *Æ. turbinata*, which is easily distinguished from the Chinese species by the much larger, fewer flowers in the clusters, and the broader leaflets of a rusty brown beneath. *Æ. turbinata* forms a small round-headed tree, hardy in the north of France and south of England. In foliage it is not unlike the common Horse-chestnut, but the leaves are borne on longer petioles and are fawn-colored on the under surface. The flowers are somewhat smaller and similarly colored, pink and white, with brown anthers. A colored figure may be seen in the Japanese *Phonzo Zoufon*, part LXII, plate 17, and the fruit is figured and described in the *Revue Horticole*, 1888, p. 496.

Kew.

W. Botting Hemsley.

New or Little Known Plants.

The Carolina Hemlock.*

THE fact that a coniferous tree of respectable size and of considerable multiplication could escape notice for nearly a century in a region so carefully explored as the hilly portions of North and South Carolina is an example of the difficulty of learning thoroughly the trees of a country, and of the danger of being deceived about them—a danger which even the most careful and experienced observer of forests cannot always avoid. It was not suspected until 1850, when Professor L. R. Gibbes noticed the difference in the Carolina trees, that there were two very distinct species of Hemlock growing in eastern America. William Bartram, who, three-quarters of a century before, explored the very region where the second species abounds, the two Michaux, father and son, as sharp-eyed tree-lookers, or, to use the more picturesque expression of the West, “tree-sharps,” as our woods have ever seen, who crossed and recrossed the region a dozen times; and, much later, Dr. M. A. Curtis, whose knowledge of the southern mountain-flora has never been equaled—all failed to notice, or, if they noticed, to record the distinct, compact habit, the darker green foliage and the larger cones, with broader spreading scales, of the Carolina Hemlock.

The Carolina Hemlock is a small tree, rarely attaining a height of more than sixty feet. It prefers the rocky banks of streams, at elevations of from 2,500 or 3,000 feet, although it is sometimes found on rocky slopes fully 1,000 feet higher. It is never gregarious, however, and it is rare to find more than half a dozen trees growing together. The two Hemlocks may be seen sometimes growing side by side with their branches intermingled, when their distinctive characteristics are made very apparent. No intermediate or connecting form has yet been noticed. The territory through which this tree is distributed is not a large one, and consists of that portion of the Blue Ridge which lies in Transylvania, Jackson and Macon Counties, North Carolina, and in the adjacent parts of South Carolina, at least as

*“*Tsuga Caroliniana*, n. sp., a small tree of the southern Allegheny Mountains, with larger (six to eight lines long, three-quarters to one line wide), darker leaves than the common Hemlock Spruce, retuse or often notched at tip, without stomata above, beneath with two pale bands each with seven or eight series of stomata, strengthening cells under the epidermis or keel, mid-rib, and edges; cones twelve to fourteen lines long, scales oblong, much larger than wide, in 8-13 order, spreading at right angles at maturity, broad bracts, slightly and obtusely cuspidate; scales (two lines long) with numerous (fifteen to twenty) small oil vesicles on the under side, twice shorter than the wing.” Engelm. in *Botanical Gazette*, vi., 223. —Sargent, *Report, Tenth Census, U. S.*, vol. ix., 207; *Gardeners' Chronicle*, xxvi., 780, f. 153.

far as Cæsar's Head, an outlying spur in Greenville County, South Carolina. Our illustration upon page 269, from a photograph by Mr. E. E. Brown, of Asheville, North Carolina, gives an idea of one feature of the scenery of the Blue Ridge—the mountain torrents which pour down through deep-cut rock gorges, over rocky and precipitous beds. It represents the falls of Little River, in Transylvania County, North Carolina, and the coniferous trees seen on the banks are large and old specimens of the Carolina Hemlock. The stage road between Hendersonville, in North Carolina, and Cæsar's Head, passes by this spot, which is one of the most accessible stations of our tree. It is ten miles from “Buck Forest Hotel,” once a famous hunting resort for Carolina sportsmen in the days before railroads destroyed the remoteness and much of the charm of this region, which can still boast, however, some of the finest and most rugged scenery in all eastern America, and a flora unsurpassed on the Continent in beauty and variety.

C. S. S.

Syringa Amurensis.

A FLOWER-CLUSTER of *Syringa Amurensis*, taken from a plant growing in the Arnold Arboretum, appears in our illustration upon page 271. This is the best known and most commonly cultivated of the Lilacs with white flowers, in which the tube of the corolla is short, and which belong to the section *Ligustrina*, so called from the resemblance of the flowers to those of the *Ligustrum*, or Privet.

Syringa Amurensis is a spreading shrub of graceful habit, growing here to a height of six or eight feet. The leaves are ovate or oblong, obtuse, or often acuminate, as on the specimen selected for our illustration, and are contracted into a long, slender petiole. The panicle of flowers is sometimes erect, and sometimes pendulous by the curving of the slender branches. It is short and compact, or more often long, one-sided, and sparsely flowered. The small creamy-white flowers are destitute of agreeable odor; they appear here from the 15th to the 20th of June.

Syringa Amurensis is a native of Manchuria, where it was discovered in 1857 by the Russian botanist, Radde. A few years later it was introduced into cultivation through the agency of the St. Petersburg garden, to which Maack sent seeds from the valleys of the Amour and the Ussuri. *Syringa Amurensis*, as might have been expected, is perfectly hardy here. It is interesting botanically as the type of a very distinct and little known form of Lilac, while as an ornamental plant it possesses considerable value.

C. S. S.

Cultural Department.

Summer Propagation of Shrubs.

MANY of our choice shrubs can be readily propagated during the summer from green-wood cuttings, at much less cost than at any other time of the year; the material is more plentiful and more easily procured, and no fire heat is required. A much longer season, too, is available, another important advantage where large quantities of plants are required. The green-house can then be used in winter for the plants of more difficult propagation. Either a green-house or frames, or both, are required, according to the number of plants to be propagated. A house forty feet long by eighteen feet wide, with two side benches three feet wide, and a centre bench six feet wide, will, under good management, be able to turn out, with the aid of frames in which to harden off the plants, many thousand of the easy rooting kinds, between June and October, after which it can be cleared out and made ready for winter work. Many kinds of material have been used by propagators to strike cuttings in, but I have found nothing better than clear, sharp sand, not too coarse, but free from clay and iron rust. Sand that has been exposed to sun and air for some time is best, but it can be used fresh from the pit, if carefully selected. The sand should be spread on the benches from two to three inches deep for any ordinary soft-wood cuttings, and at this time of the year it is not necessary to drain a bed of this slight depth, if it is carefully looked after.

The sand should be well watered and made as firm as possible with a mallet or brick. Where cuttings are put in firmly they do much the best. They should be selected from young shoots of half-grown wood, if possible, and of medium size, all over-grown suckers being avoided. Cuttings with two to three eyes, certainly not more than four, will be long enough in the case of most plants, although much larger cuttings can be used. Remove the lower leaves, and cut off smooth below an eye, being careful to have a well-sharpened knife. If the upper leaves of the cuttings are large, it is well to shorten them somewhat, to lessen the surface exposed to the air and to help prevent wilting. Soft-wood cuttings of trees or shrubs should on no account be allowed to wilt. Except in rainy weather, I invariably keep a can of water with me, and the cuttings as fast as they are collected are sprinkled and put into a close-covered box until I get to the potting-shed. When cuttings are collected at a distance, I dip each lot, as soon as cut, in water, and wrap them immediately in damp papers, keeping them away from the air as much as possible. On reaching home they are at once spread on the damp floor, sprinkled, cut in lengths and, as soon as possible, put in the bed, where they should barely touch each other, especially in summer, for when they are crowded they are more liable to attacks of fungus, the growth of which is very rapid, often going through large beds in a single night. All care should, therefore, be taken to diminish the danger from it.

As soon as the cuttings are put in they should be well watered, to settle the sand firmly around them. The roof of the house should be shaded with a slight coat of whitewash. For the first week or ten days extra shading should be given inside over the cuttings with strips of light cotton cloth or paper, hung like a curtain, so that it may be easily drawn or rolled up when not in use. The cuttings will usually need shading from nine in the morning until three o'clock in the afternoon, or even later, according to the weather and the construction of the house. If very hot weather prevails a light syringing should be given twice or three times a day, and the floors or paths of the green-house should be dampened morning, noon and night. The temperature of the house should be kept as even as possible by closing early or late, according to the weather. When cloudy all the shade should be removed, if possible, and the syringing discontinued unless the cuttings show signs of wilting, when they may have a slight sprinkling. After the first week or ten days the extra shading should be slowly dispensed with. Most of the cuttings will be well rooted at the end of a month, when they should be at once transferred to boxes or pots of light, rich, sandy earth, planted firmly, and for a few days should be shaded and syringed just as they were on the cutting bench. At the end of a week they will be somewhat established, when they may be treated as ordinary plants, in a green-house or frame, during the first season until the new growth is well ripened. The pots or boxes should be well protected from extreme weather, either in frames or deep pits; otherwise many of the plants will not endure the first winter. It is also well to remember that the soil in boxes or pots, stowed away for winter in pits, should never be sodden or wet. In the spring the plants should be shaken out of the pots or boxes and transplanted into well prepared nursery-beds, kept well cultivated, and at the end of season most of them will be fine, healthy plants. I prefer the boxes to pots, as the plants make better roots, are more easily handled, and pack away better in pit or frame. The boxes I use are made by cutting an ordinary soap box into four, using cheap half-inch spruce for the extra bottoms. The boxes usually last two seasons if housed as soon as they are out of use.

The species of plants that I have found readily propagated in this way are *Berberis Thunbergii*, *B. vulgaris* and its varieties, many of the Clematises, Deutzias, Akebias, Ampelopsis, Baccharis, Bignonias, Callicarpa, *Cornus sanguinea*, *C. stolonifera*, and other Cornels, Cottoneasters, *Eleagnus longipes*, Euonymus, Forsythias, Helianthemums, Itea, Kerrias, Ligustrums, Loniceras, Philadelphus, *Prunus Japonica* and some others, Rubus, Ginkgo, Sambucus, Symphoricarpos, Hydrangea, Syringa, Schizophragma, Decumaria, *Ribes Gordonii*, Styra, Diervillas, Rhodotypos, Vinca, Pterostyrax.

Some Viburnums like *V. cassinoides*, *V. Opulus*, *V. plicatum*, *V. dentatum* and *V. Sieboldii* root readily from soft-wood cuttings; others are best propagated by layering or grafting. Some species of Roses, such as *R. multiflora*, *R. repens* and *R. setigera*, root quite easily, while others, like *R. rubiginosa* and *R. rubrifolia*, refuse to root at all.

Exochordas, Clethras, Andromedas, Hollies, Osmanthus, Sturtias, and other slow-rooting plants do much better under a

bell-glass or double-light frame. Where only small quantities of plants are needed, five or six inch pots, well drained, all the other conditions being the same, can be used in a frame with an easterly exposure instead of the propagating bench. Whatever methods are used, the greatest watchfulness and care must be exercised at all times, or the result will be failure, however well the mechanical part of the work is done.

One of the easiest methods of increasing woody plants during the summer is by layering. This for places where large quantities of plants are not wanted, is the surest way, and requires the least care, after the operation is once completed; and many plants difficult to propagate by cutting are sure in time to root from layers. At one time, in fact, few nurseries of any size were without a place set apart as a stool-ground, so-called, and many nurseries at home, as well as abroad, use this method for increasing many plants to-day. In forming a stool-ground, select a good piece of good, light loam, well enriched with rotted manure. Trench it well and set out the plants from three to six feet apart, according to their habit of growth. This gives plenty of room to work all around the plants after they have been thoroughly established. After removing the soil to the depth of from four to six inches, gently draw down the branches to be layered, fixing them in place by hooked pegs, and, with a sharp knife, after removing the surplus leaves, cut half way through the stem, just below an eye, then drawing the knife towards you, cut the branch lengthwise from one to two inches, according to its size. Cutting the stem of the layer on the under side, as is the usual way, is often followed by the breaking of the layer, if it is at all brittle. This is prevented by making the cut on the upper side and moving the tongue slightly to one side. After being pegged down the layer should be covered with from four to six inches of loam. In many plants it is not necessary to tongue the layer, a slight twist being sufficient. With others it is only necessary to bury the stem, while others again root if the branch is only held in contact with the surface of moist earth. The only attention demanded by layers is plenty of water during the dry season and keeping the ground clean. A special ground set apart for this work is not necessary. Any plant can be layered if a trench is dug around it and filled with good loam, into which the tongued or twisted branch is held. While many layered plants will root in a few weeks, others will take a year, and some two and even three. Some will need to be recut or ringed to make them root. After layers are rooted they should be severed from the branch, pruned and transplanted to the nursery, in the same way as other plants. Almost every hard-wood plant known can be rooted from a layer if the proper time is allowed.

Arnold Arboretum.

Jackson Dawson.

The Bush Honeysuckles.

WE have many species and varieties of the Bush Honeysuckles on the college grounds, most of which have proved as hardy in wood and perfect in leaf as the best of our native trees and shrubs of the west during our recent trying years. As a full list of those now in flower would have but little general interest, I will only name three or four typical forms that will prove valuable over large areas of the country for lawn planting and for ornamental hedges and screens.

Lonicera Xylosteum.—Our form of this variable species we found at Proskau, in north Silesia, where it is used for ornamental hedges and as a bee-plant. Its fine foliage, profuse creamy-white flowers, handsome fruit and spreading pendant habit, also fit it for single planting upon the lawn. In every respect it is an improvement on our common Tartarian Honeysuckle. While our other varieties and species are rarely visited by the bees, *L. Xylosteum* is swarming with them while in flower.

Lonicera alpigena.—Our form of the alpine Honeysuckle is also from north Silesia. Its foliage is large and handsome, and its thick-branched, drooping habit fits it peculiarly for hedge-row or for single lawn specimens. Its flowers are white, followed by red berries as large as small cherries.

Lonicera splendens.—This is listed as a variety of *L. Tartarica*, but it belongs to a very distinct type from east Europe or central Asia. Some of the best named varieties we have, such as *Elegans*, *Gracilis*, *Rubra grandiflora*, *Speciosa* and *Virginialis grandiflora*, evidently belong to this soft-foliaged type with red or yellow berries. We have also been very successful in growing seedlings from this strain. Out of every one hundred seedlings, now eight years old, from seed sent us by Professor Sargent, not one can be found that is not superior in foliage, habit, flower and berries to the old Tartarian form, and some of them have larger flowers and the bushes assume

a handsomer form than any of the French varieties we have. This is specially true of some of the white-flowering seedlings with yellow berries.

In connection with the remark that *L. Xylosteum* is a good honey-producing plant, I will add that our fine hedge-row of the Amur Barberry and our plants of *Acer Ginnala* are also thronged at this time with honey-seekers, while the Spiræas, Siberian Almonds and most other shrubs in flower are neglected.

Ames, Ia.

J. L. Budd.

Notes on Wild Flowers.

ONE of the earliest and prettiest spring flowers is the purple Saxifrage, *Saxifraga oppositifolia*. Its little tufts or mats of dense foliage start into growth as soon as the snow is off in spring, and the solitary rose-purple flowers which im-

At all events the plants in groups thrive better than where each plant is set separately with more room. Of the Dog-tooth Violets (*Erythroniums*), *E. Americanum*, with its pretty yellow flowers, is not difficult to grow. It should be planted in autumn, six inches below the surface, and will flourish in sun or shade. *E. grandiflorum*, from California and Oregon, is easily grown in the same manner, but like all of these early-flowering plants, it does best when planted in autumn.

One of the prettiest early flowers, and not a difficult one to grow if placed in a cool and shaded location, is that charming little Orchid, *Calypto borealis*. It is seldom in flower before the middle of May in its natural home in the dense shade of Arbor Vitæ trees, but when set in the coolest nook of our gardens it is fully a week earlier.

Of the Spring Beauties, *Claytonia Caroliniana* is mostly out of flower, and the *C. Virginica* is just beginning to bloom.



The Home of the Carolina Hemlock.—See page 267.

mediately follow are often so dense as to almost hide the foliage and produce a solid mass of color. It should be set in the autumn, and prefers a moist, loamy soil. It is desirable for slopes of rock-work. Another early species, with white flowers, is the common *Saxifraga Virginensis*, but it is not to be compared in beauty to the former.

Our two *Dicentras* (*D. Cucularia* and *D. Canadensis*) are both early, and are now gone to seed. Their fine, delicate foliage is as beautiful as their flowers. They do best in a rich, well-drained soil, with plenty of leaf-mould about their roots.

The Bloodroot (*Sanguinaria Canadensis*) is a pretty plant, with its large, kidney-shaped leaves and its early, solitary, handsome white flower. It likes the shade and moist, well-drained soil, with plenty of peat or leaf-mould. It does best when planted in clumps of six or ten, so that they will form dense masses of foliage which seem to keep the roots cool.

Both are pretty, and should not be overlooked in making a collection of this class of plants. A rich, shaded and well-drained situation is what they like.

Two very desirable plants now in bloom with us, in the open sunlight with ordinary culture, are the *Mertensia Virginica* (Virginia Cowslip), with its large, hanging clusters of blue or purple flowers, and the *Dodecatheon Meadia* (Shooting-star), with its purplish-yellow flowers. The former is the first in flower, but there is usually little difference in their time of bloom. *Mitella diphylla* (Miter Wort) is in bloom, and its long racemes of small, white flowers are pretty, but we think it not so desirable a plant as the False Miterwort (*Tiarella cordifolia*), which flowers at the same time, producing more showy flowers and much handsomer foliage.

Two charming little plants are *Thalictrum anemonoides* and the Wind Flower (*Anemone nemorosa*). The former seems to

take more easily to cultivation, and is with us longer in bloom. Both have white flowers half an inch or more in diameter, and both like partly shaded situations.

All of the Trilliums are still in flower or are just past blooming. *T. grandiflorum*, the finest of them all, is in its prime. This plant is fast growing in favor in the United States. Large numbers were sent to Europe fifteen or more years ago, but it is comparatively a short time since it has been sold to any extent by dealers in this country. It is very hardy, and does well either in the sun or shade, if in moist, well-drained soil. Not much inferior to *T. grandiflorum* is the Californian variety of *T. sessile*. Its petals are nearly white, and being just above the large, deep-green leaves, they appear to great advantage. The bulb is very large, and often sends up several strong stems, each bearing a flower. *Trillium erythrocarpum* (the Painted Trillium) is handsome, but somewhat difficult to grow successfully. It needs a rich, loamy soil, and the bulbs should be planted deep. All the Trilliums, and there are several other species, like a rich, well-drained soil, and the finest flowers are generally found in the shade.

But the Trilliums are not so interesting as the Lady Slippers. Of these, *Cypripedium parviflorum*, the small yellow species is now in flower, and its purple sepals with the bright-yellow inflated lip make it conspicuous. It is one of the easiest Orchids to grow, and will thrive, either in the shade or sun, and in loamy soil if peat or leaf-mould is plentifully mixed with the earth about the roots. *C. arietinum* is also in flower. This plant needs shade and a moist but well-drained soil. It is not conspicuous, but when brought to its highest state of cultivation it is very handsome. The flowers are small, dainty and reddish-brown and white in color. *C. montanum*, of Oregon and California, a pretty species with white flowers, somewhat resembles *C. candidum*, but usually has more than one flower, while the flowers of *C. candidum* are single. It is not so easily grown as the Eastern species, and needs protection in winter. If strong plants are set in well-shaded and well-drained, loamy soil they will flower for two seasons.

Charlotte, Vt., May 16th.

F. H. Horsford.

Window Ferneries.

A TASTEFULLY-ARRANGED window-garden of Ferns, even if of small dimensions, adds greatly in the embellishment of a home, and is not necessarily a costly experiment to the amateur. Attention is necessary to insure its well-being, but if the plants are selected with a view to their fitness, much disappointment will be avoided.

These miniature gardens may now be had in a variety of shapes and forms, and it may be mentioned that those enclosed by glass usually give greater satisfaction, on account of the less rapid evaporation of moisture.

But whatever plan be adopted, the pan or other vessel in which the plants are placed, should be well provided with drainage, broken stone and charcoal being an excellent mixture for this purpose, which should be placed in a layer in the bottom of the pan, the latter being pierced with holes, so as to allow the easy escape of the surplus water. In the matter of soil it will be found that many of the most suitable Ferns for house use are not very fastidious, provided the soil be light, though a mixture of two parts peat to one of loam, with a fair quantity of rather coarse, sharp sand, will always prove satisfactory.

It is generally best to use those species and varieties that are content with a green-house temperature of 50° to 55°, as, for instance, several kinds of Pteris, such as *P. argyræa*, *P. Cretica magnifica*, *P. serrulata* and *P. serrulata cristata*, and during the summer months *P. scaberula* may also be used, the deciduous habit of the latter making it somewhat unsatisfactory in the winter and spring. *Adiantum cuneatum*, *A. pubescens* and *A. Capillus-Veneris* will prove worthy representatives of the Maiden-hair Ferns, and *Onychium Japonicum* and *Davallia tenuifolia stricta* are among the best in their respective genera for this purpose. A very pleasing effect is produced by the mixture of a few of the coarser-fronded sorts, such as *Lastrea Sieboldi*, *Doryopteris nobilis* and *D. palmata* and small plants of *Polypodium aureum*, with their peculiarly glaucous fronds, make a good contrast with the more delicate-looking species. Small plants of various Palms and other foliage-plants may be used to advantage for centre-pieces in these window-ferneries, *Cocos Weddelliana* being specially adapted to this use, as is also *Geonoma gracilis*, though the latter will not stand nearly as much rough usage as the Cocos. Small plants of *Pandanus Veitchii* and *P. utilis* are admirable, and will keep in condition for a long time, as will also *Aralia Veitchii*, the elegant foliage

of the latter being quite enduring, and making a charming combination with the Ferns.

Another useful little plant for this purpose in this connection, is the Japanese Sweet Flag, *Acorus Japonicus variegatus*, it being easy to grow and very pretty.

A more finished appearance is given to the fernery if the surface of the soil is covered with a carpeting composed of one of the low-growing Selaginellas, such as *S. Kraussiana*, *S. Kraussiana aurea*, *S. densa*, or even *S. apus*, the latter, though a native and perfectly hardy, is not by any means to be despised on that account, being of rapid growth and neat appearance. In the treatment of window-ferneries the often-repeated injunction, never to allow growing Ferns to become very dry, still holds good, and while giving thorough watering at the root, it will be found best to keep the moisture off the foliage, else the latter may soon become disfigured.

W. H. Taplin.

About Melons.—Years ago it was a common practice to plant Melons, literally, in "hills" raised above the surface of the ground, and some still think such a practice necessary. When the seed is sown early there may be some advantage in this, since the elevation will be warmer than the flat surface. But, as a rule, in soil best suited for Melons—a warm, sandy loam—a more thrifty growth and more prolonged health of the vine can be secured by making the hills really hollows. Nothing so promotes the growth of a Melon-vine as the drawing of fresh earth to the stem, and a vine planted a few inches lower than the general surface of the soil, by a gradual drawing-in of the soil by the time cultivation ceases can be on quite a ridge, and thus get the advantage of the hill with the further advantage of having its roots in moister and cooler soil than would have been possible if planted on a ridge. These remarks will apply equally well to Watermelons as to Muskmelons.

In growing Melons for home use quality is the first consideration. Of late years the effort among seedsmen has been to produce a Watermelon with a tough rind, adapted to the long shipment from the South. This has been obtained at the expense of quality. In our home-garden it is of no sort of advantage to raise a Watermelon which will support a weight of half a ton, as some are said to do. Neither do we care for its being "iron clad" or "copper fastened," unless the inside is well worthy of such protection. The newer sorts of Watermelons, while they have been improved for the purposes of the shipper, have not been of the average quality of some of the older sorts. We have found none superior for this region to the "Gypsy" and the "Mountain Sweet." The "Volga" is said to be small and of high quality, but we are growing it for the first time this year and cannot give an opinion upon it. In Muskmelons it is also a good rule to select varieties, not by size and looks, but by their quality for the table. In Muskmelons size is often attained at the expense of quality. Many contrivances have been proposed for protecting young Melon-seedlings from the attacks of the striped bugs, which devour them when in the seed-leaf, but most of them are very troublesome. For many years I have used a little raw bone-flour, dusted over the young plants as soon as they are fairly up. If beetles are there they leave at once, and the plants are benefited by the application.

Early fruitfulness is promoted by nipping off the tips of the vines when about three feet long.

Crozet, Va.

W. F. Massey.

Garden field-labels are a source of great annoyance. But if labels are not necessary the greater part of the annoyance is at once dispelled. In other words, plant and record your plantings in such a way that you do not need to depend upon labels. But they are convenient, nevertheless. For trees the best labels are made of zinc, cut into strips about one inch by five. The name is written with a pencil, and the opposite end of the label is bent about a limb. For stake-labels I use the ordinary twelve-inch, thin, commercial stake, always primed. These are inexpensive and are exceedingly handy for temporary use. But if more permanent or conspicuous stakes are used, I have found the best to be those which we have recently had cut for us at a planing-mill. They are eighteen inches long, three inches wide and one and a half inches thick, made of clear white pine, and sharpened by a buzz-saw at the mill. Early in spring these are all primed with white lead. They take a soft, broad pencil readily. If they are needed twice during the season, a mark is drawn through the name, and the other side is used. In the winter-time a thin shaving is taken off the stake to remove the name, another priming is given, and the label is again new. In this way the label lasts many years for many things, and although it is somewhat expensive to begin with, it is really the cheapest and most serviceable label made. I like the lead pencil better than a brush

and paint. The lead usually endures longer, and it is easily applied at just the moment the label is wanted. A carpenter's pencil is best for this work.

Cornell University.

L. H. Bailey.

Heuchera Sanguinea.—This plant, now in bloom, justifies all that has already been written and said in its favor. The flowers are borne on long, slender stems and are of a bright coral red. The foliage is handsome also, being mottled with brown. The plants from seed vary considerably in this re-

Papaver bracteatum roseum.—The gorgeous Oriental Poppy is a conspicuous plant just now in the flower-garden, and its merits as a showy border-perennial are pretty generally recognized. *Papaver bracteatum* is, strictly speaking, only a variety of *P. orientale*, differing principally in the leafy bracts attached to the flowers. We have in bloom at the present time a variety of *P. bracteatum*, the flowers of which are fully as large, but the color is a beautiful clear pink similar to that of a Mermet Rose. This plant is known as *P. bracteatum roseum*, and is of English origin. One peculiarity of this plant is that seed-



Fig. 112.—*Syringa Amurensis*.—See page 267.

spect. Our plants are twelve months old from seed, but we find that side shoots are freely produced, and these root readily and soon form nice plants. It would be interesting to know if any one has tested the plant as to its hardiness in the Eastern States, it being a native of Mexico. It will probably prove tender, but even if this is so the plant has the value of producing flowers in winter when potted and placed in a warm house where a temperature of about 50° can be maintained.

lings raised invariably revert to the typical form; this necessarily makes propagation rather slow, and may account for the fact that it has not become common yet, though known to gardens for a number of years. In other respects the plant is as hardy and floriferous as *P. Orientale*, and promises to be quite an acquisition to the list of perennial Poppies, which already contains one sterling variety of American origin—*P. Parkmannii*.

Passaic, N. J.

E. O. Orpet.

Orchid Notes.

Cypripedium bellatulum.—This handsome addition to the dwarf-growing section of Lady Slippers, represented by *C. Godefroyæ*, *C. concolor* and *C. niveum*, was introduced to cultivation early last year by Messrs. Low & Co., of Clapton, near London, but, for certain obvious reasons, they did not mention its native home, which, however, is guessed to be somewhere in further India. Botanically speaking, *C. bellatulum* may be regarded as a very superior form of *C. Godefroyæ*, which it most nearly resembles in shape and coloring. It has already become amenable to cultivation, and there is no doubt that it will soon find its way into every collection of Cypripediums.

In habit it is very dwarf and compact, with elliptic-oblong leaves of a deep green color above, mottled with a paler shade, while the under surface is thickly covered with dark purplish spots and blotches in close contact. The purplish, downy scapes are three or four inches in length, each bearing a single flower about three inches or more across. The upper sub-orbicular sepal, and the oval, depressed petals are usually pure white, thickly covered with large and small brownish-purple blotches and spots, which give them a most handsome and attractive appearance. These blotches show through on the back of the segments, which are often suffused with a purplish tinge. The long, narrow pouch is very small in comparison with the other parts of the flower; it is also white, and covered on the inner, as well as the outer, surface with smaller brownish-purple spots. The staminode, which is longer than that of any other variety of this section, is similarly colored.

The color of the flowers is somewhat changeable, varying from pale yellow to ivory white, while the blotches in some flowers are much larger and more dense than in others. Two varieties of this species already exist; the one called Roseum may be distinguished by the suffusion of rose which pervades the segments of the flower; the other, known as Egregium, is said to have the upper sepal slightly trilobed, and the purple blotches on the front face of the flower are so light in character that no trace of them is discernible on the back.

This species requires very little attention, provided that it is grown in a warm and moist atmosphere. Some plants in the nursery are grown in pots, and others are planted out, and all are doing equally well. The compost used is peat and loam, with a little sphagnum mixed. Some of the plants have been in flower now for three weeks, and are still in perfect condition; they require a rather shady position and not much water.

St. Albans, May, 1889.

John Weathers.

Cattleya Mendellii.—This grand Orchid will now be found in full beauty in most collections, and, with *C. Mossiæ*, will keep up a fine show of bloom for some weeks. Its native home is on the eastern slopes of the Cordilleras, in Columbia, where it may be found on trees and rocks often exposed to the strong rays of the sun, but where there is abundance of water to bathe the roots. The flower generally measures about seven inches across, with white or tinted sepals and petals of wavy outline. Its chief beauty, however, lies in the large, spreading lip, which is very much crisped, with a front lobe of crimson-purple. There are many beautiful varieties; a pure white one with a slight dash of yellow in the throat is called Alba. Bella and Morgania are pale-colored forms; Imperator is an immense flower with a magnificent lip, but the best I have yet seen is one called Superbissima, which was sold in London a few years since for one thousand dollars; the half of this plant is in the collection here. *C. Mendellii* grows very freely, needing plenty of drainage, little potting material, strong heat with plenty of water during active growth, and a long, cool rest, but it should not be kept too dry.

Erides crispum was introduced, nearly half a century since, from Bombay, and may be considered one of the very best of the genus. It is very robust in growth, attaining a height of four or five feet, and when the leaves are retained to the base it makes a very handsome plant. The leaves, which closely clasp the stem, are flat, broad, dark green and leathery, six to eight inches long. From the axils of these arise the erect racemes, which are often branched and bear numerous large handsome flowers about two inches across, white suffused with rose, with a beautiful large lip of rosy-purple, very crisp at the edges, and terminating in a horn-like spur. The variety Lindleyanum is more robust in growth, with larger and more distinct colored flowers. The variety Warneri differs a good deal from the type in habit, is much shorter, more slender, and with short and very narrow leaves, the dark mark at base of the leaves being very conspicuous. All of the varieties grow freely in baskets or pots of moss and peat. With plenty of heat it is hardly possible to give too much water in the

growing season, and weak applications of liquid manure are beneficial. Only large plants of this Orchid bloom freely. It may be that it needs more sunlight to thoroughly ripen the growths.

Kenwood, N. Y.

F. Goldring.

Notes from the Arnold Arboretum.

Berberis Sieboldi.—A Barberry, sent some years ago to the Arboretum from the Flushing Nurseries, under the name of *Berberis "Hakodate,"* no doubt so-called from the place where the plant was first obtained, proves to be the little-known *B. Sieboldi* of Miquel ("Prol. Fl. Jap." 1). It is one of the handsomest of all the Barberries, and a most desirable garden plant. It is a stout shrub of compact habit, growing here three or four feet high, with branches covered with gray bark; and with short, slender, three-branched, chestnut-colored spines, very short petioles, oblong-lanceolate, or obovate leaves, rounded at the apex, densely setulose-ciliate on the margins, smooth, rather coriaceous at maturity, very bright green and lustrous. The fragrant flowers which are borne in short, semi-erect, many-flowered racemes, an inch and a half long, are pale canary color, with obovate rounded sepals and petals, and about the size of those of *B. vulgaris*. The fruit is large (one-third of an inch long), oval, and bright scarlet. This plant, which has the general habit and somewhat the appearance of *B. vulgaris*, may always be distinguished from that species by the ciliate margins of the leaves, which are quite destitute of rigid teeth. The leaves are more lustrous, the racemes are erect, not pendulous, as is *B. vulgaris*; the flowers are lighter colored than in that species, and in the autumn the foliage assumes the most brilliant coloring, which makes this plant a conspicuous object among the other Barberries of the collection at that season of the year. *Berberis Sieboldi* is perfectly hardy and very free flowering; and it is certainly one of the most desirable shrubs brought from Japan to this country. Seed of this species, under its right name, was distributed last year from the Arboretum among European gardens, where it does not appear to have been cultivated. A figure of this species has been drawn for publication in GARDEN AND FOREST.

Berberis heteropoda, a Turkestan species, has been for several years an inhabitant of the Arboretum. It is not, however, perfectly hardy here, but this year, favored by the mild winter, it is flowering much more freely than usual. It is a very ornamental and distinct species, with angled stems covered with dark gray bark, slender, simple, or three-forked spines, and obovate entire, or sometimes sparingly and minutely toothed leaves, which are pale bluish-green, lighter colored on the lower surface, and borne on very long, slender petioles. The pale yellow flowers in short, few-(3-4) flowered racemes, which are shorter than the leaves, and destitute of fragrance. The peculiar pale coloring of the foliage makes this a desirable plant, which might well find a place in gardens wherever the climate is not too severe for its full development. It attains in its native country, according to Dr. Regel, a height of six to ten feet. This species is considered in the "Botany of British India," a variety of *B. vulgaris*, but for garden purposes it is certainly abundantly distinct from that very variable and widely-distributed plant.

Berberis buxifolia (the *B. dulcis* of gardens) is in flower. It is a pretty species, with small oval or oblong, nearly sessile, entire leaves, and large, solitary, orange flowers. It is a native of Patagonia, and not very hardy here, even when carefully covered during winter. This year it is flowering more freely than usual.

A curious and beautiful Barberry now in flower here is not referable to any described species, while some of its characters suggest a possible hybrid between *B. vulgaris* and *B. Thunbergii*. It has the bark upon the branches of *B. vulgaris*, the simple, slender spines of *B. Thunbergii*, the tufted, entire obovate leaves of this last species. They are considerably larger, however, paler green, more membranaceous, and borne on long, slender petioles. The flowers are produced in long-stalked (sometimes nearly an inch long), umbellate racemes, of eight or ten or sometimes only of three or four flowers. They are larger than those of *B. Thunbergii*, bright yellow (those of *B. Thunbergii* are much paler), with rounded sepals and petals, and the red-marked filaments of the Japanese plant. They open a week or ten days later than those of *B. Thunbergii*, and a few days earlier than those of *B. vulgaris*, and possess a trace merely of the delightful fragrance of those of this species. The fruit resembles very closely that of *B. Thunbergii*, and hangs, as is the case with that plant, bright and fresh upon the branches throughout the winter and early spring. Several years ago, Max Leichtlin sent to the Arboretum seeds of "two red-fruited" Barberries, without any indication of their origin.

A large proportion of the seedlings raised from this seed proved to be *B. Thunbergii*, but among them were several individuals of this peculiar plant, which suggests in its umbellate inflorescence some of the forms of the sub-evergreen *B. aristata* of the Himalayas. But whether, as I suspect, it is a hybrid, or some species unknown here, it is an exceedingly ornamental and valuable garden plant; one of the neatest of the whole genus in its habit of growth, perfectly hardy, and very beautiful when its graceful branches are covered with its nodding umbels of large, bright-colored flowers.

Japanese Maples are not, as a rule, very reliable in this climate, too often dying suddenly in summer without any apparent cause; but one of the Japanese *Negundos* (*N. cissifolium*) has so far been an exception to this rule, proving here to be a handsome, small, round-headed tree, with erect, stout branches, of excellent habit and pleasing coloring. The largest specimens, although only ten or twelve feet high by as much through the branches, have now flowered and fruited here for several years. It is a tree with smooth, gray bark, that of the young branches being pale red or brown and three-foliolate leaves, borne on long, slender, bright red, hairy petioles. The leaflets are acuminate, deeply incised towards the apex, short-stalked, hairy on the principal veins on the under surface, and on the margins, with a few short, scattered hairs on the upper surface. They are membranaceous and of a delicate pale yellow-green color, which very late in the autumn turns to bright yellow. The slender racemes of yellow flowers are erect, but become nodding as soon as the fruit begins to form; they are four or five inches long, the rachis, pedicels and wings of the young fruit red and covered with long, scattered hairs. *Negundo cissifolium* is, apparently, perfectly hardy; it grows rapidly, and has not been attacked yet by any insect or fungus. It is well suited for planting on the borders of a small lawn, or as a single specimen tree in the garden, for which purpose its small size and round, rather formal habit, admirably adapt it.

The Judas-tree or Red-bud of the Middle and Southern States (*Cercis Canadensis*) is in bloom. It is one of the most beautiful flowering trees of the North American forest; and there are few more beautiful objects than the great masses of this tree in some parts of the South or South-west, notably along the eastern borders of the Indian Territory and in eastern Texas, when they are covered with their purple flowers in very early spring. There the Red-bud becomes a tall tree, with a stout trunk; further north, although nearly always arborescent, it never attains the size developed in the more favorable climate and more generous soil of the South. It is remarkable that so fine a plant should be neglected by our horticulturists, who hunt the remotest corners of the earth for novelties with which to embellish their gardens, and pass native species which cannot be matched anywhere. *Cercis Canadensis* is rarely planted in gardens in these days, and yet a plant in flower standing out alone before a dark background of Hemlocks or of Pines, or when it can contrast its purple flowers with the white floral leaves (the two plants flower here together) of the Flowering Dogwood (*Cornus florida*) is an object which fully satisfies the imagination, and one which is not easily forgotten. The Red-bud, although not a native of eastern New England, is perfectly hardy here; it grows rapidly, and is an object of beauty from the time the abundant flowers cover the naked branches until the late autumn, when the red-brown pods are ripe.

Prunus emarginata has very unexpectedly proved perfectly hardy in the Arboretum, where it has been growing during a number of years. It is a native of western North America, from the valley of the lower Fraser River southward to middle California, and eastward to Idaho and northern Montana. It is a small tree reaching, in the neighborhood of the coast, a height of thirty or forty feet, and occupying, generally, the low banks of streams. In the Arboretum it is a stout bush, eight or ten feet high, branching from the ground. The umbellate flowers, which the plants have produced this year in great profusion, are small, scarcely more than a third of an inch across when expanded, appearing simultaneously with the unfolding of the leaves, which are dark blue-green in color, ovate, minutely glandular-toothed, pubescent on the lower surface, as are the short petioles and young shoots. The fruit, which ripens about midsummer, is black, oval and half an inch long. This is an interesting plant, owing to the region from which it comes—a region with a climate so totally unlike that of eastern America that few of its plants thrive on this side of the continent.

Rhododendron Vaseyi (see GARDEN AND FOREST, i. f.) has flowered this year better than ever before. It is a garden plant of great beauty and value certainly. It flowers earlier than any of its race, and the clear pink color of the corolla is

quite unlike that of any of the deciduous-leaved *Rhododendrons*. Its value for crossing with other species has not been shown yet, but it is probable that its blood, mingled with that of some species with deeper colored and larger flowers, will produce some remarkable results. A cross with the *Rhodora*, which is quite within the limits of possible hybridization, might be expected to produce a large-flowered plant of great beauty.

Caragana arborescens, the Siberian Pea-tree, is an old inhabitant of gardens, and a perfectly hardy small tree of good habit and an unfailing bloomer at this season of the year, when the erect branches are covered with its handsome, bright yellow, pea-shaped flowers borne in fascicled clusters from the axils of the compound leaves. These have spinescent stipules, and consist of four to six pairs of small, oblong-oval vilous leaflets. This tree, which will grow to a height of fifteen or twenty feet, is often found in nurseries grafted as a tall standard; but it makes a much more beautiful object when it is grown on its own roots and is allowed to send out its branches from near the ground.

The shrubby *Caragana frutescens* is a native of Siberia also, and a desirable plant. It has larger solitary flowers of paler yellow, and smooth leaves with broader leaflets. It flowers a few days earlier than *C. arborescens*, and is equally hardy. Both species are easily grown from seed.

May 18th.

J.

Periodical Literature.

THE May *Bulletin of Miscellaneous Information* issued by the authorities of the Royal Gardens of Kew is devoted to an account of the Persian Zalil (*Delphinium Zalil*) noticed in this journal (i. p. 6., ii. p. 227); to the economic properties of a number of New Zealand timbers, the most interesting of which are Red Myrtle (*Fagus Cunninghamii*), Huon Pine (*Dacrydium Franklinii*) and Black wood (*Acacia melanoxylon*); and to an interesting account of Lily flowers and bulbs used as food. From this it appears that the trade of Lily flowers from Chinkiang was last year over seven and a half million pounds. These flowers are the dried blossoms of *Hemerocallis graminea* and of *Lilium bulbiferum*. They are used by the Chinese for flavoring soups, and are also eaten as a vegetable. They are also said to be efficacious in pulmonary diseases, and to have tonic properties. Hankan is the chief place of export in China, and great quantities are sent from Japan to the Flowery Kingdom. Lily bulbs are an important article of food in Japan.

There are articles on Pa-ért tea, an article of commerce in the province of Yun-nan, in south-west China, said to possess medicinal and invigorating properties, and to be used to aid digestion after heavy meals; on the short-podded yam-Bean (*Pachyrhizus angulatus*), widely cultivated in the tropics for the starch of its tuberous roots.

This part concludes with a list of the officers of the Royal Garden, and of the other British and Colonial botanical establishments. The *Bulletin* is well sustained in interest, and in its practical value to all persons who have to occupy themselves with economic plants and plant products.

Recent Publications.

A Handbook of Cryptogamic Botany, by Alfred W. Bennett and George Murray. With 378 illustrations. London and New York: Longmans, Green & Co.

This is an attractive looking volume of about 450 pages, with a large number of well-executed figures. Since the appearance of Berkeley's "Introduction to Cryptogamic Botany," in 1857, there have been several excellent English translations of German works in which the different divisions of Cryptogams have been treated either incidentally or specially, but the present Handbook is the first attempt by English writers to prepare a general treatise on the subject. So much has been written of late years on the development and classification of Cryptogams that it is almost a hopeless task to summarize all that has been written, and the authors are to be congratulated on their success in presenting so nearly complete a summary of what had appeared up to the date when their book went to press. After a brief introduction—too brief to be in all respects clear to the reader who is not more or less of an expert—the different subdivisions are discussed, beginning with Vascular Cryptogams. Whether one should begin with the higher groups and go downwards, or the reverse, seems to us to be of comparatively little moment. Each plan has its advantages, and the only real question is, having settled upon one method rather than the other, How has the general plan been carried out?

Naturally, the part of the Handbook most symmetrically treated—if one may use such an expression—is that relating to Vascular Cryptogams and Muscineae, for those groups have been so long and so well studied that it is possible to give in a condensed form an account which not only will be recognized as accurate by experts, but will also be intelligible to students. With regard to Thallophytes it is quite another matter. He must be certainly very sanguine or strongly prejudiced who believes that any really satisfactory classification of Thallophytes has as yet been discovered. About all that can be done is to relate the facts known with regard to their structure and development in as clear and simple an arrangement as possible, without much pretense at classification, as the word is understood when speaking of higher plants. The subdivisions adopted are Algæ, Fungi, Mycetozoa and Proto-phyta, and, admitting that these subdivisions are arbitrary and, in a sense, mechanical rather than strictly scientific, this arrangement has what appears to us the supreme merit, in a work of this kind, of being more easily followed than other classifications which have been proposed, and it also brings near together orders of plants which, whether rightly or wrongly, are always studied together. For a long time to come we shall have algologists and mycologists, but we are not likely to have conjugatists, oosporists and carposporists. What the student needs is to have pointed out distinctly the parallelism of the reproduction in certain Algæ and certain Fungi—which the present method sufficiently accomplishes—and there the matter had better rest until experts have settled more clearly the doubtful points in the relationships of Thallophytes.

If we look at the manner in which the authors have carried out their general plan, we are struck at once with the unusual and disproportionate amount of space devoted to Algæ; 120 pages to Algæ proper and forty-three to algoid protophytes, while only 101 pages are devoted to Fungi, including Mycetozoa, and Bacteria barely cover seven pages. In most text-books considerably more space is given to Fungi than to Algæ. We do not, in the least, object to the amount of space given to Algæ, but, on the contrary, regard this part of the work as the most valuable, as it goes beyond what is given in similar treatises, and contains a deal of information which could have been obtained only by an extended and careful reading. But the relatively small space given to Fungi has made it impossible to treat adequately a number of subjects on which the student and general reader ought to have clearly expressed and fully explained information, and we consider this part of the Handbook too condensed to be followed readily by those who are not already pretty well informed. The placing of *Diatomaceæ* among Protophyta rather than near *Desmidiaceæ* is scarcely to be commended, for, although we agree with Mr. Bennett in thinking it very doubtful whether the *Diatomaceæ* are zygosporic in the strict sense, we still believe that they can be described better in connection with *Desmidiaceæ* than when removed to the ill-assorted group of Protophyta, with which they have little in common except that their reproduction is not well known. Nor can we agree that the position of *Ulvaceæ* is uncertain, but think that they belong to *Confer-voideæ* and not to *Floridææ*, for their resemblance to the genera *Porphyra* and *Bangia* is merely superficial, and does not indicate a real affinity.

In short, the Hand-book is a valuable summary of the present state of our knowledge of a branch of botany which is becoming more and more popular, and the editorial work has been well done, so that the errors which are seen at first reading are few and unimportant. We would, however, suggest that the name *Mazæa*, on p. 440, should be changed to *Nostochopsis*. If there is any general criticism to be made it is that the work, as a whole, has perhaps a little too much the air of a catalogue of orders and sub-orders, and one would be glad to have the essential and general parts brought out somewhat more plainly by larger type or other printers' device, leaving specific details to smaller type. There is only one point on which we have any serious objection to offer, and that is the introduction of new terms to replace others already well fixed in English botanical literature. In the introduction the following statement is made: "Many of the terms which we employ throughout this volume, such as sporangium, archegone, antherid, cænobe, sclerote, epiderm, etc., will probably be accepted at once; and it seems strange that the awkward and uncouth foreign forms of these words should have held their ground so long." We venture to hope that they will not be accepted, and would suggest that the reason why the so-called "awkward and uncouth foreign forms" have held their ground so long is because they have proved by experience to answer their purpose perfectly well. So far as technical botanical

terms are concerned there is no intrinsic reason why they should be English in form. It is one of the many points of superiority of the English language that it can absorb and make a part of itself technical terms, whether classical compounds or derived from modern languages, and it is neither necessary nor in good taste to trim and prune words which have for years been accepted. Why, we would ask, is the commonly-accepted epidermis more uncouth than epiderm? or why is the French word sporangium any less foreign than sporangium, which has been adopted for years by good English writers? Why is the word mycelium, which has become so thoroughly a part of the language that it has almost ceased to be technical, to be abandoned for the decidedly un-English mycele? To quote a passage at random on p. 370: "The male cells are *pollinoids* formed in a flask-shaped antherid, somewhat resembling a perithece." The unprejudiced reader would hardly be struck by the peculiarly "English" look of the sentence, and the meaning would be quite as plain if, adhering to the common nomenclature, the sentence had run as follows: The male cells, called spermatia, are formed in a flask-shaped sack, the spermogonium, which somewhat resembles a perithecium. The substitution of the word "sperm" for "spore" in compounds, like "zygospore" and "oospore," only makes a bad matter worse. We can only regret that in a book, otherwise so good, the authors have allowed themselves to be carried away by what we must consider an unwise desire to substitute new terms for well-established terms which fulfil their purpose sufficiently well.

Correspondence.

To the Editor of GARDEN AND FOREST:

Sir.—Several years since, when the question of injury to conifers was being discussed in the *Gardeners' Monthly*, I had occasion to notice it somewhat in Cambridge and elsewhere. Red squirrels were abundant, and were seen to clip some of the twigs found on the ground, but the marks they left at the broken end or about the buds were wanting on many twigs, which nevertheless appeared as if broken across—never with the smooth surface, characteristic of self-pruned twigs of the Poplars, Elms, "brittle-branched" Willows, etc. In St. Louis, where red squirrels are unknown (at least to me), the ground is often covered by hundreds of freshly-fallen twigs under the Norway Spruce, etc., especially toward the end of winter. Careful and repeated observation for the last four years has convinced me that if fox or gray squirrels (which, however, I have never seen in the botanical garden), or birds of any kind are responsible for the injury, they work during the night, and leave no evidence of their work on the fallen twigs, which are quite like those seen in Cambridge. So far as our trees are concerned, I quite agree with Mr. Fernow that the twigs are simply shaken off. After a sleet-storm the number is sometimes very great.

St. Louis, May 5th.

Wm. Trelease.

To the EDITOR OF GARDEN AND FOREST:

Sir.—I have read your tombstone article with solemn interest. I am much amongst graves; and were it not for the broken lives and hearts I often see at the edge of newly-opened ones, cemeteries and their monuments would suggest nothing to me but the tragedy of human vanity. May your article help to bring such tasteless egotism into disrepute, and establish some congruity between the gravestone and the fact of death.

New York City.

Clergyman.

Vineland, New Jersey.

To the Editor of GARDEN AND FOREST:

Sir.—A land of Vines it is indeed, and the name which its venturesome founder bestowed upon this borough in the way of prophecy has been amply justified by the facts of subsequent history. And yet the belief that these sandy stretches in southern New Jersey were nearly worthless for any form of husbandry was almost universal twenty-five years ago, and the land had been called "The Barrens" time out of mind. The charcoal crop, however, was always a sure one, and there are men now living who have cut twice over some portions of the Vineland tract and carted the charcoal into Philadelphia, thirty-four miles away. This luxuriance of tree-growth ought to have suggested that the soil was not altogether destitute of plant-food. One Chestnut stump, at least, remains within the borough limits which is twenty-one feet in circumference, and its roots must have tapped big reservoirs of fertility somewhere. And yet no one had faith enough in the land to clear

and till it, and the farmer who declared that he would as soon think of raising a crop in a soil of pulverized glass as in the sands of "The Barrens" did not state the general belief with too great emphasis. Notwithstanding its proximity to Philadelphia, the tract of 34,000 acres was bought in 1860 for five dollars an acre, and to the daring purchaser the privilege was granted of paying only as fast as the land was re-sold to settlers. As the war closed greenbacks were floating freely, a good many people felt inclined to settle somewhere, a great volume of seductive advertising found its way into the press, and Vineland began to fill up rapidly with enthusiastic amateur farmers, who were convinced that five acres was more land than any man really needed to get rich upon. These hopeful people usually spent all their ready money in building a house, borrowed some more to set out a useless hedge and some trees and vines, and then began to rest, while their orchards and vineyards grew. A period of some depression naturally followed, but at last business has settled down upon a permanent basis, and the prosperity of the place seems established. Landis Avenue, the main street, is nine miles long, and many of the farms that front it contain only five or ten acres, and from these the owners are realizing a comfortable income.

But as Grape-vines and fruit trees took the place of scrub Oaks and Pines, the insects and fungi which prey upon them began to multiply, until the Downy Mildew and the Black Rot, not to speak of other rusts and blights, threatened to destroy the fruit industry. With some varieties of the Grape the rot made so clean a sweep of the crop that many vineyards were abandoned and rooted out. Colonel A. W. Pearson, one of the large growers, however, concluded that his vineyard was worth fighting for, and he began a series of experiments which attracted attention for their thoroughness, and finally he was selected by the Department of Agriculture as one of the agents to make trials of certain remedies which had been used with some promise in France. He feels confident that the two most destructive enemies of the vine can be held in check by preparations of copper sulphate. Last year, beside untreated vines on which ninety-five per cent. of the grapes were lost, vines sprayed with the Bordeaux mixture lost but two per cent. It was primarily to look at this experimental vineyard that I came to Vineland. It was too early, however, to see any effects of the diseases or their remedies, although an inspection of the methods of conducting the experiments was most interesting. It is not enough to discover some mixture that will kill the fungus. What is needed in practice is a certain remedy, which can be applied most cheaply and with least danger to the plant and to man. A great number of preparations are on trial, applied on belts running across the rows so as to take in every variety of vine, and with check lines of untreated vines between the belts sprayed with the different mixtures. A description of the remedies in detail would be tedious to your readers, and the reports at the close of the season will show which ones have proved of value.

The vines are set in rows nine feet apart, with a vine every six feet in the row. The stakes are short, and carry a single wire at a height of two feet and a half from the ground. The whole vineyard has been ploughed and cultivated till it is absolutely free from weeds, but as the fruit gains size tillage will be suspended, the weeds will be allowed to grow, and when ploughed under they will help to add a little humus to the light soil. On the 29th of May the fruit had already set on the Iron-clad variety, while the other kinds were not yet in blossom. This Iron-clad Grape, so-called because it has been proof against every attack of rot spores, is supposed by experts to be a natural hybrid between some form of *Vitis Labrusca* and *Vitis riparia*. The original vine, which is at least a hundred years old, still covers a great Oak on the banks of a little stream which empties into the Schuylkill a few miles from Philadelphia, and is good for something like a ton of Grapes every year. These vines show their remarkable vigor as compared with such varieties as Concord and Ives by the superior size of their stems, and the pressed juice of the Iron-clad Grape is so rich in color that three or four teaspoonfuls will give a fine claret color to a goblet of pure water. This color, as well as its freedom from rot, gives the Iron-clad exceptional value as a wine-grape, and its juice is in great demand where pure fruit syrups are used in soda fountains. And, by the way, Colonel Pearson finds that the manufacturer of unfermented wine, and of the syrups from strawberries, raspberries, blackberries, quinces, etc., are among the most profitable ways of utilizing fruits.

Colonel Pearson is using no bags, although he may cover some of his grapes for private use. A drive through Vineland, however, showed that in many vineyards this operation had already been performed, although the blossoms had not yet

appeared, and in many others, groups of women were fastening bags over every cluster of flower-buds, pinning the paper to the canes, and not to the stems of the clusters, which were still so tender that the wind would snap them off. These bags protect the grapes from the spores of the fungus which fill the air later in the season, and they were formerly applied when the grapes were about the size of peas. Last year, however, it was found that the infection entered the cluster sometimes before the flower-buds opened, and it was found, too, that many varieties were fertilized perfectly when the flowers were enclosed in paper so as to exclude foreign pollen. It is in view of this experience that the bags are being applied so early to thousands of vines. In Colonel Pearson's opinion, the practice does not pay for ordinary commercial vineyards, although it may pay when fruit of extra quality is desired.

As we drove by the freight-station the area was crowded with wagons bringing in strawberries. The crop is a week earlier than usual this year, and when at its height a dozen or more car-loads are shipped every day, while twenty car-loads of blackberries is an ordinary day's picking. The boast of the villagers that there is never any mud in Vineland is probably a patriotic exaggeration, but that water soon filters away from the surface was evident in the fields, where plows were moving a few hours after four inches of rain had fallen. The soil is by no means uniform, and there are mucky hollows, which look dark and full of humus, and there are places where the clay comes near enough to the surface to mix with the sand and make it consistent. But it is in soil of this character that the effects of dry weather are most apparent. Where the land is said to be "sand all the way down," and the porous sub-soil permits the water to filter quickly through it, the roots of crops seem to penetrate more deeply, and the Corn will be green and growing here when its leaves are curled and wilted elsewhere. Deep-rooting trees like the Chestnut might be expected to thrive even without such evidence as is given by the great stump alluded to in an early part of this letter. As a matter of fact, one of the most beautiful rows of trees I saw was of Chestnuts planted along one of the streets. Each lot-owner was obliged by the terms of his title to plant a double row of trees along his street-front and to seed with grass the strip between the wheelway and sidewalk. As a result the avenues, which are 100 feet wide, are already bordered with fine trees and a continuous stretch of good turf. The general effect would have been better if a single species had been used in each row, and it is unfortunate that so many Silver Maples have been used when better trees have proved themselves so well adapted to the conditions here. I have rarely seen more thrifty Chestnuts, or Oaks of various species, or Tulip-trees, or Lindens, or Honey Locusts than those which shade the walks of Vineland.

Vineland, N. J.

S.

Exhibitions.

Rhododendrons in Boston.

The exhibition of the Massachusetts Horticultural Society, held in Boston last Saturday, was devoted principally to Rhododendrons, for which Mr. H. H. Hunnewell, whose knowledge of these plants is only equalled by his skill and enthusiasm in collecting them, offers every year a number of special prizes. Several large collections were shown; that of Mr. Hunnewell, which was not entered for competition, numbered several hundred heads of flowers, and included all the principal hardy and many half-hardy varieties. The flowers in all the collections were of good size and quality, for the mild weather and the abundant rains of the spring months have favored their development. Nothing very new or striking in hardy varieties appeared, however, while there were probably fewer flowers of half-hardy varieties shown than in previous years. Indeed, the collection of the half-hardy varieties of *Rhododendron Catawbiense* is looked upon with less favor in the neighborhood of Boston than was the case a few years ago. The truth is they are very unsatisfactory plants to manage. Many are shy bloomers under the most favorable conditions in England even; but when it is necessary to lift them in the autumn every year, and protect them in pits through winter, many of the varieties refuse to flower at all, or will only flower once in three or four years. The delicately-colored flowers of such varieties we only see to advantage under canvas, which is essential, too, to shield them from the hot sun and frequent rains of early June, so that if they are not wanted for a flower-show, such as Mr. Hunnewell has provided annually for his friends during the last twenty years, they are practically useless. And even where Rhododendrons are shown under canvas there are now so many high-colored hardy varieties that a

remarkable display can be made with them alone. Hardy varieties with flowers of the brightest scarlet are common now, as are those with white, pink, rose and all the self-colors. Only dark flowers, with light centres, and white or pale flowers, with dark blotches, are wanting among the hardy varieties. These, especially the last, are exceedingly beautiful and showy, but they are, unfortunately, very shy bloomers, and produce their flowers very sparingly even when they are not transplanted, as they must be in this climate every autumn. Mr. R. T. Jackson exhibited sixty-seven varieties of the German Iris, many of great beauty; and there were several unusually large and attractive collections of wild flowers staged. The exhibition, owing to the advanced state of vegetation in eastern Massachusetts, was held one week earlier than usual.

Notes.

Along one of the boundaries of the Germantown Nurseries is a fine hedge of "*Elaeagnus parvifolia*." This plant endures cutting well, and makes a close, solid growth. When the plants are in bloom the hedge is very fragrant, and the boys find its fruit palatable.

On the nursery-grounds of Messrs. Hoopes, Brother & Thomas, near West Chester, Pennsylvania, stands an *Acer pictum* (sometimes called *Acer latum* and *Acer Colchicum rubrum*), the trunk of which measures six feet three inches in circumference. The tree is about thirty-five feet high.

A charming combination of colors can be obtained by planting some of the varieties of the German Iris with pale blue flowers among plants of the Japanese *Azalea mollis*. They flower simultaneously, and a large bed arranged in this way, which recently came under our notice, was a refined and beautiful object.

Last week Mr. John MacElvery, of Flatbush, Long Island, sent to this city some fine spikes of the white variety of *Gladiolus Colevillei* which had bloomed in the open air after having received no special protection during the winter. The flower is delicate and graceful, and is largely grown in England by florists, who supply Covent Garden.

A correspondent, interested in Professor Goff's article on Muskmelons in a recent number, enquires how the vines can be saved from the attacks of the Squash-bug. To this Professor Goff replies: That if a tablespoonful of kerosene is stirred through two quarts of common land-plaster and the mixture is sprinkled on the vines, the effect will be good, although he cannot vouch for this as a sovereign remedy against this troublesome enemy.

The new Strawberry, known as the Pearl, is yielding a large crop of fruit, of very uniform size in some parts of southern New Jersey this year. The fruit is sharply conical and of excellent flavor. Colonel Pearson, of Vineland, and other large growers consider it most promising both for market and home use. Whether it will succeed on heavier soils remains to be seen. On the highly-manured lands of Bridgeton, a few miles away, it does not thrive as well.

Temple & Beard send us a specimen of a remarkable variegated-leaf form of the Sugar Maple which has been growing for several years in the yard of a house in New York, and which they have now transferred to the Shady Hill Nurseries. The whole blade of the leaf, with the exception of the principal veins and a few green blotches, is clear, bright yellow. If the yellow color is constant this will make an interesting addition to the list of abnormally colored trees—which many people consider beautiful.

In response to a request made in behalf of the West-End Improvement Association, the Torrey Botanical Club and the Park Commissioners of this city, Mr. Frederick Law Olmsted and Mr. J. B. Harrison, have prepared a paper upon the plantations of Central Park, with special reference to the alleged excessive thinning out of trees during the past winter. The report agrees with the views already expressed in this journal. Nothing was found to indicate that any of the cutting had been done without regard to the requirements of the Park design, but, on the contrary, evidences were apparent that a more liberal use of the axe is needed.

Mr. Carmen, of the *Rural New Yorker*, brought to his office, on Saturday, some flowers of a new Rose, which he obtained by crossing Harrison's Yellow upon *Rosa rugosa*. The flowers resemble those of General Jacqueminot closely in color, and they are very fragrant. The foliage is not quite as dark as that of *R. rugosa*, nor quite as leathery, but the leaflets are much larger. The plant seems to be as little liable to the attacks of insects and fungous diseases as its female parent.

Mr. Carman assures us that the plant bloomed constantly through the summer last year, and altogether it seems to possess a combination of sterling qualities.

A committee has been appointed to receive contributions for a monument to be erected in memory of the late William Court, who for so long a time represented in this country the house of James Veitch & Sons. Mr. Court was widely known and highly esteemed here, not only among dealers but among buyers of Orchids and other choice plants. The monument, as designed by a London architect, will cost about \$500, and all moneys above that amount will be disbursed for the benefit of Mr. Court's four orphan children. Contributions may be sent to Mr. Alfred Outram, of the firm of B. S. Williams & Co., London, or to any member of the American committee, which is constituted as follows: Robert Craig, Philadelphia, Chairman; A. D. Cowan, New York, Treasurer; Peter Henderson, New York; Wm. Elliott, New York; John Thorpe, Pearl River, New York; Wm. Gray, Albany, New York; John N. May, Summit, New Jersey; Robert Halliday, Baltimore; W. R. Smith, Washington; Wm. Robinson, North Easton, Massachusetts; David Allan, Mt. Auburn, Massachusetts.

A correspondent of *The Garden* (London) writes that he has preserved all the plant and flower catalogues which have been sent him during a period of forty years, and that they now supply much interesting information with regard to changes in taste and in commercial enterprise. Their lists, we are told, offer "hosts of beautiful and most interesting things never heard of now, and most likely very many lost to cultivation. One list offers: Acacia, 59 species; Berberis, 15; Canna, 57; Chorozema, 10; Genista, 14; stove and greenhouse Hibiscus, 9; . . . ornamental fruit-bearing Solanums, 23; . . . Kennedias, Hardenbergias and Zichyas, 25; ornamental Gourds and other cucurbitaceous plants, 117; and so on. Where are the seedsmen now that can offer us anything approaching this? . . . Why do not some of our great nurserymen, instead of ransacking the furthestmost corners of the earth for some new orchid, or seedsmen, instead of giving us the everlasting Cineraria, Calceolaria, Primula and such like, . . . re-introduce some of the multitude of beautiful and interesting plants cultivated in the last generation? They would be novelties to-day."

"A plan is on foot," says a correspondent of a New York daily paper, "to make an addition to Chicago's Lake Shore Drive, which, if carried out, will give this city one of the finest and most extensive systems of boulevards and drives in the world. The present idea is to extend the beautiful drive which runs along the lake, through the handsomest portion of the North Side and through Lincoln Park. This drive now stops at the north end of the park. The new plan, which is well under way, is to extend it as far north as Lake Bluff, twenty-five miles north of Chicago. This section of country is by far the prettiest in this neighborhood. The flat shores of Lake Michigan gradually slope upward until at Lake Bluff they assume the shape of almost perpendicular banks, rising to a height of 100 feet, and showing the waters of the lake far below. A heavy growth of timber stretches toward the west, while at other places it is broken by deep ravines that open up unexpected glimpses of the lake through the dark foliage. The new drive will run along as close to the lake as possible, and through the villages of Evanston, Highland Park, the new military post, Fort Sheridan, and Lake Forest.

Accounts of the opening of the Paris Exhibition prove that it will be of great interest to horticulturists and lovers of the art of gardening. The gardens of the Hôtel des Invalides contain the products of the French colonies and of the several Ministries. Along the Quai d'Orsay are the halls of agriculture and viticulture, the fisheries and the general food products, while the great Trocadero gardens are given up to fruits and flowers, grown under glass and in the open air. The whole of the Champs de Mars, formerly nothing but a dusty desert, is transformed into a charming park, with verdant lawns, shady paths, masses of shrubbery and multitudinous flower-beds. The plans were traced more than two years ago by Monsieur Alphand, Director of Public Works, and were mapped out on the site itself. Trees and shrubs were then set out and sods were laid, and the place now looks like a park of many years' standing. A good deal of injury was done by the crowds that attended the opening ceremonies, even the energetic *gendarmes* of Paris being unable to control so vast a multitude. Scores of blooming flower-beds were trampled into mire, and many shrubberies and lawns were seriously injured; but the damage was being repaired, and in a few weeks no trace of it will appear.

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Specialized Gardening.

A READER of this paper asks us to describe a spring garden made a few years ago in the neighborhood of Boston, by a lady of taste, which has attained already to some local celebrity, and received last year a special prize from the Garden Committee of the Massachusetts Horticultural Society. It occupies the site of an old-fashioned formal garden, in a sort of amphitheatre, of a third of an acre, perhaps, in extent, formed by deciduous trees of fair size, in front of which were a few fine old shrubs, relicts of the past. The ground slopes gradually to the south and west, the centre of this slope being occupied by two noble Hemlocks, with wide branches sweeping on the turf. The problem to be solved was how to make this piece of ground most attractive during the months of May and June, the only part of the year when the place is occupied. The walks, of which there were a number, and all the flower-beds occupying the space surrounding the two Hemlocks, were first removed, and then a broad border was made continuously round the amphitheatre, except at three points, where entrances from the outside were left. This border was planted with shrubs, the general effect then being that of a small lawn of generally circular outline surrounding the two Hemlocks and in turn surrounded by a border of shrubbery backed with larger trees. No treatment could be more simple, and there is no description of garden which can be more easily made. The success of such a garden depends on proper natural surroundings, a fitting selection of plants for the borders, and the adoption of graceful and natural curves for the line dividing the turf from the plantations. The selection of plants, in themselves suited for such a garden and harmonious each with his neighbor, is a matter demanding taste and some technical knowledge; and the introduction of a single inharmonious element might easily destroy even an exceptionally good site like the one we have briefly described. The problem of selection has, however, in this particular case been greatly simplified by the fact that this garden was to be used during two months only; such plants as do not flower during these months could there-

fore be discarded. Generally speaking, tall shrubs, such as Lilacs, dwarf Apples, and various Plums occupy the back of the border; before these *Spiræas*, *Exochordas*, *Calycanthus*, *Forsythias*, Tartarean Honeysuckles, and others which may be expected under favorable conditions to attain a height of six or eight feet, are grouped as naturally as possible, while the margin of the bed, for a space of three or four feet wide, is occupied with isolated masses of *Daphnes*, *Andromedas*, small *Azaleas*, and other dwarf spring-flowering shrubs, the spaces between these masses being planted with such hardy bulbous and other perennial plants as bloom with them. This low growing margin is broken occasionally by a plant of *Spiræa Van Houttei* or of *S. Thunbergii* planted close to the turf, to send its branches out over the green, and so to remove all idea of stiffness or formality.

This garden is in itself a beautiful creation, and a good deal can be learned in it, of how to associate, and of how not to associate, plants when natural and pleasing effects are sought. It is surprising, for example, how entirely out of place a mass of high-colored garden Tulips or of double Hyacinths appear near the margin, and how admirably single Narcissi and Scillas look when used in a similar situation. All herbaceous plants, in fact, greatly altered by long cultivation, appear here inharmonious, while Violets, hardy Lady Slippers, Trilliums, Bloodroot and other inhabitants of the woods, produce the best possible effect. There is a danger always in such a garden of over-doing and of crowding in too many plants, either from the desire of possessing a great number of varieties or of producing immediate effects. Close-planting in the beginning is well enough, but unless some plants are removed as fast as they begin to encroach on their neighbors the whole feeling of the scheme will be destroyed, for certainly there is no more melancholy spectacle than a mass of shrubs so crowded together that they can grow only upwards, without lateral branches and without foliage and flowers, except at the very summit of the stems. A deciduous shrub is only really handsome when it has play for full and free development, and in the garden in question the neglect of timely thinning has already left its mark.

But it is time that we should leave this delightful spot, and turn to the general conclusion to which it naturally leads. It is that specialized gardening, that is, the concentration of effort in one direction must produce the most satisfactory results, and that it is, therefore, the wise and proper method to adopt. This is particularly true in America to-day. A large proportion of our best gardening is in connection with suburban homes; and every year the custom of leaving these homes about the 1st of July for a three months' vacation at the sea-shore or in the mountains, prevails more and more in this country. Anything like out-door winter-gardening in the Northern States is a delusion. The climate from December till April makes it impossible; so that when a man leaves his home early in July, and does not return to it until after frost has nipped vegetation, he can obtain the greatest amount of pleasure by growing only such plants as are at their greatest beauty between the 1st of April and the 1st of July. But specialism in gardening can, of course, be carried much further, and the further it is carried the greater may be the pleasure to be derived from it. Suppose, for example, that instead of a garden of mixed plants selected because they flower during May and June, a number of such gardens, each of which might have been much smaller, had been planted, one with Chinese Magnolias, another with dwarf Apples, another with Lilacs (and no one who does not know the varieties of these plants produced in recent years, can have any idea of the beauty of Lilacs), another with hardy Azaleas, another with Rhododendrons, and so on through a dozen other genera of plants, each of the series being arranged with perennial plants to flower simultaneously with its special tree or shrub. Each of these gardens would be perfect during a single week, perhaps, only, but it is easy to comprehend how the pleasure which could be ob-

tained from it would be great in proportion as it was concentrated. A man with abundant means and sufficient ground at his disposal might make a dozen such gardens without greater outlay than is required for the mixed planting now in vogue; or, in a village, a dozen men might join together and each one plant the surroundings of his villa or cottage with some plant or plants, for a particular effect, for one particular time, leaving to his associates to carry on the display from week to week. Such a scheme might be difficult to inaugurate, but if carried out to its possible limit it would develop a greater excellence in gardening, and produce more marvellous results than have yet been attained.

A lady who carries on a large farm and has for many years been a successful planter of trees, and a lover of them and of country life, sends us some male flowers which she has found growing on one of her young Pines, with the query, whether they are not some new form of disease which has appeared on her trees. We mention this fact, which does not astonish us as much, perhaps, as it should, as an illustration of how little even well educated and intelligent people know about the commonest trees which they see growing about them every day and as an argument in favor of giving children in the schools some elementary instruction about trees. The men or the women who can readily distinguish all the trees among which much of their lives are passed, and who have mastered some of the simple secrets of their life histories, have prepared for themselves an amount of pleasure which the person ignorant of such matters can hardly realize. This is a pleasure, too, of a sort which is as enduring as the trees themselves, and which, like them, bursts out each year into new and more vigorous growth.

A New England Village Street.

THE people of New England have reason to be thankful that their original forests produced many trees whose wood was of much greater value than that of the American Elm, for this, no doubt, is one reason why so many magnificent specimens of this tree have been left to shelter farm-houses and shade the highways of the Eastern States. It is plain, too, that its value as a street-tree was recognized there as soon as street-planting was begun, and many a New England town, like Old Hadley and West Springfield and Conway, has gained a name for beauty because the men who dwelt in it a hundred years ago appreciated the dignity and grace of the Elm, with its columnar trunk, buttressed at the base with sturdy roots, and its massive branches arching outwards to hold aloft its dome-like crown of foliage. The Sugar Maple is another of our noblest northern trees, although when young its outlines are rather too smooth and featureless. With advancing years, however, this Maple develops a certain individuality, with a more rugged contour and deeper shadows; and no one sees the avenue of Maples at Hyde Park on the Hudson, for instance, without a feeling of unqualified admiration.

Our illustration on page 283 shows a remarkable row of each of these trees. It is a view looking down the main street of Charlestown, New Hampshire, a town that was a frontier post in the old French war, and afterwards as a shire town, became the home of many people of more than ordinary public spirit and intelligence. In 1800, some of these residents planted a row of Elms on one side of the street and one of Sugar Maples on the other, and their successors continued the practice as the village grew, until the street is bordered with trees for about a mile. The two large Elms in the foreground on the right belong to a still earlier planting. They stand in front of the site of the old tavern which was kept by Colonel Abel Walker, and as the sign of the tavern, now in possession of the Massachusetts Historical Society, bears the date of 1785, they were probably planted as early, at least, as that year. Three other trees probably date from the same period, as they are larger than those known to have been planted in 1800, and

at five feet from the ground vary in circumference from twelve and a half to nearly fifteen feet, and appear to be nearly one hundred feet high. The avenue of Elms seen in the background is probably unsurpassed in New England, and later plantations on the side streets so hide the houses that the town looks like a continuous forest to one who looks down upon it from any of the neighboring hills.

The view is reproduced from a photograph taken by Mr. S. S. Webber, a grandson of one of the old residents who practiced medicine in the town for more than sixty years.

Horticulture in Ancient Egypt.

FROM an article on "Egyptian Horticulture," by Monsieur G. Delchevalerie, recently published in the *Revue Horticole*, we have gathered a few facts which may be of interest to our readers in connection with the chapter on Egyptian gardening-art that was printed in these pages not many weeks ago. On the tomb of Ti, in the vicinity of the great pyramid, which dates from about forty centuries before Christ, the harvest of the Lotus and the manufacture of wine are represented, together with irrigating machines and horticultural tools similar to those in local use to-day. The tree called "Heglig" (*Balanites Ægyptica*), was largely cultivated in the Thebaid, and was sacred to Isis because it would grow even in the desert sand, and also because its edible fruit was shaped like a heart and its leaf like a tongue. The Sycamore, as has been said, was one of the chief trees of Egypt and likewise the Doum Palm (*Hyphane Thebaica*) and, of course, the Date Palm. Lentils and Onions formed the main food of the people and Melons, Leeks, Radishes, Watermelons, Garlic and Chicory were everywhere cultivated, the last-named being indeed prescribed by a special law. Oil was obtained from the Castor-oil plant, Flax, Carthamus, Sesamum and Turnip. Olive-oil was obtained from Judea. Herodotus is careful to note that in his day the Olive was only grown in one or two districts and there not with great success. From two species of Lawsonia the ancient like the modern Egyptians obtained the henna with which to dye their finger-nails. In mummy cases many fruits have been found in a recognizable condition—Dates, Figs, Bananas, Lemons, Grapes, Doums, Pomegranates, Castor-oil beans, Sycamore Figs and Lotus beans, as well as bees-wax, gum-arabic and flowering shoots of Lawsonia. The Vine was grown for ornament over arbors and porches and was cultivated on trellises. An ancient legend explained that the first idea of pruning it came through observing a specimen which, after a goat had eaten off the tips of its shoots, bore with greater luxuriance than usual. Beer made from cereals was in common use among the lower classes, and as Hops did not grow in Egypt a bitter infusion of *Lupinus tenuis* was used instead. During the rule of the great conquering dynasties part of the tribute always exacted from subjected peoples was in the form of useful and ornamental trees and plants not indigenous in Egypt.

The cultivation of Sugar-cane was not introduced until the time of the Mohammedan caliphs, and then its chief use for a long period was to be eaten raw. At the present day the Egyptian laborer is never so happy as when squatting hour after hour on his heels beside the Nile chewing an immense stick of Sugar-cane. Nor did the ancient Egyptians cultivate the Bean which now plays so large a part in their domestic economy; it was considered by the priests an "unclean" plant. It is needless to repeat what has recently been said in these pages about the Sacred Lotus and the various Water-lilies which grew in Egypt. The Poppy was another favorite flower. The Papyrus does not now grow there spontaneously and it is a question whence the ancient inhabitants originally obtained it; probably from Upper Nubia and the Soudan countries where it grows in enormous thickets.

At a feast celebrated in Alexandria 284 years before Christ, during the reign of Ptolemy Philadelphus, a conspicuous feature in a splendid procession was a car, twenty cubits in length, which was drawn by three hundred men and surmounted by a wine-press full of grapes that were being pressed by sixty satyrs, singing vintage songs to the accompaniment of flutes. The wine ran out into the road and was served to the public by numerous children carrying vases of gold, silver and parti-colored enamel.

When Egypt fell under the dominion of Rome half a century before Christ, it became, as is well known, the granary of the imperial city, and furnished it with vast quantities of wine as well as cereals. This state of things lasted for three centuries and a half until about the year 330 A. D., when the

Greek Emperors at Constantinople obtained possession of the country. In 638 they were followed by the Arab invaders and the long line of Egyptian caliphs was established. Then, of course, the cultivation of the Vine was abandoned.

"California Lilacs."

ONE of the most prominent, as well as ornamental, shrubs of the Santa Cruz coast range of mountains is the *Ceanothus* in its various forms and species. As early as January some flowers begin to appear. But May is the month of its greatest glory. On the sea-side slope of these mountains there are five distinct species: (1) *Ceanothus cuneatus*, Nutt.; (2) *C. papillosus*, Torr. & Gray; (3) *C. incanus*, Torr. & Gray; (4) *C. thyrsiflorus*, Esch.; (5) *C. Andersoni*, Parry.

I mention them in the order of their blooming. The flowers are all of a pleasant fragrance, and when in bloom give a charm to these regions peculiarly attractive to the lover of nature.

Dr. C. C. Parry, the eminent botanist, who for forty years or more has made observations from time to time on the Pacific Coast, has published lately in the "Proceedings of the Davenport Academy of Sciences" a paper on the *Ceanothus*. To him I am indebted for much information in regard to these shrubs; and with him a few days ago I had the pleasure of a visit and trip of observation to the habitat of each of the above-named species.

The doctor having an eye for the beautiful as well as the new in botany, says: "If asked to designate a spot where they (the *Ceanothus*) occur in the greatest profusion and variety I should not hesitate to award the palm to the Santa Cruz range of mountains."

Ceanothus cuneatus has pale blue or whitish flowers in small, rounded clusters, small opposite leaves and branches, gray bark; a very pretty shrub, three to eight feet high.

C. papillosus has deep sky-blue flowers in small globose clusters. The dark green leaves, by which it is most readily distinguished, carry small pimples (papillæ) on the margin and upper surface. Whilst May is the month of its greatest bloom, flowers can be found at all seasons.

C. incanus is well-named, for the leaves and branches are hoary or white. The common name is White Thorn, so named because of its spinose branches. The leaves are broad, ovate and triple-veined. The flowers are whitish, in short racemes, and slightly fragrant. The bush is five to fifteen feet high, with a rounded shape, but with crooked and very angular branches.

C. thyrsiflorus is a graceful shrub, reaching in many cases thirty feet in height. It may be recognized at a long distance by its slender branches of pale green leaves and sky-blue sprays or plumes of flowers, looking like the smoke from a camp-fire. This species and No. 2 are not often found growing together. The traveler, however, will often pause to admire the flowering clusters of each as they stand against the mountain-side, giving an indescribable beauty to the landscape.

C. Andersoni is not very abundant, and only occupies the higher summits of these wooded mountains. With its sprays of pure white flowers, slender and somewhat drooping branches, small, modest, feather-veined leaves of a pale green, it readily attracts attention. When first seen by me in 1882 I secured a few specimens of the flowers, but thinking it possibly a hybrid, they remained unnamed in my herbarium until Dr. Parry saw them; and, after careful investigation, concluded that they belonged to an unnamed species, which he described in the paper I have mentioned.

The *Ceanothus* in these mountains are commonly called "Lilacs," or, as I have frequently heard, "Laylocks." They flourish most abundantly among the openings of Oaks, Redwoods, Pines and Firs, on the borders of basins and cañons. They are easily cultivated, and might be used to ornament grounds, or possibly for hedges. Nos. 1 and 3 might grow well in colder climates. I have found them at an altitude of 7,000 feet, where the winters are long and severe.

"Hybridity," says Dr. Parry, "which would seem to be largely favored by the profusion of showy and occasionally fragrant flowers, and which has been suffered to be largely instrumental in confusing species, is not a very troublesome feature in field observation where alone it can be properly studied."

And yet in our little walk among these plants we found some very curious combinations which could not be solved very easily in the field, much less in the herbarium. Some of these hybrids were very pretty, too. But the parents were found growing on either side, and the blending of characteristics were so apparent that a botanist would seldom be deceived.

Santa Cruz, Cal., May 15th, 1889.

C. L. Anderson.

New or Little Known Plants.

Rudbeckia laciniata.

THE most conspicuous feature in the herbaceous flora of North America is found, perhaps, in the great number of autumn-blooming plants of the natural order *Compositæ*. No foreigner visits any part of this continent during the months of September or October without being struck by the great masses of color produced by our Asters, Golden-rods, Sunflowers, and other plants of their order. There are among them many subjects which are admirably suited for cultivation in herbaceous borders, or for naturalization in less carefully kept parts of the garden; but although sometimes found in the best European gardens, they have never yet received in this country anything like the attention which they merit.

One of the best of these plants for the garden is *Rudbeckia laciniata*, a figure of which appears in our illustration upon page 281. It is an old inhabitant of gardens, having been cultivated by Tradescant, the gardener of Charles the First, as early as 1640, and is sometimes, although not very often now, found in collections of herbaceous plants here. A well-grown plant forms a stout mass of dark green and rather coarse foliage, sometimes four feet high, by nearly as much through, and covered during the month of September, year after year, without any care or attention, with long-stemmed, terminal heads of bright yellow flowers, which light up the herbaceous border or the margins of a wood-walk as few other plants are capable of doing.

Rudbeckia laciniata is a widely distributed plant, being found from Canada to Florida, and as far west as Montana and New Mexico.

The *Rudbeckias* are confined to North America; and twenty-one species have been distinguished. They all, with one exception, have bright yellow ray-flowers, and elongated dark brown or nearly black discs. They are all worth a place in the garden.

Cultural Department.

Bagging Grapes.

SINCE the enclosing of the clusters of grapes in paper bags to preserve them from the germs or spores of *Læstadiæ Bidwellii*, the seed, so to speak, of the Black Rot, was suggested, I have practiced it; in a small way at first to test its efficacy, and since I became satisfied on this point I have annually bagged all the best clusters of all the varieties subject to this malady, using from 12,000 to 15,000 bags for a small vineyard. But after all that has been written on the subject for the past few years, I frequently find people who have scarcely heard of the practice. These spores are invisible to the naked eye, but they float about in the air, and, lodging on the skin of the grape, are ready to germinate under favorable conditions of moisture and temperature. To prevent their coming in contact with the grapes the clusters are enclosed in paper bags, the mouth reaching over the cane, folded and secured with a pin. Some writers give instructions to gather the top of the bag around the stem of the cluster and pin it, but this is bad advice; first, because if it is done as early as is advisable to protect the fruit, the young clusters are too tender to withstand the strain of wind and water, and many of them break off before they acquire sufficient strength to resist the pressure; and, secondly, many, I may say most varieties of Grapes have such short stems that there is no room between the cluster and the cane to fasten the bag. The Brighton, Empire State, Noah and a few others are not subject to this difficulty, but for the first reason assigned the advice is dangerous.

A two-pound plain manilla paper bag of fair quality, such as grocers use, is the size generally recommended, but I use the one and a half pound size in preference. This bag measures six and three-eighths by nine and a half inches. The two-pound bag is of the same length, but a little wider, which is of no advantage, and costs more. An inch or two added to the length would be desirable for many varieties. The patent square-bottomed bag possesses no advantage over those of the old pattern, and in fact I should prefer the latter

at the same cost. The corners of the bags are cut off—at the bottom to let out any water that may enter, and the tops to facilitate its reaching around the cane. In fact, if the bags were open at the bottom they would probably be quite as efficient. The tighter and more perfect the roof or top of the bag to exclude the entrance of the fungus and water from above, the better. I sometimes use three-pound bags, enclosing two clusters in each, which answers very well where the clusters are close and compact, but with looser clusters they are apt to grow into each other.

Complaint is sometimes made that the bags are not a complete protection, as the grapes sometimes rot in the bags. This is true, but in such cases it is fair to presume they were infected before the bags were applied. It is a great mistake to defer bagging too late. The longer it is put off after the grapes are fairly set, the greater the risk of failure. I have demonstrated to my satisfaction that if the grapes are uncontaminated when the bags are applied, they will remain so till maturity if the bag remains perfect. Sometimes small hail-stones will perforate the bags, and the rot spores will thus gain an entrance; and sometimes a manufacturer will use paper of an inferior quality that will not resist the rain-drops, but generally, they will withstand the weather through the season. Some varieties of Grapes having strong, perfect flowers are self-fertilizing, and these can be bagged before they bloom, as they will fertilize perfectly in the bags. In fact, we have good reason to believe that many blossoms are fructified before they open. The Niagara, Cottage, Concord and Clinton are of this class. On the other hand, varieties with imperfect flowers seem to need the pollen of other varieties to enable them to set their fruit. To bag these before blooming would, of course, deprive them of this assistance. Bagging is not only a protection from rot, but from birds also. Bagged fruit is a little later in maturing, and in the case of white grapes a little greener in color, but the bloom and appearance is more perfect. I have not been able to perceive any tendency to tenderness of skin as claimed by some, in bagged specimens.

Does bagging pay is the question universally asked, and I can answer it in both the affirmative and negative. To the amateur who thoroughly appreciates fine, well-grown, perfect clusters that excite the admiration of all beholders, to the professional grower who competes for the prizes at exhibitions, or who aspires to fancy trade at fancy prices, I say yes. But to the one who cannot command five cents a pound or over for his fruit I say no, emphatically.

The experiments made during the past two years in this country with preparations of copper-sulphate for the prevention of the mildew of the Vine have seemed to indicate that these mixtures were also antidotes for Black Rot. If further experiments should fully establish this fact we can dispense with bags, save the labor, and grow grapes out-of-doors as in former years. I learn the rot has appeared already at Vineland, and this season will perhaps fully demonstrate the efficiency of this treatment. The preparation considered the best is what is known as the Bordeaux mixture, which is made as follows: Dissolve six pounds of sulphate of copper in hot water, and slake four pounds of fresh lime in sufficient water to make milk of lime; mix the two together, and add enough water to make twenty-two gallons. This mixture should be sprayed on the vines at intervals of ten days to two weeks during the summer. This can be done with any of the force-pumps with a nozzle that delivers the liquid in the form of mist. The Eureka Sprayer, a modification of the Vermorel machine sent over here from France, is recommended highly by those who have used it.

Montclair, N. J.

E. Williams.

Summer-Flowering Bulbs.

AN important point to remember in the culture of these bulbs is that their flowering season is the rainy season of their native countries. This is particularly true of the Tigridia and the Gladiolus, which bloom in cool, rainy or winter season, while their period of rest is in the excessive hot, dry weather peculiar to their home. The Calla, a native of the Nile, blooms when the roots are a foot under water in the spring, and rests at low water, when their roots are as dry as it is possible to be and live. The same is the case with many of the so-called Cape bulbs.

The Gladiolus will grow under any conditions, but it will not grow well. A cool, moist atmosphere is the one in which they delight. Climate alone is what makes them succeed so well in England. Last year we had rain in abundance, with low temperature, and never before have we had such perfection in Gladiolus flowers. We make a mistake in planting our bulbs

too early. They should be kept cool and dry, and in a dark room until the 1st of July, then they will come into bloom about the 1st of October, throwing up spikes that for number and size of flowers would hardly be recognized as the varieties that bloomed in midsummer. If planted early, so as to flower in July and August, they should be protected against the heat of the sun by a lattice or light canvas covering, and the bed should have a light mulching of newly-cut grass. This will keep the roots cool, and is not unsightly. The capabilities of the Gladiolus are only known to those who grow them in this manner. The soil makes but little difference with Gladioli. Any soil that will yield good crops of potatoes will be equally good for these plants. If it is heavy, plant shallow, say from one to two inches deep; if light, from four to six inches will be better. It is best to use ground made very rich for some other crop the previous year, as fresh manure does not suit them.

Lilies, quite as much as Gladiolus, need a good mulching to keep the roots cool and moist. A bed of Lilies that has been properly mulched a few years will yield enormously; more than thrice the number of flowers will be produced, and they will be much larger, with better defined colors and of greater substance. A Lily-bed should be made in a position where it can remain undisturbed for a number of years, and as long as the plants flower well. The Ascension Lily (*L. candidum*), the handsomest of all Lilies, should be planted in July or August, while the bulb is resting. They will live when planted at any time, but will flourish only when planted at the proper season.

Tigridias are Mexican bulbs, and do not endure our northern sun. Treat them as Lilies should be treated. In October the flowers remain open nearly the whole day, while in August they close before noon. Give them a moist, cool situation, and they will appreciate the treatment.

Dahlias are not properly bulbous plants, but they may properly be included in the same list. To be grown well they must have a cool and moist soil, which is usually a heavy one. If the garden does not afford such assist it by heavy mulching. If Dahlias are grown simply for distant effect give them plenty of room to branch out and plenty of plant-food, for they are great feeders. If individual blooms are desired, thin out the smaller branches and disbud. We prefer the former treatment, and want the plant to occupy all the space it requires, and to produce as many flowers as it likes.

Floral Park, N. Y.

C. L. Allen.

Notes on Wild Flowers.

Viola cuculata, now in flower, has the greatest number of forms of any of our northern Violets. Under cultivation the larger forms attain great size, and the profusion of large, deep green leaves make it a desirable plant. It likes a moist and rich clay loam, but will live in almost any soil. *V. pedata* (Bird's-Foot Violet) is a showy species, bearing numerous large blue flowers. A moist, loamy soil seems to suit it, yet it will grow in any ordinary soil. *Viola Canadensis* is the tallest species we have in New England, and it often reaches a height of two feet or more. The white flowers, veined with purple, are borne in great abundance. It is a more difficult plant to grow to perfection than the Violets before named, but if given a moist, rich soil in the shade it will become established.

Camassia Fraseri, now in flower, has a short, loose spike of blue flowers and grows about eight inches high. It seems to be hardy, having stood the past two winters here in the open ground without protection. *C. cusickii*, also in flower, is by far the largest *Camassia* we have seen. The bulbs are often twice the size of an ordinary hen's egg. The stems attain a height of over two feet, bearing long spikes, or racemes, of light blue flowers an inch in diameter, and there are frequently over forty of these to one spike. The plant is not difficult to cultivate, and, if planted deep, ought to be as hardy as most of the Lilies.

Aplectrum hyemale (Putty root) is not a showy Orchid. Its curious single leaf, which, like that of *Calypso* and of *Tipularia discolor*, comes up in autumn, remaining green through the winter until flowering time, then dying down to the bulb, is one of its chief attractions. It may be planted with success at any season, in moist, well-drained soil in the shade.

Arethusa bulbosa, now in flower, is one of the most charming little Orchids we have, although it is generally considered difficult to grow. It is a bog plant, and needs plenty of moisture. The finest plants we have seen were growing naturally in thick beds of Sphagnum moss. It sometimes attains a height of fourteen inches, but is oftener not more than six. We have planted it in autumn in a moist clay loam with good success. But the best place for it is in the Sphagnum beds of artificial bogs, where it would be sure to thrive.



Fig. 113.—*Rudbeckia laciniata*.—See page 279.

Our hardiest Lady Slipper is *Cypripedium pubescens*. We have transplanted it into all kinds of soil and at all seasons when the ground was not frozen, and it has always lived. It will grow in the sun, but prefers the shade. Its flowers are very like those of *C. parviflorum*, except that they are larger. Indeed, it is hard to distinguish between large specimens of *C. parviflorum* and small ones of *C. pubescens*. *C. acaule* is the most difficult to grow of our hardy *Cypripediums*. It likes a loamy, well-drained soil and needs shade. The flowers, always solitary, vary in color from a rose-purple to almost pure white, and in the highest colored forms are very showy.

Another pretty Orchid, now at its best, is *Orchis spectabilis*. Its flowers are pink-purple and white in color, borne on short stalks three to seven inches high. Its leaves are broad and lie close to the ground. It is an easy plant to cultivate if given just the right soil and situation, and will not thrive in any other. It needs plenty of fine, well-decayed leaf-mould or chip-dirt about its roots, plenty of moisture, yet perfect drainage and shade.

Fritillaria recurva, now almost out of flower, is a plant of the Lily family from California. It grows from six to twelve inches high, bearing several red flowers tinged with yellow, bell-shaped, three-quarters of an inch long by half an inch in diameter and resembling a Lily. It is one of the finest of this genus. The bulb is flat, an inch broad by one-fourth to half an inch thick. The plant needs well-drained soil and should be protected from frost in winter, or stored in dry sand in the cellar.

Phlox divaricata is a good plant for cultivation. The colors of its flowers are not so bright as those of some other Phloxes, but they are borne in great profusion and last a long time. It thrives in ordinary soil. *Silene Pennsylvanica* is now in bloom. The variety with pinkish flowers is a pretty plant, but the white variety is not so desirable. *S. Virginica* (Fire Pink), also in flower, is one of the finest species of this genus. Its flowers are large, not very numerous, but of a deep crimson color. It is easily grown from seed, or can be readily transplanted.

Charlotte, Vt., May 3d.

F. H. Horsford.

Orchid Notes.

A GREAT many *Cypripediums* are now in bloom at this place, the most distinct and conspicuous among them being the rare *C. Mastersianum*, a plant introduced from the East Indies, though the exact habitat is not at present known. The foliage of this plant resembles *C. ciliolare*; the sturdy, hirsute scapes bear a single flower which in general outline is like that of *C. Hookera* but is much larger; the sepals are green, the dorsal one having a deep border of yellowish-white; the petals and lip are reddish-brown the former prettily spotted with dark purple. The general characters of growth and flower suggests a natural hybrid between *C. hirsutissimum* and *C. Hookera*. Another fine plant is *C. macropterum*, a hybrid from *C. Lowii* and *C. superbiens*, which bears a resemblance to both parents, but has foliage more distinctly that of *C. superbiens*. This superb Orchid rivals the famed *C. Morgania* in the elegance of its flowers, and, like it, is of strong growth and bears three flowers on a scape. *C. orphanum* is rare and extremely attractive, being the very best of its section. It possesses the free-growing qualities and habit of *C. Druryi*, and flowers as freely as *C. barbatum*. *Cypripedium Lindleyanum*, though known for nearly half a century, has always been a very rare plant until quite recently. It is found growing in British Guiana in swamps and on rocks where there is considerable water. In cultivation it needs to be treated almost as an aquatic, with strong heat and a very light position. The scapes are about three feet long, bearing four to five yellowish-green flowers, closely veined and reticulated with reddish-brown. *C. leucorrhodum* is a hybrid of *C. Roezlii* and *C. Schlimii album*, and is the best of this class. The growth is very strong, and produces branching scapes with many pale-rose and white flowers, the lip being prettily speckled on the inside with green. *C. Sedeni candidulum* is very near this species in its flowers, but differs considerably in growth. Branching scapes of this very pretty kind now bear fifteen to twenty flowers each. Several plants of the grotesque flowered *C. caudatum* are in full bloom, also the hitherto very rare white variety, *C. Wallisii*, and the quaint, slipperless *C. Lindenii*. A plant of the gay little *C. barbatum Warneri* has twenty-seven flowers, while the bold, dark-flowered variety *C. giganteum* is represented by a plant with thirty-seven flowers. *C. selligerum majus* is an immense improvement on the type, and Veitch's *C. Harrisianum superbum* is the best of the many varieties of this old and well-known hybrid. A plant with us is showing ten scapes.

Erises crassifolium.—This species is again in flower with us. It is one of the handsomest of the genus. The habit is dwarf and thick-set, and, as the name indicates, the light-green leaves, sparsely dotted with purple, are very thick and fleshy. The racemes are long and drooping, bearing a number of large, handsome, purple-amethyst and white flowers. This plant, in cultivation, grows very slowly, and is seldom seen in bloom; but it will well repay any extra care it may require. We have plants doing fairly well in pots, also in shallow baskets with moss, but the best plant is in a cylinder. It requires the warmest treatment, with a very moist atmosphere and a minimum of potting material. It was introduced from Burmah about twelve years since.

Angræcum modestum (*Sanderianum*) is a charming, free-flowering and sweet-scented Orchid, introduced a few years since from Madagascar. The stem is somewhat short and slender, bearing broad, elliptic, bright green, leathery leaves. The pendulous racemes spring from the axils of these, which are a foot or more long, bearing about thirty pure white flowers, about one and a half inches across, the lip terminating in a spur some four inches long. The flowers last in perfection for three weeks. This Orchid should be found in the smallest collection. It will grow very freely in baskets or on blocks of wood, and should not have too much potting material. This may consist of moss alone or mixed with peat. The warmest house is best for it, with a plenteous supply of water at all seasons; the red spider attacks and disfigures the leaves at once if the atmosphere is too dry.

Cattleya iricolor is now blooming freely, and is remarkable for its distinct habit of growth, the color of its flowers and its rarity. The slender clavate bulbs are about four inches long and bear large strap-shaped leaves more than a foot long. The peduncles bear two to three flowers, four inches across, milk-white except the convolute lip, the base and side lobes of which are prettily marked with broken lines of purple and a transverse band of yellow. The native country of this species is unknown, and only one plant was ever imported. I am not sure whether there is any other part of this plant living or if the entire stock is here.

Kenwood, N. Y.

F. Goldring.

Astragalus hypoglottis.—This is a pretty little prostrate plant belonging to the Pea family, and is now in bloom with us, with its heads of blue and white flowers raised just above the foliage, and amongst a batch of seedlings are some pure white flowered forms, which are pleasing by contrast. This plant is a native of Great Britain, but has proved perfectly hardy here in the open ground, but it is hardly suitable for a mixed border where strong-growing plants are. In such a position it would speedily become smothered. Another plant which makes a suitable companion to the above is *Lotus corniculatus*, with its golden-yellow blossoms, which are also pea-shaped. When planted together these form an interesting group.

Ranunculus speciosus, with yellow flowers an inch across, and as double as it is possible for a flower to be, is just now at its best, and resembles a much-branched double Buttercup, except that the flowers are larger. This is one of the easiest plants to grow when planted in a wet or heavy soil. Under these conditions *R. speciosus* will increase rapidly and form nice strong clumps, with abundance of flowers every year.

Saxifraga granulata.—The Saxifrage family is a numerous one, embracing plants vastly different from each other in habit and general appearance from the pretty trailing *S. oppositifolia* of the Pyrenees, and others of a similar habit to the large, thick-leaved *S. crassifolia*, and *S. peltata* of the Pacific coast, probably the largest of the genus. The subject of this note is now in bloom, and its pretty, double, white flowers render it a desirable plant. The popular name, Fair Maids of France, is not in this case a misnomer. The rock-garden is the best place to grow *S. granulata*, but is not essential. We have grown it successfully for years in the open border, where it flowers every spring. After flowering, the plant dies down for the hot season, and care should be taken not to disturb the small bulbs which are about the size of peas. Growth will begin again in fall, and the leaves will remain green all winter; the flower stems are produced with the opening of the spring season.

Passaic, N. J.

E. O. Orpet.

Long, White, French Turnip.—This is the best of all Turnips for family use, and is known in Virginia as Sugar Turnip. The only trouble about it is that it needs earlier sowing than the flat, quick-growing sorts. At the north, June is none too early to put the seed in the ground. This is the hardiest of all Turnips I have ever grown. In this latitude it can be

left out just as Parsnips and Salsify are left, and it will be sound and sweet all winter. Another great advantage is that the tops in the spring make the best of greens—much better than Kale and almost equal to Spinach. With a good covering, in dry ground, this Turnip would probably winter over much further north. A good way to treat them is to sow the seed early in June in a bed, and transplant them later as vacant spots occur in the garden. Managed in this way the necessity for early sowing is not so inconvenient, and the Turnips are far superior to the flat sorts sown later. It belongs to the long Ruta Baga class.

A Hint About Pickles.—When working early sweet Corn for

the small plants now at much lower rates than at planting time in July and August, and much better plants can be had by setting them now in beds and caring for them until the time to transplant finally. A cold frame, which has been used for early plants, is a good place to put them. They should be dibbled two or three inches apart all over the bed, and then, instead of the glass sash, the frame should be covered with a screen made of laths nailed an inch apart. This will give a varying shade which will not draw the plants and will protect them from the scorching sun. With proper attention to watering, stout plants can be grown, which will come up with a good mass of roots and suffer little in moving.

Crozet, Va.

W. F. Massey.



Main Street, Charlestown, New Hampshire.—See page 278.

the last time plant a few Cucumber seeds between the hills of Corn, so as to have them about four feet apart each way. If a shovelful of manure is well chopped in before planting on each spot where a hill is to be, so much the better. Then as soon as the Corn is eaten, cut away the stalks and give the Cucumbers all the ground. Should the striped bug attack the young plants, as they seldom will at this season, dust bone-flour over them and they will leave at once. Brussels Sprouts can be set between Pea rows, and afterward allowed the whole ground.

Celery Plants.—Now that commercial growers produce Celery plants at such reasonable rates it hardly pays the private grower to take the trouble to raise them from seed. It is much better, however, to get these plants in advance of the time for setting in their final location. The growers will sell

The Climbing Hydrangea.—*Hydrangea radicans* bloomed abundantly this year, but the flowers, borne in large, flat corymbs, have little color and are not very interesting. The large, deep green leaves, however, appearing as early as they do, are very beautiful, and as the plant makes rapid growth whenever it has anything to cling to, it is a very valuable addition to our climbers.

Germantown, Pa.

Joseph Meehan.

Popular Gardening, in a recent issue, calls attention to the common and wasteful method of applying top-dressing to fruit and other trees, which consists of piling a heap of stable manure directly round the trunk. The roots of plants are capable of receiving nourishment through their young, growing tips only, so that unless the top-dressing is applied directly over the ends of the roots much of the value of the manure is wasted,

so far as immediate benefit to the tree is concerned. A picture of a tree with a horizontal section of ground showing the position and mode of growth of the roots clearly enforces the lesson, and indicates that the place to apply manure to a tree is a circle three or four feet wide drawn upon the ground just under the extremities of the lateral branches. A better way still is to cover the entire circle about the tree whose radius is equal to its height.

Notes from the Arnold Arboretum.

Pourthia arguta is flowering here freely for the first time. It is a graceful, hardy shrub, with slender, spreading branches, covered with smooth, pale gray bark, that of the branchlets thickly covered with warts, as are the peduncles and pedicels; lanceolate or elliptical, oblong, membranaceous, short-petioled, opposite leaves, pointed at both ends, finely and sharply serrate, and three inches long by one and a half inches wide. They are covered when young, as are the stout branches and inflorescence, with short, scattered white hairs, but become perfectly glabrous at maturity. The flowers are small, one-fourth of an inch across, pure white, and borne in flat, few-flowered, cyme-like, almost sessile corymbs, and are followed by small, red globose or ovoid, one to two-seeded pomes. The genus *Pourthia* was established by Decaisne ("Nouv. Arch. du Mus," x., 146) for a number of plants peculiar to the Himalayas, China, Corea and Japan, which, in herbaria, were long confounded with species of the allied genus, *Photinia*, which they resemble in general appearance. *Pourthia* can, however, be recognized by the minute serratures of the leaves, by the profusion of the warts which cover the young shoots, the petioles and peduncles, by the styles (two, or generally three), connate to the middle, and by the testa of the seeds, which contains ducts filled with resinous gum, a peculiarity which, as M. Decaisne pointed out, is not shared by the plants of other genera of *Pomaceæ*. The genus commemorates the labors of the French missionary, Pourthié, massacred in Corea in 1866.

Pourthia arguta is a native of the Himalayas from Sikkim to the Kashya Hills and to Burmah. It is apparently very variable, Sir Joseph Hooker describing no less than six varieties in the "Flora of British India" (ii., 382).

In cultivation here it is a remarkably neat and apparently a perfectly hardy plant, already nearly eight feet high, having inhabited the Arboretum for a number of years. The divergent habit of the branches and flower-bearing lateral branchlets give to this plant a peculiar and striking appearance quite unlike that of other plants in the collection. It flowers here about ten days earlier than its near ally, *Photinia villosa*, of which a figure was published in the first volume of GARDEN AND FOREST, p. 67.

The Dalmatian *Spiræa cana* is very fine here this year. It is one of the most variable of the *Spiræas* in habit, in the size and pubescence of the leaves and in the size of the inflorescence. Next to *S. trilobata* and its varieties, of which *S. Van Houttei* is by far the most beautiful, *S. cana* is the best of the late-blooming *Spiræas* which produce their flowers on the extremities of lateral, leafy branches. The most attractive of the numerous forms of this plant which are cultivated in the Arboretum is one with small, ovate, entire leaves (one-half to two-thirds of an inch long), covered with soft, silky-white tomentum, and with very abundant, although small, panicles of flowers. This is a perfectly hardy shrub of handsome, compact habit. It grows here to a height of two or two and a half feet.

There are many species and varieties of *Cotoneaster* in the collection. Among them are plants of considerable ornamental value, especially for the autumn decoration of gardens, as they nearly all produce showy fruit. Among the species now in flower the handsomest at this season of the year is the dwarf and here nearly prostrate *C. microphylla*. It is a low, intricately-branched shrub, with very stout, rigid, horizontal branches, ovate or obovate entire leaves, a third to half an inch long, the margins often somewhat recurved, very coriaceous, dark green and glossy on the upper surface, the lower covered with sparse hairs, which also occur upon the calyx and short peduncles. The flowers are rather large (half an inch across), solitary, greenish-white, with showy red stamens. The scarlet fruit is globose. *C. microphylla*, often confounded in gardens with *C. rotundifolia* and *C. buxifolia*, is a native of the Himalayas, from Kashmir to Bhotan, where it is found at elevations of from 4,000 to 10,000 feet above the sea level. *C. microphylla* is fairly hardy here, and is a useful plant for carpeting the ground under larger shrubs. Its neat habit, brilliant, although small, leaves, and handsome and abundant flowers and fruit make it a desirable subject for the rock-garden, or for the margins of small shrubberies.

Cotoneaster acuminata is also in flower. This is an erect shrub, with rather stout branches, with ovate, acuminate or acute leaves two inches long, pubescent or tomentose beneath (glabrous at maturity), as are the shoots of the year and the inflorescence. The flowers are dull pink, inconspicuous, in short, one to five-flowered cymes. They are followed, however, by handsome black fruit, which makes this plant a conspicuous object during the autumn months. It is a native of the Himalayas from Sumor to Sikkim, where it extends to an elevation of 13,000 feet. It attains sometimes a height of fourteen feet in its native country, where the wood is used for walking-sticks ("Fl. British India," ii., 385). *Cotoneaster acuminata* is perfectly hardy in the Arboretum, which it has inhabited for several years.

C. vulgaris is the most showy species of the genus in fruit in this collection. It is an erect shrub, with stout branches, broadly ovate, acute or obtuse leaves, one to two inches long, glabrous above, softly tomentose on the lower surface; small, inconspicuous, reddish flowers, in short, glabrescent, few-flowered cymes, and brilliant, bright red, drooping fruit, which remains upon the branches for a considerable time after the leaves have fallen; it is found from northern Europe, through Siberia and Persia to the Himalayas. There is a variety with black fruit which is not in this collection. *C. vulgaris* is a perfectly hardy plant, and although a very old inhabitant of gardens, it seems to be rarely cultivated in this country in spite of the fact that it is one of the most desirable of autumn fruit-bearing shrubs.

Rhamnus alpinus, now in flower, has the most ornamental foliage of the genus. The leaves are ample, four or five inches long, oval, lanceolate, crenately toothed, dark green and lustrous, and conspicuous for the exceedingly prominent primary veins. The flowers, like those of the other species, are inconspicuous, yellow-green, four parted, the females with four-lobed stigmas. The fruit is black. It is a dwarf shrub, attaining sometimes a height of three or four feet. Here it grows rather slowly, and its hardiness is not yet satisfactorily demonstrated. *Rhamnus alpinus* is a native of the mountain ranges of southern Europe from Spain to Turkey.

The Deerberry, or Squaw Huckleberry (*Vaccinium stamineum*) is a charming garden plant, and one which, when well established, grows freely in any good soil, requiring no special care or peculiar treatment. It is now covered with flowers, with open, bell-shaped corollas, and long, exserted stamens, hanging singly on graceful, slender pedicels from the axils of the small upper leaves or leaf-like bracts, and forming leafy racemes. *V. stamineum* is a widely-branching shrub, two or three feet high, with ovate or oval ample pale leaves, glaucous or white on the lower surface, and large, round or pear-shaped fruit, which is green or sometimes dull purple when fully ripe, and barely edible. The Squaw Huckleberry is found over a large part of the Northern States, and along the southern Alleghenies, growing always in gravelly soil, under the shade of deciduous trees, generally different species of Black Oaks. Brought into the garden, and treated generously, it will grow more freely than it does in its native home, and will delight and astonish those persons who are not familiar with the beauties of the American *Vaccinia*.

The English Bilberry, the pretty little *Vaccinium Myrtillus*, is in flower. This is a small, glabrous shrub, growing only eight or ten inches high, with angled green branches, ovate, thin leaves, globular, solitary, nodding, pale green flowers, tinged with red; and round, nearly black fruit, covered with a glaucous bloom. It is a native of northern and central Europe, extending to the great mountain ranges of southern Europe, often covering wide tracts of ground. It is hardy here, but a delicate plant, requiring special care and attention.

Exochorda grandiflora, a well-known garden shrub and a native of central China, has flowered this year in this neighborhood in the greatest profusion, and perhaps has never before been seen here in as great beauty. It is certainly one of the most beautiful of all spring-flowering shrubs. It is not, however, although known in European gardens for more than forty years, as common a plant as the great beauty and profusion of its flowers would lead one to expect. The truth is, it is a difficult plant to propagate; there is no stock upon which it will grow, and green wood cuttings root very slowly and with great difficulty. Seed, if it can be had, germinates freely, but young plants rarely produce seeds, which appear apparently only on old and long-established plants; and old plants are rarely seen. The *Exochorda*, from some reason or other, dies young, at least in this climate, and it is rare to see a bush more than six or eight feet high here. Generally before it reaches that size the branches begin to crack and to lose the bark. After this the plant gradually perishes, and generally disappears at the end of

two or three years more. Any seed which can be found should be carefully collected and sown, so that a succession of young plants can be kept up.

Lonicera parvifolia, a small, shrubby species from the alpine Himalaya is in flower. It is a neat shrub with minute leaves and small, greenish-white flowers with cylindrical, corolla-tubes a quarter to a third of an inch long—a pretty plant enough, but of no great beauty or horticultural interest.

Lonicera glauca (the *L. parviflora* of Gray's Manual) is a beautiful native Honeysuckle, which is now in flower. It has trailing or sometimes bushy stems, rarely more than four or five feet long, smooth leaves, green on the upper and very pale and glaucous on the lower surface, the upper pairs united and all closely sessile. The flowers are greenish-yellow, tinged with dark purple, and are produced in closely approximate whorls.

This is a northern plant, extending almost to the shores of Hudson's Bay, and not uncommon in northern New England and New York or on the high Carolina mountains—a good subject to naturalize on rocky banks or the borders of woods.

Lonicera Alberti (see GARDEN AND FOREST, i., 226) may be mentioned again, that the testimony of another year's trial may be recorded in its favor. It is certainly one of the best small shrubs of recent introduction. The habit is graceful and the coloring delightful. The flowers are abundant, fragrant and of good color; the fruit which was produced here last year very freely, is large (three-fourths of an inch in diameter), vinous-red and covered with a glaucous bloom. This is, so far as we know here, by far the most valuable of the ligneous plants introduced in late years from central Asia through the efforts of the Russian botanical explorers, the most active and successful of whom, Dr. Albert Regel, is very fittingly commemorated in this charming plant.

Lycium pallidum, figured last year in GARDEN AND FOREST (f. 54), is now loaded with its handsome, tubular flowers. The introduction of this species was certainly a very lucky hit. The fact that a plant of the dry south-west grows here so well and flowers so profusely is a remarkable and interesting fact.

May 25th.

J.

The Forest.

Succession of Forest Growths.

THE following is from an address delivered by Mr. Robert Douglas before the Association of American Nurserymen at the meeting in Chicago last week:

It is the prevailing and almost universal belief that when native forests are destroyed they will be replaced by other kinds, for the simple reason that the soil has been impoverished of the constituents required for the growth of that particular tree or trees. This I believe to be one of the fallacies handed down from past ages, taken for granted, and never questioned. Nowhere does the English Oak grow better than where it grew when William the Conqueror found it at the time he invaded Britain. Where do you find White Pines growing better than in parts of New England, where this tree has grown from time immemorial? Where can you find young Redwoods growing more thriftily than among their giant ancestors, nearly or quite as old as the Christian era?

The question why the original growth is not reproduced can best be answered by some illustrations. When a Pine-forest is burned over both trees and seeds are destroyed, and as the burned trees cannot sprout from the stump like Oaks and many other trees, the land is left in a condition well suited for the germination of tree-seeds, but there are no seeds to germinate. It is an open field for pioneers to enter, and the seeds which arrive there first have the right of possession. The Aspen Poplar (*Populus tremuloides*) has the advantage over all other trees. It is a native of all our northern forests, from the Atlantic to the Pacific. Even fires cannot eradicate it, as it grows in moist as well as dry places, and sprouts from any part of the root. It is a short-lived tree, consequently it seeds when quite young and seeds abundantly; the seeds are light, almost infinitesimal, and are carried on wings of down. Its seeds ripen in spring, and are carried to great distances at the very time when the ground is in the best condition for them. Even on the dry mountain sides in Colorado, the snows are just melting and the ground is moist where they fall.

To grow this tree from seed would require the greatest skill of the nurseryman, but the burnt land is its paradise. Whenever you see it on high, dry land you may rest assured that a fire has been there. On land-slides you will not find its seeds germinating, although they have been deposited there as abundantly as on the burned land.

Next to the Aspen and Poplars comes the Canoe Birch, and further north the Yellow Birch, and such other trees as have provision for scattering their seeds. I have seen acorns and nuts germinating in clusters on burned lands in a few instances. They had evidently been buried there by animals and had escaped the fires. I have seen the Red Cherry (*Prunus Pennsylvanica*) coming up in great quantities where they might never have germinated had not the fires destroyed the debris which covered the seed too deeply.

A careful examination around the margin of a burned forest will show the trees of surrounding kinds working in again. Thus by the time the short-lived Aspens (and they are very short-lived on high land) have made a covering on the burned land, the surrounding kinds will be found re-established in the new forest, the seeds of the conifers, carried in by the winds, the berries by the birds, the nuts and acorns by the squirrels, the mixture varying more or less from the kinds which grew there before the fire.

It is wonderful how far the seeds of berries are carried by birds. The waxwings and cedar-birds carry seeds of our Tartarian Honeysuckles, Purple Barberries and many other kinds four miles distant, where we see them spring up on the lake shore, where these birds fly in flocks to feed on the Juniper berries. It seems to be the same everywhere. I found European Mountain Ash trees last summer in a forest in New Hampshire; the seed must have been carried over two miles as the crow flies.

While this alternation is going on in the east, and may have been going on for thousands of years, the Rocky Mountain district is not so fortunate. When a forest is burned down in that dry region, it is doubtful if coniferous trees will ever grow again, except in some localities specially favored. I have seen localities where short-lived trees were dying out and no others taking their places. Such spots will hereafter take their places above the timber-line, which seems to me to be a line governed by circumstances more than by altitude or quality of soil.

There are a few exceptions where Pines will succeed Pines in a burned-down forest. *Pinus Murrayana* grows up near the timber-line in the Rocky Mountains. This tree has persistent cones, which adhere to the trees for many years. I have counted the cones of sixteen years on one of these trees, and examined burned forests of this species, where many of the cones had apparently been bedded in the earth as the trees fell. The heat had opened the cones and the seedlings were growing up in myriads; but not a conifer of any other kind could be seen as far as the fire had reached.

In the Michigan Peninsula, northern Wisconsin and Minnesota, *P. Banksiana*, a comparatively worthless tree, is replacing the valuable Red Pine (*P. resinosa*), and in the Sierras *P. Murrayana* and *P. tuberculata* are replacing the more valuable species by the same process.

In this case, also, the worthless trees are the shortest-lived, so we see that Nature is doing all that she can to remedy the evil. Man only is reckless, and especially the American man. The Mexican will cut large limbs off his trees for fuel, but will spare the tree. Even the poor Indian, when at the starvation point, stripping the bark from the Yellow Pine (*P. ponderosa*), for the mucilaginous matter being formed into sap-wood, will never take a strip wider than one-third the circumference of the tree, so that its growth may not be injured.

We often read that Oaks are springing up in destroyed forests where Oaks had never grown before. The writers are no doubt sincere, but they are careless. The only Pine-forests where Oaks are not intermixed are either in land so sandy that Oaks cannot be made to grow on them at all, or so far north that they are beyond their northern limit. In the Green Mountains and in the New England forests, in the Pine-forests in Pennsylvania, in the Adirondacks, in Wisconsin and Michigan—except in sand—I have found Oaks mixed with the Pines and Spruces. In north-western Minnesota and in northern Dakota the Oaks are near their northern limit, but even there the Burr Oak drags on a bare existence among the Pines and Spruces. In the Black Hills, in Dakota, poor, forlorn, scrubby Burr Oaks are scattered through the hills among the Yellow Pines. In Colorado we find them as shrubs among the Pines and Douglas Spruces. In New Mexico we find them scattered among the Piñons. In Arizona they grow like Hazel-bushes among the Yellow Pines. On the Sierra Nevada the Oak region crosses the Pine region, and scattering Oaks reach far up into the mountains. Yet Oaks will not flourish between the one hundredth meridian and the eastern base of the Sierras, owing to the aridity of the climate. I recently found Oaks scattered among the Redwoods on both sides of the Coast Range Mountains.

Darwin has truly said "The Oaks are driving the Pines to

he sands." Wherever the Oak is established—and we have seen that it is already established wherever it can endure the soil and climate—there it will remain and keep on advancing. The Oak produces comparatively few seeds. Where it produces a hundred, the Ash and Maple will yield a thousand, the Elm ten thousand, and many other trees a hundred thousand. The acorn has no provision for protection and transportation like many tree-seeds. Many kinds are furnished with wings to float them on the water and carry them in the air. Nearly every tree-seed, except the acorn, has a case to protect it while growing, either opening and casting the seeds off to a distance when ripe or falling with them to protect them till they begin to germinate. Even the equally large seeds of other kinds are protected in some way. The Hickory-nut has a hard shell, which shell itself is protected by a strong covering until ripe. The Black Walnut has both a hard shell and a fleshy covering. The acorn is the only seed I can think of which is left by Nature to take care of itself. It matures without protection, falls heavily and helplessly to the ground, to be eaten and trodden on by animals, yet the few which escape and those which are trodden under are well able to compete in the race for life. While the Elm and Maple seeds are drying up on the surface, the Hickories and the Walnuts waiting to be cracked, the acorn is at work with its coat off. It drives its tap-root into the earth in spite of grass, and brush, and litter. No matter if it is shaded by forest-trees so that the sun cannot penetrate, it will manage to make a short stem and a few leaves the first season, enough to keep life in the root, which will drill in deeper and deeper. When age or accident removes the tree which has overshadowed it, then it will assert itself. Fires may run over the land, destroying almost everything else, the Oak will be killed to the ground, but it will throw up a new shoot the next spring, the root will keep enlarging, and when the opportunity arrives it will make a vigorous growth, in proportion to the strength of the root, and throw out strong side roots, and after that care no more for its tap-root, which has been its only support, than the frog cares for the tail of the tadpole, after it has got on its own legs.

There is no mystery about the succession of forest-growths, nothing in Nature is more plain and simple. We cannot but admire her wisdom, economy and justness, compensating in another direction for any disadvantage a species may have to labor under. Every kind of tree has an interesting history in itself. Seeds with a hard shell, or with a pulpy or resinous covering, which retards their germination, are often saved from becoming extinct by these means.

The Red Cedar (*Juniperus Virginiana*) reaches from Florida to and beyond Cape Cod; it is among the hills of Tennessee, through the Middle States and New England. It is scattered through the western states and territories, at long distances apart, creeping up the Platte River, in Nebraska. (I found only three in the Black Hills, in Dakota, in an extended search for the different trees which grow there. Found only one in a long ramble in the hills at Las Vegas, New Mexico.) Yet this tree has crept across the continent, and is found here and there in a north-westerly direction between the Platte and the Pacific Coast. It is owing to the resinous coating which protects its seeds that this tree is found to-day scattered over that immense region.

Correspondence.

Ulmus fulva pendula.

To the Editor of GARDEN AND FOREST:

Sir.—I appreciate the kindly notice your correspondent has given of me and my work. In regard to the "Weeping Slippery Elm," I am responsible for the name under which it has been distributed. It was regarded as a form of the Slippery Elm without the close examination that should have been made. Two of the trees originally grafted have now flowered with me. They prove to be not *Ulmus fulva*, but a form of the common White Elm (*U. Americana*). It is inconceivable that I should not have noticed this, as the Slippery Elm is readily distinguished by the rough bark on the younger twigs, very different from the smoother bark of the American or White Elm. As there are many weeping forms of the common American Elm, and it is necessary to re-name this, it will be better to drop the Latin designation for a mere variety like this. The grafts were sent to me by Mr. E. Beebe, then of Galena, Illinois, from a tree growing wild near there. An appropriate designation will be "Beebe's Weeping Elm."

Beebe's Weeping Elm is a very striking form. The branches curve over as they grow, much as the Weeping Willow does—the branches being thick and cord-like. I have seen some of

these curving branches that make an annual growth of twenty feet. They, however, get up to be trees of considerable size for all the curving tendency of the young growth. My trees are about thirty-five feet high, with trunks three and a half feet in circumference. The appearance at a little distance is precisely that of a Weeping Willow.

Germanstown, Pa.

Thomas Meehan.

To the Editor of GARDEN AND FOREST:

Sir.—A friend, whose son is a large grower of flowers in England, writes me expressing obligation to GARDEN AND FOREST for the note on the poisonous properties of *Primula obconica*. She says, in substance, "this has solved the mystery for us of the very troublesome inflammation of face and hands from which not only I but two of my daughters have been suffering this last year. It is undoubtedly *P. obconica* that has been the cause of it, for since we have avoided handling the plant the symptoms have gradually disappeared. I do not suppose any but those who grow the plant in large quantities need be afraid, and our men have divided and re-potted a great number without ill effects, so that it is only injurious to certain persons. It so happens that I have taken special trouble about our picking dead leaves, etc., little thinking that the evil was thus continually kept up. My eldest daughter, who has charge of boxes of cut flowers, has suffered greatly in her hands and arms, and, in some degree, in her face and eyes. Another daughter, who has used the flowers in wreath-making, of late showed similar symptoms, which puzzled our doctor extremely, though he said he was positive there was some local cause. It is such a charming plant that we are truly sorry, but I am afraid the fact remains." As *P. obconica* is now being so largely grown it seems well that this evidence confirmatory of your note should be given, as a warning to those who are susceptible to plant poisons.

Elizabeth, N. J.

Jno. N. Gerard.

Kissena Nurseries.

To the Editor of GARDEN AND FOREST:

Sir.—In the early part of this century the most attractive spot in the Middle States, for lovers of ornamental trees and other plants, was "The Linnæan Botanic Garden and Nursery," at Flushing, Long Island, of which Mr. William Prince was the proprietor. Mr. Prince was a man of excellent taste and a genuine enthusiast in horticulture. He gathered a notable collection of trees and shrubs, and in the now busy town, hard by the railroad station, there still stands to mark the site of the old nursery a noble Cedar of Lebanon, one of the best and oldest specimens of this tree in the United States. It was, perhaps, the success of this establishment, for so many years identified with the gardening art of the country, which led to the foundation, fifty years ago, of the Parsons' nurseries, which still remain, so that the town of Flushing has never lacked for choice material when any planting was to be done. This is made evident to the visitor not only by the unusual number of striking trees and shrubs on the private grounds of the town, but by the trees in its streets, which are exceptionally well planted. There are fine avenues of Elms here as elsewhere, but it is rare to find such long lines of Tulip-trees, or Lindens, or Beeches as are seen here. Mr. Samuel B. Parsons, the present head of the nurseries, who has done most of the planting, is particularly hopeful as to the future of the Beeches, and certainly a long, straight street with a row of well-grown English Beeches on either side would be worth a journey to see. This particular street, however, is comparatively new, and the trees have but just taken hold of the soil as if they were determined to grow. No better wish for them can be made than that they all may attain to as fair proportions as those of a tree of the same species standing near by on the private grounds of Mr. Parsons. In sweeping grace of outline, and in the lustrous beauty of its foliage, this particular tree is not equalled by any English Beech it has yet been my pleasure to see.

In their present estate, however, the Oaks are to me the most interesting street-trees in Flushing. That the conditions of the place are adapted to the best development of these trees might have been surmised from the size of the famous Fox Oaks, one of which was blown down in 1831, while the other survived until 1873, when it was destroyed by fire. A count of the annual rings then showed that the trees were 300 years old when George Fox preached under them in 1672. The giant White Oak on Parsons Avenue belongs, no doubt, to the same generation, and its knotted and furrowed trunk is twenty-three feet in girth. But the younger Oaks do not lack interest. Here they stand to prove that Oaks of many species grow rapidly,

and are in every way desirable for street-planting. A row of Pin Oaks, with perfectly straight trunks and shining strata of foliage, leaves nothing to be desired. And Willow Oaks, Chestnut Oaks, Over-cup Oaks are all equally good, each species having special merit of its own. In some places Mr. Parsons planted White Maples between the Oaks for immediate effect, with the intention of cutting them out as the trees began to crowd. But some of the later owners lacked the intelligence or nerve to remove the Maples, and now the beauty of both Oaks and Maples is lost beyond recall. In one instance I noted that an eccentric chopper had preferred the Maples, and had actually slaughtered the Oaks to save them.

In no commercial establishment in the country can a buyer find a more comprehensive list of trees and shrubs for ornamental planting than at the Kissena Nurseries. If the business has been directed towards any specialties, these have been Rhododendrons, in the first place, and after them in order, hardy Azaleas, Magnolias, Conifers and Japan Maples. Many of the hardy Rhododendrons sold here are Flushing seedlings, and the foreign varieties are propagated here—not imported—all being grafted on stock of *R. Ponticum*. Mr. J. R. Trumpy, the well-known propagator, who has spent a third of a century in this nursery, grafted last year 10,000 plants with his own hand. The Rhododendrons had largely passed their blooming season when I saw them, but there were still flowers enough to illuminate the broad acres where the larger plants stood. After all, the almost interminable stretches of younger plants closely set, of uniform size and perfect health, made quite as brave a show. Many of the Azaleas were yet bright with bloom, and these late-flowering sorts have a special value. One of the most brilliant of them, a plant which fairly flamed with orange and scarlet, is called Flushing Queen, and is a home-raised seedling. Many of these seedlings are among the best varieties, but the parentage of them all is unknown. It has not been the practice here to make special crosses, but to sow seed of the best, and then to select the best of the seedlings until plants worthy of a name are found. The Hardy Azaleas are grafted on stock of *R. nudiflorum* and *R. viscosum*. The deliciously fragrant *Magnolia Thompsoniana* was in flower, and so was the still more beautiful *M. parviflora*, and the large number of young Magnolias of various kinds showed the faith that an increase in the demand for these choice trees was imminent. Mr. Parsons notes that there is a more intelligent enquiry for trees of approved beauty, and the Magnolias are among those sought for. Space would fail me to enumerate all the select Conifers which are grown here in quantities. The season had come when the young growth was just covering the trees with the softest green, and I could hardly feel reconciled to the theory which rejects so generally this family of trees because many of them are short-lived. It is true, urges Mr. Parsons, that many of them are short-lived, but while they do live they have characters of beauty which no other tree can offer, and which no lover of Nature is willing to lose. If we can plant a bed of *Coleus* for its brightness during a single summer, why not plant conifers for their beauty in the heat of summer and the snows of winter—a beauty which we can command with no other material—during the vigorous life of the tree, whether that be ten or twenty or thirty or more years? Arguments like this are easily assented to at this season of the year in the Kissena Nurseries when surrounded by scores of specimens of as many species and varieties, every one of which is a perfect picture.

As we stood by long rows of variegated Japan Quince, with foliage as bright as that of the Japan Maples which have been sent out from here in such great numbers, I asked Mr. Parsons how many of these Japanese trees and shrubs had been introduced through these nurseries. To this he was unable to give a full answer without an examination of his books, but I hope to furnish you at some time with a complete list of these introductions, as the record would be worth preserving. The catalogue would include many of our best and best-known shrubs. From Dr. Hall, for example, came in 1862: The double form of *Deutzia crenata*, *Hydrangea paniculata grandiflora*, *Magnolia stellata* and *M. Kobus*, five varieties of *Wistaria*; *Acer polymorphum*, *Quercus Dentata*, *Thuyopsis dolabrata*, *Sciadopitys verticellata* and *Lilium auratum*, eight bulbs of which were afterwards sold to a European firm at eighty dollars, in currency, each. Besides these and others, these nurseries received the seeds of many conifers from Dr. Hall. Among them, of *Picea Ayanensis*, *P. polita*, *Retinispora obtusa* and *Pinus Koraensis*.

The consignments from Mr. Thomas Hogg were much more important, including such prizes as twenty-five species and varieties of Maples, the Japanese Chestnut, the *Cercidiphyllum*, two varieties of *Benthamia*, the *Stuartia*, whose

flowering in Europe last year created some sensation; *Daphne Genkwa*, *Deutzia scabra*, *Elæagnus longipes*, *Hydrangea paniculata*, *Styrax Japonica*, *Schizophragma hydrangeoides*, *Dimorphanthus Mandchuricus*; many fine conifers, including the Japanese Hemlock; nine varieties of *Retinispora*, *Pinus Thunbergii*, *P. densiflora* and *Taxus cuspidata*. This by no means completes the list of hardy plants for which the horticultural world has to thank Mr. Hogg, not to speak of many kinds adapted to green-house culture, which were also sent out through the agency of these nurseries. If we add to these importations such plants as the Weeping Hemlock, the Red-flowered Dogwood and many others, besides the seedlings raised here, we can begin to appreciate how large a place this firm will occupy in the history of American gardening.

Much of what was the original nursery-ground has been cut up into building-lots, but about the old place are still found a collection of noteworthy trees that cannot be matched elsewhere in this country. The great Weeping Beech has already been pictured and described in GARDEN AND FOREST—but near it stands a Purple Beech with a trunk ten feet in girth and branches spreading over a diameter of sixty feet. Near by is a Cephalonian Fir, which is at least forty years old, with perfect foliage and feathered to the very turf. The *Pseudolarix* here has a trunk four and a half feet in circumference. On the grounds of Mrs. Leavitt, a few rods distant, stands a characteristic specimen of the Oriental Spruce, with its deep shadows and rich green foliage. This tree is doubtless fifty years of age, but shows no deterioration. An immense *Magnolia Soulangiana* is not far distant, and is probably of the same age. It divides into four trunks close to the ground, which girth respectively four, four and a half, two and three-quarters and two and two-thirds feet. Its spread of branches altogether is forty feet. Words and numerals give faint ideas, however, of the charm which invests these trees and a score of others equally attractive on the home grounds of Mr. Parsons. The sum of the whole matter is that no one can say that he is familiar with the finest collections of trees which this country has to show until he has been at Flushing, where, for a hundred years at least, have been located some of the foremost establishments for propagating trees and shrubs for ornamental planting.

Flushing, L. I.

S.

Recent Plant Portraits.

PASSIFLORA EYNSFORD GEM, *Gardeners' Chronicle*, April 20th; a hybrid Passion-flower raised in England from *Constance Elliot*, a white form of *P. cerulea* crossed with *P. racemosa*. "The petals are a lovely shade of rosy-lilac, the threads of the corona being ivory-white, tipped with violet. It is exceptionally beautiful, even among a genus famed for good looks, and it has the advantage of being almost constantly in flower."

MUTISIA CLEMATIS, *Gardeners' Chronicle*, April 20th; a free-growing, climbing Composite from the high mountains of Bogota, with deep, orange-colored flowers, and a capital plant for the cool green-house.

SKIMMIA JAPONICA (seedling male form; *S. fragrans* of gardens), *Gardeners' Chronicle*, April 27th.

SKIMMIA JAPONICA (female; *S. oblata* of gardens), *Gardeners' Chronicle*, April 27th.

SKIMMIA FORTUNEI (*S. Japonica* of gardens), *Gardeners' Chronicle*, April 27th. Dr. Masters has been studying the various *Skimmias* grown in English gardens, with the result that he finds that much confusion has existed among botanists and cultivators about these plants, and that the plant universally known as *S. Japonica* is not that species at all, and that it is not even known to belong to Japan, but that the plant described as *S. oblata* is the true *S. Japonica* of Thunberg and of Siebold and Zuccarini, or rather the female of that species, in which male and female flowers are separated on different individuals. The *S. Japonica* of gardens, so considered by Lindley, with whom all this confusion originated, and afterward by Sir W. Hooker, when it was first introduced by Fortune from China, in 1849, Dr. Masters now first properly distinguishes under the new name of *S. Fortunei*. This is the common species in cultivation. Dr. Masters calls attention to the interesting facts that this plant is not represented by wild specimens in herbaria, and that its Chinese origin rests upon Fortune's own statements with regard to it, which he says have been generally overlooked, although published in the *Gardeners' Chronicle* for 1852, p. 739, from which it appears that Fortune found this plant in a nursery-garden at Shanghai, to which he was told it had been brought from a high mountain in the interior called "Nang Shang." It is certainly both interesting and curious that nothing more definite is known of

the origin of a plant which has become one of the most popular and universally used evergreen shrubs of English gardens; and these last results (of which more are promised) of Dr. Masters' studies of garden plants are a solid and valuable contribution to knowledge.

MACLEANIA PUNCTATA, *Gardeners' Chronicle*, April 27th; the berries of this vacciniaceous shrub—a native of the Andes of Ecuador—are now first made known from a specimen grown in the gardens of Chatsworth.

Notes.

It is expected that during the month of June three thousand varieties of Roses will bloom in the grounds of the International Exposition at Paris.

The larvæ of the Imported Elm-leaf beetle are already appearing, and the sooner the trees are sprayed the better. One pound of London Purple to one hundred gallons of water makes an efficacious mixture.

Those of our readers who intend passing the summer in England may be interested to know that important Rose-shows will be held as follows: July 2d, Boston, Sutton; July 10th and 11th, Brighton, Ealing; July 17th, Bedford; July 26th and 27th, Wilmslow.

Mr. Edward L. Greene will devote the next three months to exploring the forests of Colorado, Montana, Oregon, Washington and California, and his journey should throw much new light upon some of the perplexing questions relative to the trees of western America.

The summer meeting of the Wisconsin Horticultural Society will be held at Sparta, on June 19th and 20th. Prizes will be offered for the best essay on the native trees of Wisconsin and for the best plan for laying out a school-ground not exceeding an acre in area. Here is an example which some of the older states might follow with profit.

The Association of American Nurserymen, at their meeting in Chicago last week, elected the following officers for the year: President, Geo. A. Sweet, of Dansville, New York; Secretary, Charles A. Green, of Rochester, New York; Treasurer, A. R. Whitney, Franklin Grove, Illinois; Executive Committee, Leo Wetz, Wilmington, Ohio; S. D. Willard, Geneva, New York; S. M. Emery, Lake City, Minnesota.

M. Viullemin has recently discovered that the now widespread disease of the Lombardy Poplar is due to the attacks of a fungus (*Didymosphaeria populina*), against which a solution of sulphate of copper has been found effective. But as the lower branches of the trees are attacked first, it is suggested that their removal as soon as the presence of the fungus is detected will check the spread of the disease.

A plant of the new Strawberry originated by Mr. James Nimmon, of Dennison, Texas, and named Parker Earle, has been sent to this office from the experiment-grounds of the *Rural New Yorker*. The plant is remarkable for its strong foliage and for the abundance of fruit, held up from the ground by the stout peduncles. The berries are large, of excellent flavor, and their entire surface becomes white like wax before turning red.

A Brussels journal notes the fact that the Belgian Government has decided to grow plants for distribution in the schools in sufficient numbers to insure that each student shall have a specimen before him when he takes his botanical lesson. A subscription price of five francs yearly seems cheap enough, even if it stands only for an individual pupil; but in Berlin for a number of years plants have been cultivated for the same purpose and freely distributed by the government. When shall we be intelligent enough to follow German example in directions like this?

During the last session of Congress the sum of \$200,000 was appropriated for the establishment of a zoological garden in Washington. The necessary site for it has now been selected. It comprises about 150 acres, lies to the north-west of the city, about two miles from the White House, along the banks of Rock Creek, and is said to be admirably situated and in every way well adapted for its purpose. It is expected that before next winter the necessary arrangements will be so far advanced that the animals now inappropriately housed in the grounds of the Smithsonian Institution can be removed to their new quarters.

Patchouli, says a recent writer in the *Journal of the Agricultural and Horticultural Society of India*, is the product of *Oci-*

mum Basilicum, var. *pilosum*. The species is largely grown on the continent of Europe in pots for room decoration, under the familiar name of Sweet Basil. It is a small annual belonging to the *Labiata*, with little white flowers in simple racemes. The variety *Pilosum* seldom or ever flowers, the perfume being obtained from its aromatic leaves. Its cultivation is almost entirely confined to the Chinese of the Straits Settlements, who grow the plants from cuttings in raised beds.

A fine, colored plate of *Dictamnus fraxinella*, showing both the crimson and the white varieties, was recently published in the *Garden*. About a year ago one of our correspondents called attention to this plant, saying that it was once a great favorite, but now, despite its beauty and its peculiarly attractive fragrance, is seldom seen and almost forgotten. Nevertheless, it is a surprise to learn from the text which accompanies the picture in the *Garden* that no colored illustration of *Fraxinella* had ever before been published in England. The great peculiarity of the plant is the luminosity it develops on warm summer nights, owing to the aromatic juice which exudes from its pores, especially those of the pedicels of the flowers.

Professor Patrick, of the Iowa Agricultural College, undertook last winter to make a chemical study of apple twigs to ascertain whether he could detect differences of composition between the young growth of such varieties as are hardy, and those which are not hardy in that region. At the same time and for the same purpose a microscopic examination was made of apple twigs by Dr. Halsted. It would be a great advantage if hardy and tender varieties could be distinguished from each other by a chemical analysis or an examination of their cell-structure. Professor Budd, indeed, has expressed the opinion that there was an apparent difference in the structure and composition of the trees which proved hardy in Iowa and those which were tender. The results of Professor Patrick's analysis "lend, perhaps, some slight encouragement" to this idea. Professor Halsted found "no parallelism between microscopic structural differences and ability to withstand the influences of a trying climate."

The only plant of any size, probably, of the true *Abies amabilis* to be seen in the eastern States is growing in the nurseries of Mr. Josiah Hoopes, in West Chester, Pennsylvania. This, for many years and until 1880, when Engelmann and Sargent gathered a number of small seedlings in the mountains of the lower Fraser, and subsequently made arrangements for the collection of large quantities of seed, was the rarest of all the western American conifers in cultivation; the only large plants in Europe being those in the Botanic Garden at Edinburgh and in the Arboretum of Dropmore, derived from the scanty collections of David Douglas, who found this tree more than half a century ago on the Cascade Mountains, overlooking the great Falls of the Columbia. He discovered on the same day and in the same locality *Abies nobilis*. *Abies amabilis* was certainly well named, for it is by far the loveliest of the North American Firs. The West Chester plant is a graft from the Edinburgh tree; and although some fifteen years planted, it has been slow, like so many grafted conifers, in getting started to grow. It has at last, however, commenced to grow satisfactorily, and is now something like four and a half feet high with a diameter of branches of seven feet on the ground. It is healthy, and apparently quite hardy, giving promise of becoming a handsome tree.

A constant increase may be noted in the varieties of flowers sold by the street venders in this city. In a space of a block and a half there were counted, a short time ago, Roses of several kinds, among which La France, Bon Silene and General Jacqueminot were most conspicuous, Heliotrope, Pansies, Carnations of many colors, including large numbers of a fine scarlet kind with unusually long stems, Lilies-of-the-Valley, Peonies, white and red, Magnolias (the sweet-scented *M. glauca*), Corn-flowers, Syringa, Mountain Laurel, huge baskets full, and Daisies by the thousand, sometimes mingled with Red Clover blossoms. A few moments' observation showed that the preference of purchasers was distinctly for the wild flowers. Hot-house flowers are lovely in themselves, but they tell of nothing but themselves, while the wild flowers bring with them a picture of the spot where they grew, a vision of summer, a breath of country air, and eyes weary of brick and mortar are quick to appreciate the difference. Excellent taste is shown by many of the peddlers in making up their wares. The bunches of Daisies and Clover very often as fresh and natural as though a child had just picked them, and sometimes sprays of Beech leaves are prettily mingled with the Daisies.

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The Danger from Mountain Reservoirs.

ON the very day when the city of Johnstown was annihilated and the prosperous Conemaugh Valley was transformed into a scene of desolation and death, which has never had a parallel in the history of the country, a dispatch was prepared in Washington for the Associated Press to the effect that Secretary Noble had approved of the plan for continuing the survey of the arid lands proposed by Major Powell, Director of the Geological Survey. This plan looks to the construction of a system of reservoirs in the mountain regions, where the waters are to be stored for use upon the dry plains below. The project contemplates operations of greater magnitude and importance than any which our hydraulic engineers have yet attempted, and many features of the proposed work demand more careful study than they seem to have received. The one point, however, which the Pennsylvania deluge forces upon our consideration is the threat of destruction which hangs over a valley when a vast amount of water is imprisoned above it. There are barriers which avail against the sweep of a tornado; no conflagration is so swift and fierce but that a hopeful fight can be organized to quell it; but there is absolutely no escape from a flood of water like that which raged through the Conemaugh Valley.

When we consider the thousands of square miles which it is proposed to irrigate, and estimate the vast amount of water that will be needed to give each acre as much as might fall elsewhere upon this space in a single summer shower, we can begin to understand what an enormous capacity these reservoirs must have to be of any practical benefit to agriculture. We are not prepared to deny that it is within the limit of engineering skill to construct dams that will not yield under the pressure of a given weight of water. But it is a fact that both in this country and in Europe the walls of reservoirs which have been pronounced safe by experts have opened to release torrents which have desolated a thousand homes. No one can tell what agencies of disintegration are at work in the foundations of such a structure. The engineer can measure the pressure of so many feet of water, and if he knows the

quality of every solid yard of material in his embankment he can estimate its power of resistance when his work is finished. But he never can be sure that some chemical agent is not corroding an obscure portion of his masonry, or that some insignificant animal is not undermining it. The work of government contractors has not always proved the staunchest, and when we consider the difficulty of making any adequate inspection of such enormous dams as those proposed for the mountain gorges of the West, we must believe that there is no security for the lives or property of the people who would venture to make their homes below them.

What we have said applies to the conditions of ordinary times and average seasons, but besides this there is the constant menace of some unusual danger. It is the opinion of Major Powell, we believe, that all the forests should be cut away from the mountains where the great western rivers take their rise, so that the water will not soak into the ground, but run away on the surface to be caught by his dams. Another benefit to be derived from making the mountains bare would be, according to this theory, that the snows would all blow into the cañons, where they would remain and find their way to his reservoirs later. It is conceivable, however, that a warm rain or a warm wind through those gorges might deliver the melted snow with great rapidity. The Ardèche is a small mountain stream in France, and yet the sudden melting of the snows in the deep valleys at its sources so swelled its current that it once delivered 1,305,000,000 cubic yards of water into the Rhone in three days. For this short period it flowed with a volume like the Nile, and what reservoir could be trusted to restrain an outpouring of this sort? An earthquake so moderate that it would do no other damage might easily make a fissure in the dam of some storage reservoir which would admit enough water to open a passage for the sea that was crowding behind it. In short, there is danger always from large bodies of water held in by artificial construction, and the Congress of the United States should exercise the utmost caution in appropriating money to build such reservoirs of death.

Of course it is easier to persuade Congress that great public works like these dams will be more efficacious to restrain the waters of the mountains and deliver them when they are needed than is Nature's way of clothing the upper slopes of the river basins with forests. Where millions of money are to be spent in any gigantic scheme there will be hundreds of eloquent advocates to urge its necessity. But perhaps the ruin in the Conemaugh Valley may be allowed to offer one plea for the lives which will be put in daily peril if the project is not arrested. This is but one of the arguments against this scheme, and we are glad to learn that Mr. Fernow, Chief of the Forestry Department, is preparing a report for the Senate Committee on Irrigation, which will discuss the matter from other points of view. It is high time that some organized effort was made to check a movement which has been gathering force from the plausible statement of half-truths, until the government seems committed to the construction of enormously expensive works, which all experience has shown to be inadequate for the purpose they are intended to accomplish, and fraught with serious danger to the lives and property of thousands.

M. Naudin has recently contributed to the *Revue des Sciences Naturelles Appliquées* an instructive paper upon the Australian Acacias, whose bark is valuable for tanning, and upon the advantages which may be expected from the general cultivation of these plants in Algeria. The three species which he considers the most valuable for Algeria are *Acacia pycnantha*, *A. decurrens* and *A. dealbata*.

The actual amount of tan-bark of good quality in California is not large. The Oak which supplies it (*Q. densiflora*) was never a very abundant tree, although widely and very generally scattered in some parts of the state, and the growth of the tanning industry on the Pacific Coast has

already made serious inroads upon the supply. The Hemlock is still fairly abundant in the immediate coast regions of Oregon and Washington; but the bark of the western Hemlock is inferior in quality of tannin to that furnished by the Tan-bark Oak of California or by these Australian Acacias. It is evident that sooner or later tan-bark will have to be produced in California from plantations specially made for the purpose. Australian trees are now known to flourish in the southern part of the State, where there are vast tracts of land suited to them; and these conclusions which M. Naudin reaches in the case of Algiers are equally applicable to southern California, where the climate resembles that of Australia as closely certainly as that of this last country resembles the Algerian climate.

"Algeria as a whole has the greatest climatic analogy with Australia—similar heat and similar droughts. Algeria, especially in the south, like Australia, possesses immense tracts of unoccupied land which can be made productive by the Acacia; and, like Australia, Algeria will be able through these trees to export tan-bark.

"The Acacias will produce, besides tan-bark, which is their principal product, valuable fuel, and possibly gums also as they do in Australia. Certain species, like *A. melanoxylon*, attain the size of forest-trees and produce timber. The wood of this interesting tree is exceedingly hard and richly-colored, and is much sought after by cabinet-makers. This species is already common in the parks and gardens of Provence, and springs up freely from self-sown seed in the garden of the Villa Thuret, as do many other Acacias; and I have not the least doubt that these trees can become naturalized on the other side of the Mediterranean more completely even than they can in southern France."

The Art of Gardening.—An Historical Sketch.

VI.—Persia.

IT is a familiar fact that the Persians, who succeeded the Assyrians and Babylonians in the dominion of eastern Asia, were the most luxurious and pleasure-loving of ancient peoples. When conquest had brought them enormous wealth and unlimited power, their effeminate, self-indulgent habits were the scorn of the hardier, simpler Greeks; and the school-boy of to-day is taught the enormous significance of the result of those wars which left the intellectual Greek instead of the sensuous Persian to be the guide and leader of the world's development. But even in those earlier times, when the Persian had not lapsed into sloth and dissipation, we can divine his pleasure-loving temperament; and it nowhere expressed itself more strongly than in the creation of gardens. In the annals of Persia we find the first distinct record of something more extensive and varied than the small formal enclosure around temple, palace or private dwelling—something which is rightly called a park and seems to have been conceived, in part, at least, in the spirit of what we now call landscape-gardening.

The Persian park, in its first estate, was doubtless a hunting-preserve. Nowhere do we read of such persistent and enthusiastic sportsmen as the Medes and Persians. Hunting on horseback was the chief royal pastime, and the chief means of training noble youths in vigor of body, quickness of mind and familiarity with the saddle. In the "Cyropedia" Xenophon tells us that when the grandfather of Cyrus the Great was persuading him to remain in Media he said: "All the animals which are now in the park, I give them to you; and I will collect others of all kinds which you shall hunt as soon as you have learned how to ride." When the lad had once tasted the excitement of the chase in the open he exclaimed, "Boys, what children we seemed when we hunted in the park! It seemed as though we hunted animals tied by the leg, for . . . they were within a narrow compass of ground." But narrow in such a connection does not mean narrow as one would use the word with regard to a formal walled garden; and there is abundant evidence to prove that very large parks, containing wide expanses of plain, lay near the royal residences and were formed by Persian princes in distant parts of the empire. For example, when Xenophon in the "Anabasis" speaks of Celænæ, "a populous, large and rich city of Phrygia," he says "here Cyrus had a palace and an extensive park full of wild beasts, which he was accustomed to hunt on horseback when-

ever he wished to give himself and his horses exercise. Through the middle of this park flows the river Mæander. Its springs issue from the palace itself, and it runs also through the city of Celænæ. Here Cyrus held a review of the Greeks in the park, and took their number, and they were in all 11,000 heavy armed troops, and about 2,000 peltasts." This, indeed, in extent at least, was a park more than worthy of the modern name, which could not have been entirely devoted to the preservation of wild roving beasts; and if the Cyrus of the "Anabasis"—Cyrus the Younger, a prince and satrap, but not the sovereign of Persia—had such a pleasure-ground, and another equally famous at Sardis, it is not surprising to find that his greater namesake, a century and a half before, and all the kings who followed on the throne, were no less well provided. Cyrus the Great, we are told, after he had conquered the Asiatic world, managed to enjoy "a perpetual spring with regard to heat and cold" by spending seven months of the year at Babylon, three at Susa, and the hottest two at Ecbatana, in the wind-swept mountains of Media. The love for out-door life and natural beauty implied in such a statement might alone suffice to paint the Persian character in this respect. Nor even after death was Cyrus deprived of the free and verdurous environment he loved. He died at Pasargadæ, "and here," says Strabo, "Alexander saw his tomb in a park concealed within a thick plantation of trees." It remains to-day in a naked plain, and is a tower with a stepped platform and a closed upper room in which the body lay; and the contrast is great indeed between such a monument, set in such surroundings as it once possessed, and the dark, sealed caverns, hid in enormous pyramids or excavated in barren hill-sides, where the kings of Egypt were laid to rest. When Darius transferred the capital of Persia proper from Pasargadæ to Persepolis he created gardens that long were famous, though the nature of the site proves that they cannot have been very large, and were probably terraced constructions.

Nor did great parks exist only in the vicinity of the chief royal towns. In his Life of Artaxerxes Mnemon, brother of Cyrus the Younger, Plutarch tells us that, returning from an expedition against the Cadusians, the king "arrived at one of his own mansions which had beautiful ornamented parks in the midst of a region naked and without trees;" and he emphasizes in the succeeding words the respect and affection in which the Persians held such spots: "The weather being very cold, Artaxerxes gave full commission to his soldiers to provide themselves with wood" by cutting down any of the trees, "without exception, even the Pine and the Cypress; and when they hesitated and were for sparing them, being large and goodly trees, he, taking up an axe himself, felled the greatest and most beautiful of them." Moreover, in the "Economist" Xenophon makes Socrates relate that the younger brother, not content with what he had done at Celænæ and Sardis, "wheresoever he travels takes care that there may be gardens, such as are called *Paradeisoi*, stocked with everything good and valuable that the soil will produce; and in these gardens he himself spends the greatest part of his time whenever the season of the year does not prevent him."

Princes and kings were rivalled in their gardening enterprises by their wealthy subjects. Xenophon cites the gardens of Belesis, governor of Syria; and the famous satrap, Tissaphernes, must have had several, for Plutarch says* that, despite his hatred of the Greeks in general, he cherished such love and admiration for one among them that "the most beautiful of his parks . . . received by his direction the name of Alcibiades, and was always so called and so spoken of." Could there, again, be more convincing proof of the exceptional affection that the Persians had for their pleasure-grounds?

The Persians' name for a garden was the word from which our "paradise"† has come; and it is but a just tribute to their national love for such places that it should have been adopted into every language, from Hebrew to English, and become the symbol of the highest delights which the body or the soul of man can enjoy. But the widespread effect of Persian taste upon matters of gardening art does not rest only upon the evidence of this universally borrowed word. Wherever their influence extended—and this means over the whole of western Asia and into Egypt and Ethiopia as well—they carried their love of gardens. The "Persian gallants" who destroyed the Babylonian monarchy, says Sir Thomas Browne in "The Gardens of Cyrus," maintained the "botanical bravery" of the hanging-gardens; and in later times a hunting-park lay near the palace which had been laid out, perhaps, by the great King. When Quintus Curtius, in his "Life of Alexander," tells of the

* "Life of Alcibiades."

† Literally, it means "enclosed."

king's expedition to Bazaria, a far-off district lying east of the Caspian Sea between Parthia and Bactriana, he says: "Of the barbaric splendor prevailing in these parts there are no stronger marks than the extensive forests in which are shut up untamed beasts of the grandest kinds. . . . In one park it was said the game had remained undisturbed through four generations." Our idea of the size of these parks is enhanced, furthermore, by the statement that Alexander entered one of them with his whole army when preparing for a lion-hunt. Pliny tells us that Cambyzes planted trees in Egypt. Syria was long a Persian stronghold, and so, too, the whole of Asia Minor, and in both regions many gardens are named which seem to bespeak the fact. A royal paradise, for instance, that had been established by the conquerors at Sidon, was destroyed in an insurrection under Artaxerxes Ochus in the fourth century B. C. Of course by the time of Strabo and Diodorus the Greeks and Romans had supplanted the Persians in eastern Asia. But, as we shall see, the Greeks and Romans themselves had learned the luxury of gardens from the Persians. The same influence doubtless penetrated with the armies of Alexander and his various successors into the Indian peninsula. In mediæval times we find the favored land of Persia, under the rule of a new race and faith, still the centre of sumptuous living and its handmaid, gardening art. And, in short, a study of the early history of the art of gardening leaves us convinced that the Persians were much more potent than any other people in its development and extension.

M. G. Van Rensselaer.

New York.

Recent Botanical Discoveries in China.—IV.

Æsculus Chinensis is a tree of altogether more slender proportions than *Æ. turbinata*; the relatively small flowers, the color of which I have not found described, are borne in long, narrow, dense panicles, and the small fruit is quite smooth. This species inhabits the mountains near Peking, and Maximowicz also reports it from the province of Shensi. This, doubtless, would be quite hardy in the southern and western parts, at least, of the British Islands, if not throughout, and in similar climates in the New World.

Aucuba.—Dr. Henry has sent specimens of a very singular variety of *A. Japonica*, very different from anything I have seen in cultivation. The peculiarity is in the shape of the leaves, which are from five to six inches long and exactly wedge-shaped, with a truncate, coarsely-toothed apex, the tooth formed by the excurvent midrib being two or three times as long as the others. The other teeth all result from excurvent veins, which are given at an angle of about 40°. In some of the specimens the apex is shallowly three-lobed, the central lobe, the smallest, being an acuminate prolongation of the midrib and a narrow portion of the blade, whilst the lateral lobes are rounded and four to six-toothed. Horticulturally this is more distinct than many of the species of botanists, though the difference is all in the shape of the leaves. A considerable series of specimens are all from the neighborhood of Ichang, where this shrub grows two to four feet high, according to notes accompanying the specimens. Among evergreens of known hardness this is one of the most desirable in our recent Chinese collections.

Buddleia.—An investigation of the Chinese species of this genus has led to the discovery that the plant cultivated in European gardens under the name *B. curviflora* is not the species described and so named by Hooker and Arnott. The latter is a native of the Loo Choo Islands, and probably less hardy than the one passing under the same name, which inhabits Japan, and is apparently restricted to that country. Moreover, it is the only one common in Japan, hence I have named it *B. Japonica*. There is a very good figure of it in the *Illustration Horticole* (xvii., 1870, pp. 133, f. 25), showing the prominently four-winged branches which, with other characters, distinguish it from *B. curviflora*, Hooker and Arnott.

One of the first fruits of Fortune's journey to China on behalf of the Horticultural Society of London was *Buddleia Lindleyana* (*Botanical Register*, 1846, t. 4), which he met with on landing at Chusan in November, 1843. He obtained seeds and posted them on the first opportunity, and in the following March there were young plants growing in the Society's garden. This was regarded as a striking illustration of the rapid communication then existing between England and the far East. I have seen this in a living state on very few occasions—that is to say, in flower—but it is a beautiful plant, much more so than one would imagine from the figure. Dr. Henry collected an elegant variety of this species in the neighborhood of Ichang with sinuately-lobed, long, taper-pointed leaves.

The new species of *Buddleia* offer nothing strikingly ornamental, though one I have named *B. albiflora* is well worth a trial, and if hardy, or rather where it is hardy, it would, doubtless, prove attractive. It is a tree from twenty to thirty feet high, with papery, lanceolate leaves, from six to nine inches long, and small white flowers in long, narrow, dense, terminal panicles. It is from the Patung district, which, as already pointed out, has a considerable elevation, and where there is a long stretch of what Dr. Henry regards virgin forest. *B. variabilis*, another new shrubby species, is remarkable for the great diversity exhibited by its foliage, both in size and in the indumentum, as well as in the shape. Taking the extreme forms, one would not suppose them to belong to the same species, and in aspect there is indeed less resemblance between them than there is between them and *B. albiflora*. Thus one variety from Ichang has narrow, oblong, entire leaves, from one and a half to two and a half inches long, with a short whitish tomentum beneath. The other extreme is from the mountains of Szechuen at an elevation of 6,000 feet. In this the largest leaves are nearly a foot long and broad in proportion, with a coarsely crenate margin, and the two at each node are connected by large ear-like expansions from one petiole to the other. Intermediate forms of every grade are contained in the rich collections of Dr. Henry and the Rev. E. Faber. The flowers are described as pink outside and orange inside; and as they are produced in large pendulous panicles they must have a very pretty effect.

Jasminum.—Among the old Chinese Jessamines none is a greater favorite in England than *J. nudiflorum* (*Botanical Register*, 1846, t. 48), another of Fortune's numerous introductions. Against a wall it flowers freely with us in midwinter, when there is almost nothing else, and the showy yellow blossoms are set off by the green branchlets in the absence of leaves at this season. I have seen only cultivated specimens of this species from China although M. Franchet (*Planta Davidiana*, i., p. 206) records it as common on both slopes of the Tsew-glin range of mountains in the northern province of Shensi.

There are several new species, the most interesting among them being *J. Sinense* and *J. serophyllum*. The former inhabits the provinces of Hupeh and Kwangtung, and would almost certainly require the protection of a green-house except in the very mildest parts of the United Kingdom. It has rather large, softly hairy, trifoliolate leaves and terminal clusters of long, narrow, white flowers; and, judging from dried specimens only, it must be a very ornamental plant. *J. serophyllum* is from Mount Omei, in the province of Szechuen, at an elevation of 5,000 feet. This likewise has trifoliolate leaves, and in aspect strongly resembles the Indian *J. caudatum* (*Botanical Register*, 1842, t. 26), but the somewhat smaller flowers are described as yellow. *J. pachyphyllum* is a new species from the island of Lantao, below Canton, and is allied to *J. paniculatum*, of which there is a very poor representation in the *Botanical Register* (ix., 1823, t. 690), but the new species has very thick, almost orbicular, leaflets.

Diospyros.—Dr. Henry sends numerous specimens of the important *D. Kaki* from the province of Hupeh, and as he does not state the contrary, I assume that they were taken from wild trees. He calls it the oil, or varnish Persimmon, and mentions that an oil is obtained from the fruit and is used for waterproofing the common Chinese umbrellas and hats. There are four or five new species, none probably of any really ornamental character, though it is difficult to judge of this from dried material. *D. Sinensis*, from Mount Omei, at 4,000 feet, is apparently a shrub, with small leaves and slender branchlets, and a small apheroidal fruit about three-quarters of an inch in diameter.

Kew.

W. B. Hemslley.

New or Little Known Plants.

Syringa Japonica.

THE late W. S. Clark, the first President of the Massachusetts Agricultural College, in the autumn of 1876 sent to the Arnold Arboretum from Japan, where he had gone to organize an agricultural college at Sapporo, in the northern island, a small collection of seeds. Among them were seeds of a plant belonging to the *Oleaceæ*, and described as a small tree. A number of specimens were raised; these flowered for the first time four years ago, and proved to be the *Syringa Japonica* of Maximowicz, which had not, I believe, been introduced previously into cultivation. Our illustration upon page 293 represents the largest specimen of this tree growing in the Arboretum, and now about eighteen feet in height. That upon page

295 shows, on a much reduced scale, a flowering branch. The photograph from which this last illustration was taken was made in the Arboretum three years ago, and was reproduced at the time in the *Gardeners' Chronicle*. A figure of this species, made from dried specimens, was published also in the *Nouvelles Archives du Muséum*, second series, ii., t. 2, in connection with Decaisne's monograph of the genus *Syringa*.

Syringa Japonica, as it appears in the Arboretum, is a tree of remarkably rapid and vigorous growth. The trunk is straight, and shows no tendency to divide near the ground; it is covered with brown-red, smooth bark, which separates occasionally into thin scales, and is conspicuously marked, as is that of the branches, with raised, white, oblong dots. It might be easily mistaken, except for these dots, for the bark of a young Cherry-tree. The branches are upright and rather slender; those of the year being round and covered with light-brown bark. The winter buds are very small, rarely more than an eighth of an inch long, the broadly ovate scales ciliate on the margins, tipped with a short, blunt point, and pale chestnut colored. The leaves are broadly ovate, contracted into a long, slender point, cuneate or sometimes rounded at the base. They are smooth on the upper and villous pubescent on the lower surface, dark green, thick and leathery, seven or eight inches long by three or three and a half inches wide, and borne on stout petioles an inch and a half or two inches long. The small white flowers, with short corolla-tubes, included in the calyx (like those of the other species belonging to the section *Ligustrina* of the genus), measure from a quarter to a third of an inch across. They are produced in immense compound panicles, eighteen to twenty-four inches long by sixteen or eighteen inches across, and appear here during the first week of July. The fruit is smooth, oblong and obtuse.

The hardness and vigorous growth, the excellent habit, ample, dark green foliage and splendid inflorescence, appearing at a season when few trees bloom, make *Syringa Japonica* one of the most desirable of the small trees recently introduced into gardens. The fact that it loses its leaves early in the autumn, and that they fall while still green, is the only drawback which has yet been noticed in it here as an ornamental plant. C. S. S.

Entomological.

The Imported Elm-leaf Beetle (*Galleruca xanthomelæna* Schr.).

EXPERIMENTS made during the season of 1888 at New Brunswick, New Jersey, by Rev. Geo. D. Hulst prove that this pest can be controlled by an expenditure of time and money, small in proportion to the result attained. The trees in Rutgers College Campus were effectually protected by spraying with a mixture of one pound of London Purple to one hundred gallons of water. In this proportion the larvæ are destroyed and the foliage is not injured. Some little difficulty is experienced in getting London Purple to adhere well to the leaves, and about three pounds of flour should be added to every fifty gallons of water, and thoroughly stirred. Better than this is the mixture of London Purple prepared by the Nixon Nozzle and Machine Company, of Dayton, Ohio, which I find by experiment adheres very firmly where brought into contact with the leaves. The underside of the leaves of the Elm, where the larva feeds, is covered with a rather dense velvety pubescence, which tends strongly to shed water, and consequently to prevent the proper distribution of the poison on the leaves. To remedy this about two quarts of kerosene emulsion should be added to it. This will give sufficient penetrating power to the mixture to spread it wherever it touches, and its effectiveness is thereby greatly increased. In my experience this spring I find quite a decided difference in the wetting power in favor of the mixture containing the kerosene. I should give the formula thus: Water, 100 gallons; London Purple, one pound; kerosene emulsion, one gallon. The kerosene emulsion may be made either with milk or soap, as is most convenient, in the proportion of two parts of kerosene to one of milk, or two parts of kerosene to one of soap-suds, made with half a pound of soap to the gallon of water.

The results of an application of this mixture are quickly noticeable. The young larvæ succumb almost immediately, and many of the eggs are destroyed where they are fairly hit by the mixture. Another point to be observed is the time of application. This should be just after the eggs are hatched and before the larvæ become half-grown. One application will then probably be sufficient, though the tree will be somewhat eaten by the imago. If the trees to be protected are small and few in number it will pay to spray twice—once when the beetles are beginning to oviposit, and again when the eggs are hatching. If sprayed too early a few beetles will be destroyed, which will be replaced by later arrivals, and little good is done. If sprayed too late the advanced larvæ will be ready for pupation, and will not be affected. Many a man has tried poisons to destroy insect pests, and declared them a failure; they were so not because of any fault of the poison, but simply because they were put on at the wrong time and in the wrong way. It is advisable to avoid wetting the trees more than necessary. The finer the spray, and consequent coating of poisonous moisture, the better the result.

The Elm-trees on Rutgers College Campus are probably as high as any trees that are ever sprayed, and to reach to the extreme tops of these I have the following apparatus: A Seneca Falls force-pump, mounted on a wheelbarrow-tank holding forty gallons, to which is attached a canvas-covered garden-hose fifty feet in length. The end of this hose is provided with a large-sized Nixon nozzle, and is lashed to a bamboo stick ten feet in length. With this I can reach twenty feet with the spray attachment from the ground; removing the spray attachment, I throw a small stream among the higher branches, which breaks into quite a fine spray at about twenty-five feet from the ground, and wets thoroughly a height of thirty feet. A light ladder about twenty feet long gives access to a position in the centre of the largest trees, whence the extreme tips may be reached. Few shade-trees are larger than the trees sprayed by me, and no more apparatus would ever be required. For the largest trees, over fifty feet in height, I use about twenty gallons of water, containing about one-fifth of a pound of London Purple, and a pint of kerosene emulsion, at a cost of seven cents, and the labor of applying the mixture. The result so far has been to destroy all the beetles and larvæ and most of the eggs, and has preserved fine-looking green trees, instead of skeletons with fragmentary patches of withered leaves.

Rutgers College.

John B. Smith.

Cultural Department.

The Late Garden.

ONE who has secured by careful planning and good management an early garden, can also have a late one, by persistent care in carrying forward the work; and a late garden brings, in many respects, as much pleasure and profit as an early one.

Corn, Beans, Cauliflower, Tomatoes, Lettuce, Endive, Cucumbers, Peas, Beets, Turnips, Radish, Celery, Spinach can yet be planted in vacant places. July 1st is not too late in the latitude of Boston to plant Cory or Crosby Corn; but it is too late for large varieties, like the Evergreen. It is now too late to plant the pole Lima Bean; but the early bush varieties will mature before frost if planted before July. Black Wax (yellow pod), Early China (green pod) and Bush Horticultural (shell) Beans will all attain edible size before frost. Cauliflower, Kohl-Rabi, Brussels Sprouts, Kale, Red Savoy and White Cabbage plants set now will have abundant time to perfect their growths before autumn. Tomato-plants set now will set fruit for ripening before frost, or, at least, fruit which will ripen on the vines after they are pulled up and put under cover. Lettuce-seed planted now, and again on the 15th of July, and thinned where it stands, will make heads to weigh a pound; in the summer months it will not make good heads if transplanted. Endive sown now, and for succession, up to July 20th, can be both thinned and transplanted and will furnish a very acceptable salad from October to December. Cucumbers for pickles, or for the table, can be planted the last week in June or the first in July. Peas will not produce a full crop sown at this time of the year, but are worth trying for. The Turnip-beets, sown up to the middle of July, will make sweeter and more tender roots for the table than those sown in May, as they will grow more quickly and not so large. Turnips of the English varieties, as well as the summer and winter Radishes, can be sown up to August. Celery, if the plants are large, can be set during July; and Spinach can be sown up to September in rich land, where it succeeds best. The Viroflay

(Henderson) is the best all-purpose Spinach I have tried.

As fast as the early Peas, Beans, Corn, Radishes, Beets, Lettuce, Onions and Potatoes mature fill the spaces with later crops; this keeps the weeds down, the garden full, and the table well supplied at a time when the average garden is empty or over-run with weeds.

W. Springfield, Mass.

W. H. Bull.

the growth of fine fruit. The nurserymen offer potted plants at such reasonable figures that it is a matter of small expense to renew a bed annually. The best plan is to have two beds continually; one planted in autumn and bearing its first small crop, and another with its best crop of the second year. The latter is to be plowed or spaded under as soon as the fruit is off, thus furnishing the best place for the crop of



Fig. 114.—*Syringa Japonica* in the Arnold Arboretum.—See page 291.

Strawberries.

AS soon as the fruit is gathered clean out the Strawberry beds and cultivate thoroughly. If plants are wanted, a portion of the bed should be specially reserved for this purpose, but the fruiting-bed should be kept scrupulously clear from runners. In small gardens it seldom pays to raise plants, since this interferes with the neatness of the beds and

winter Cabbages or Savoy. Then on some other vacant spot plant, about the first of September, another bed of Strawberries with strong, potted plants. In raising these potted plants I have abandoned the practice of layering the plants in pots buried along the rows. This is tedious and laborious, and interferes with weeding. Many of the pots, too, get buried and overlooked. My plan is to make the

soil perfectly clean and mellow between the rows where I want the plants. Runners are trained out and are induced to strike root as soon as possible. Then, as fast as they have made little roots half an inch to an inch long, they are lifted carefully and taken to the potting-shed at the greenhouse, where they can be potted in good soil and in a comfortable manner for the operator. I use three-inch pots, and as soon as potted the plants are set on a bed of coal-ashes in a frame, and shaded with screens made of laths nailed an inch apart, so as to give a varying shade and sunshine. Having them thus convenient for watering, they grow with great vigor, and soon make better plants than if the pots were left plunged in the garden to take the chances of rain or drought. Plants potted in this way in July, in a rich compost of rotted sods and manure, furnish the best material for setting a bed late in August or early in September, or in fact at any time when the ground is ready after the pots are filled with roots. By raising or buying a new set of potted plants in this way every year, one can always have, with good soil and culture, the finest fruit the variety selected is capable of yielding, and can avoid the nuisance of an old, worn-out, grassy Strawberry bed. These fall-planted Strawberries will give a moderate crop the following spring, and a full crop the second year, after which they should be destroyed. As to varieties, every one must experiment for himself, for no fruit varies so much with soil and local circumstances. But having a fruit that suits, it is folly to abandon it for some much-advertised novelty. Test promising novelties in a small way, but depend for fruit upon the sort that has done well in the past.

Crozet, Va.

W. F. Massey.

Lælia purpurata.

THIS magnificent Orchid has been known to cultivators more than forty years, and is certainly deserving of the title "King of the Orchids," which has been bestowed upon it, for it stands without a rival among its congeners on account of the size and beauty of its flowers. Unlike most other beautiful plants, *Lælia purpurata* is not rare, and poor, indeed, must be the collection which does not possess a specimen of it.

It has been stated in various works that this species was first discovered by M. Pays, of Bornhem, near Antwerp, hence the name of *Cattleya Brysiana*, under which it was formerly known in gardens and figured and described in books. Its real discovery, however, is attributed to François Devos, who found it growing in the province of Santa Catherina, in south Brazil, while traveling there in 1847. He sent plants to M. Verschaffelt, a nurseryman of Ghent, whence they were distributed over Europe. In England it flowered for the first time in the nurseries of Messrs. Backhouse, of York, who, at that time, were able to sell small plants of it for the sum of twenty-five guineas each. Now, however, it has become more plentiful, and good plants may be obtained at a very low figure.

The plants, which grow about two feet high, have spindle-shaped stems, which become furrowed when old, each bearing a single large, leathery, strap-shaped leaf, of a deep shining green, and an erect peduncle, bearing from three to seven large and beautiful flowers, each six or seven inches across. The oblong-lanceolate-acute sepals, and the ovate-oblong wavy petals, are of a delicate white color, while the lip, which forms the great attraction of the flower, is slightly trilobed; the two basal lobes are folded over the column, forming a tube (white outside and yellow on the inside), which is traversed by conspicuous radiating lines of a deep crimson-purple. The large anterior lobe, which is crisped and spreading, is also of a very deep velvety crimson-purple, which passes into rose at the apex, and is covered with deeper purple veins. The flowers will remain in good condition for three or four weeks if the plants are placed in a moderately cool and dry atmosphere.

There are many varieties of this species known, all distinguished more or less by the difference in color. Among the most distinct varieties are Schröderiana, with pure white sepals and petals, and a white border around the mauve-purple of the front lobe of the lip; Russelliana has the white sepals and petals tinged with rose, and a lilac-purple lip with deeper veins; while Williamsiana has the sepals and petals of a deeper rose color, and a very deep purple lip. Other varieties run so near to each other that it is impossible to distinguish them by sight only.

Lælia purpurata and its varieties thrive, when grown in a temperature of 60° to 65° Fahr., in a compost of good fibrous peat and sphagnum moss. The plants generally produce their flowers during May and June, and a short time after they are over the growing season begins. Any plants requiring it should then be re-potted, but they should be kept an inch or two higher than the rims of the pots, so that the roots may be able to creep over the surface of the soil. The plants should

be placed in such a position that they may obtain plenty of light, as this will induce them to develop and ripen good strong bulbs, without which it is impossible to expect a good crop of flowers when the proper season arrives. When growing, the plants may be freely watered, and a syringing in the latter part of each day is also beneficial. The plants should be slightly shaded when the sun is exceptionally hot, otherwise the leaves would become brown and shrivelled. During the winter months the plants should be considered at rest, and consequently require very little water, and when in flower, the less water given the better.

St. Albans, May 1st, 1889.

John Weathers.

Papaver Caucasicum.—This handsome perennial Poppy is flowering with us for the first time. It was received last year from southern Germany, and has proved to be quite hardy and worthy of cultivation. In general appearance the plant resembles a *Meconopsis*, the leaves being of a glaucous green and covered with hair-like prickles. The flower-stems are two to three feet high and branched from base to apex, each branch producing numerous flowers of a delicate salmon color, and measuring two inches across. *P. Caucasicum* is easily raised from seed, which is freely produced, and it usually flowers the second year from sowing.

Alstromerias.—These lovely Amaryllidaceous plants are too seldom met with in gardens, and the reason is not easily explained. There are at least two species that are perfectly hardy here in the Eastern States—namely, *A. Peruviana* and *A. aurantiaca*. These two we have grown for several years, and find them to do well and increase rapidly when planted in a warm, sheltered corner of the garden, near brick-work, or on a sloping bank, where there is no danger of moisture accumulating in winter. Alstromerias are gross feeders, and when planted need plenty of well-decayed manure worked in with the soil, the more so as their fasciculated masses of fleshy roots bear disturbance badly. Our plants have been in bloom several weeks, and will continue to produce their bright orange flowers on successional growths until frost stops them. Seeds are produced freely, and should be sown as soon as matured, otherwise they will remain dormant until the second year from sowing. As soon as the young plants are large enough to handle they should be potted, and in spring planted in their permanent beds. There are two other species said to be hardy, but these we have not tried.

Passaic, N. J.

O.

Sweet Peas.—The secret of having these beautiful flowers during the whole season does not lie in successive plantings. The earlier the seed is in the ground after it is in fair working order the better, and later plantings will never succeed as well as the first. To insure continuous bloom it is only necessary to cut the flowers as they are fully formed. The tendency of the plant is to produce seed, and if this is prevented by plucking the flowers others will be thrown out quickly to supply the loss. If the cutting is neglected a crop of pods will be produced at once, and the flowering will very shortly come to an end. By this constant cutting of the flowers I have kept Sweet Peas in bloom until October. The plants should not be hoed after they begin to form flower-buds, but after the last hoeing it is good practice to mulch the ground with some coarse litter. This will keep the roots moist in dry weather and hold the small weeds in subjugation. It may be worth mentioning that I have grown Sweet Peas for seven successive years on the same spot, and do not observe any deterioration in their quality. Every year I plant a few in some other part of the garden, and the difference between the two lots, if there is any, is in favor of those grown in the old Sweet Pea corner.

Boston, Mass.

M. B. Faxon.

Dwarf Pears.—It is commonly said that Dwarf Pears are so short-lived as to be unprofitable, but such is not of necessity the case. There are three requisites to longevity of Dwarf Pears and to success in their cultivation: (1) A perfect union with the Quince; (2) Systematic heading-in, in order that the top may not become too large and heavy for the root; (3) Good care always. Varieties which unite permanently with the Quince are comparatively few. Angoulême is undoubtedly the best, and Anjou is excellent. The best old Dwarf Pear orchard which I have ever seen is a ten-acre plot belonging to T. G. Yeomans and Sons, Walworth, Wayne County, New York. It was set in 1853, and notwithstanding its thirty-six years is still in prime of vigor. Two-thirds of the new wood is cut back every spring, and a fair-sized man can pick every pear on the trees without a ladder and without climbing into the trees. As I write the fruit has set profusely, and it has

already been thoroughly sprayed with London Purple. The orchard has always been a profitable one. The varieties are various, but the best are the Angoulèmes.

Cornell University.

L. H. Bailey.

Notes from the Arnold Arboretum.

THE Moonseed (*Menispermum Canadense*) is one of the most graceful of our native vines. The long, slender, twining stems and ample and abundant, delicately thin leaves, adapt this plant for covering small arbors and other structures or for clambering over trees and among shrubs. The flowers, which are white and borne in short axillary clusters, are not in themselves particularly conspicuous, and are quite hidden by the leaves, which conceal also the black grape-like fruit, which ripens in September. *Menispermum* is dioecious, so that plants of the two sexes must be planted if fruit is expected.

The cosmopolitan *Viburnum Opulus*, the so-called Cranberry-tree, with its showy, neutral ray-flowers, which are now expanded, is one of the most beautiful of hardy shrubs of large growth, although now less commonly planted than the variety in which all the flowers are neutral—the "Snowball," or than its Japanese relative, *Viburnum plicatum*. The wild form of *V. Opulus* is not only more graceful and far more attractive than any of the abnormal forms of *Viburnum*, but it seems to escape the visits of plant-lice, which so disfigure the leaves of the "Snowball," and sometimes almost exterminate it. There are growing in the Arboretum, side by side, *Viburnum Opulus*, from our northern woods, the European plant, and others raised from seed gathered by Dr. Bretschneider on the mountains near Pekin. The last is a distinct and very ornamental plant, with striking, narrowly acuminate leaves, sharply wedge-shaped at the base, and often almost destitute



Fig. 115.—*Syringa Japonica*.—See page 291.

M. Canadense is a common plant in the central portions of the country east of the Mississippi River, where it is found growing in deep rich soil along the banks of streams and in other moist situations. There is a second species in this collection, *M. Dauricum*, a native of Siberia, Manchuria and northern China, whence it has been introduced into the Arboretum by Dr. Bretschneider. It may be distinguished from the North American species by its rather larger leaves, which are here quite glabrous on the lower surface, and more broadly and conspicuously lobed; by the larger flowers, which expand here nearly a week earlier, and by its larger fruit. It is a perfectly hardy plant, and grows easily and rapidly, but from a garden point of view it does not seem in any way superior to our native species. The name, *Menispermum*, is composed of two Greek words, meaning moon and seed, having reference to the laterally flattened stone of the fruit, which assumes the form of a crescent from the ovary being incurved in its growth after the flower has fallen.

of the broad lateral lobes usually found on those of this species. The cymes of flowers are rather broader than those on the American plant. There is in the collection a curious dwarf variety of *V. Opulus*, which has never been known to flower before here. It forms a perfectly compact little round bush a foot and a half high and more than two feet and a half across. The leaves, inflorescence and flowers are all smaller than those of the ordinary plant, from which it does not otherwise differ. The variety is not without interest as a curiosity, and it might, perhaps, find its place in a collection of dwarf shrubs. Its compact habit and stiff and formal outline, however, do not make it a desirable object when planted on the margins of shrubberies composed of more graceful plants, while the rarity of its flowers detracts also from its value as a garden plant. It should not be forgotten in comparing the Cranberry-tree with the "Snowballs," that the former is one of the most ornamental of all shrubs in fruit, which hangs bright and scarlet on the naked branches almost until the return of spring, while the

"Snowballs," which produce neutral flowers only, are destitute of fruit.

The Scotch or Burnet Rose (*Rosa pimpinellifolia*, or as it is still more generally known, *R. spinosissima*) is a plant which was more frequently seen in gardens a quarter of a century ago than it is to-day, being, like so many of the beautiful wild single Roses, discarded in favor of the showier-flowered races which have come into fashion in late years. The Scotch Rose, nevertheless, is one of the most charming of hardy plants, with numerous varieties, differing in the color and size of the flowers. *Rosa pimpinellifolia* in its uncultivated state is a small, erect, much-branched shrub, rarely growing more than a foot high, thickly armed with straight, slender prickles, intermixed with glandular hairs. The leaves are composed of seven to nine glabrous-toothed, broad leaflets. The flowers are white or pink, one-half to one inch across, solitary on the ends of the short branches, with smooth, globular calyxes. The fruit is globular, or nearly so, black, or rarely red. This plant has been cultivated in gardens for centuries, and formerly, when Roses were less common than they are in these days, a good deal of attention was devoted no doubt to the selection and improvement of varieties. There are several of these varieties in this collection, some with pure white, others with pink, and one with semi-double flowers. The Scotch Rose is absolutely hardy, and grows and flowers year after year without other care and attention than the early dose of whale-oil soap, which is necessary in this climate to preserve the foliage of every Rose, always excepting that of the Japanese *R. rugosa*, which is unpalatable, apparently, to all insects. *Rosa pimpinellifolia* is widely spread over Europe and temperate Asia, occupying shrubby wastes, often close to the sea, or heathy hills.

As they are now in flower, a few words may be said about two of the twining-stemmed Honeysuckles of the eastern States. They are *Lonicera flava* and *L. Sullivanii*. The first is one of the rarest plants of the United States flora, being known to have grown wild only on the top of Paris Mountain, in Greenville, South Carolina. It was first made known by a notice published in 1802 in Dayton's "View of South Carolina." Later it was collected in the same locality by Fraser, who introduced it into English gardens, where it is still occasionally met with, it is said. It is very rarely seen in those of this country. It is a high-climbing, glabrous plant, with somewhat glaucous, thin leaves, which are broadly oval, the two or three upper pairs joined together into a disk. The flowers are borne in short, capitate, terminal clusters; they are slightly fragrant, bright yellow, later turning orange, with long, slender corolla-tubes, from half an inch to nearly an inch long, slightly hairy on the upper part of the interior surface. The plant, which has long been confounded with this beautiful species, and is now generally cultivated under the name of *L. flava*, is the much more common. *L. Sullivanii* (the *L. flava* of Gray's Manual), which was first distinguished in Ohio many years ago by Mr. W. S. Sullivan, and which is a widely-distributed plant from central Ohio to Winnipeg and to Tennessee. This plant may be distinguished from *L. flava* by its short, bushy stems, which barely climb or attain a greater height than six or eight feet; by the much thicker leaves, whitened with a glaucous bloom; by the inflorescence, which consists of several more or less approximate whorls of flowers, and by the flowers themselves, which have a short corolla-tube, less than half an inch long, conspicuously gibbous and very pale yellow. The leaves are two to four inches long, oval or obovate-oblong, those of the flowering-stems sessile, with the upper pair joined into an orbicular disk. The flowers of this species are not fragrant. This is the half-bushy Honeysuckle often seen in old gardens, with pale foliage, which becomes by midsummer quite mealy-white. It is a far less ornamental or desirable plant than the true *L. flava*, which some nurseryman would do well to take up and make common. Mr. Faxon, who has detected *L. Sullivanii* in the plant commonly cultivated, has made sketches of the two species, which will in time appear in the pages of GARDEN AND FOREST and illustrate the distinctive characters of the two plants, which are, moreover, clearly defined in Gray's "Synoptical Flora of North America."

The Scarlet Trumpet-Honeysuckle, a widely-distributed plant through the middle and southern States, and one of the most beautiful of the Honeysuckles in cultivation, is such a well-known plant that it need only be mentioned for the purpose of calling attention to a variety with clear yellow corollas, which is not as well known to cultivators, or as often seen in gardens as its great beauty entitles it to be.

Lonicera hirsuta is another of the climbing Honeysuckles of the eastern States, which is now in flower, and which well deserves a place in every collection of hardy shrubs. It is a

high-climbing, free-twining plant, with oval, prominently-veined, softly-pubescent, green leaves (destitute of the whitish bloom found upon those of *L. flava* and *L. Sullivanii*), the upper pairs connate. The corollas are orange-yellow fading to brown, viscid-pubescent on the outer surface, the tubes half an inch long. The throat and the base of the filaments are covered with hairs. This pretty plant is found growing upon rocky banks from northern New England and Canada to the Saskatchewan, and southward to Michigan and Pennsylvania.

It is surprising that the English Woodbine (*Lonicera Periclymenum*) is not more generally grown in the gardens of this country. It is one of the most beautiful of all the climbing Honeysuckles—a perfectly hardy plant, and the delicious fragrance of the flowers is unequalled. The flowers are pale red externally with yellow throats, and are produced from the ends of the branches in closely sessile heads which are stalked above the upper pair of leaves, which are closely sessile, although not united. This is a widely-distributed plant from Scandinavia to the shores of the Mediterranean. The "Dutch Monthly" Honeysuckle is a variety of this plant, so named, it is said, because it originated in one of the Dutch nurseries. The flowers are rather darker colored than those of the species. These Honeysuckles flower quite continuously through the summer months, and there are no more charming plants to train over the porch or veranda of a dwelling-house, that the fragrance of their flowers may be enjoyed constantly.

Lonicera orientalis is in flower. It is a low, shrubby species of western Asia, extending from Asia Minor to Kashmir and the temperate Himalaya, where it sometimes attains the size of a small tree. Here it is a slender shrub, with membranaceous, pale green, ovate, pointed smooth leaves, rather prominently veined; small, pink flowers and conspicuous black fruit. This plant, from an ornamental point of view, has little to recommend it as compared with some of the fine forms of the Tartarian Honeysuckle, or with some of the recently introduced Bush Honeysuckles from western Asia.

Another Himalayan species, *Lonicera quinquelocularis*, closely allied to *L. Xylosteum* of Europe and Siberia, is certainly better worth a place in the garden. It is a hardy shrub, growing to a height of from five to ten feet, with pubescent branchlets, ovate, or broadly lanceolate leaves, which are hairy on the lower surface; and clustered, sessile, axillary flowers, with short-tubed, hairy, yellow corollas. This plant is an old inhabitant of the Arboretum, where it is perfectly hardy, and decidedly ornamental. It is widely distributed in the Himalayas, where it is common between 4,000 and 12,000 feet elevation.

Elaeagnus Canadensis is still, in spite of some interesting introductions from western Asia, the most ornamental species of this genus, at least in foliage. It is a stoloniferous shrub, growing to a height of eight to ten feet, with unarmed branches, those of the year covered with ferruginous scales. The silvery-white, scurfy leaves are broadly or narrowly elliptical, one and a half to four inches long. The axillary tubular flowers are a third of an inch long, silvery on the outside and yellow within. They are deliciously fragrant, and are followed by abundant, globular, dry, mealy, edible fruit. It is a widely-distributed plant from northern Minnesota to the Saskatchewan and to Utah; it is abundant, and a characteristic feature of the vegetation of the upper Missouri valley, where it was discovered by Lewis & Clark during their transcontinental journey. *E. argentea* was introduced into English gardens as early as 1813, but is now not very often seen in cultivation. It is perfectly hardy, and the silvery whiteness of the foliage and the pleasant fragrance of the flowers make it an attractive garden-plant. *E. umbellata* is also in flower. It is a shrubby plant, three or four feet high, the gray branches covered with brown scurfy scales. The leaves are oblong lanceolate, silvery on the lower surface, bright green on the upper. The flowers are clustered, creamy-white, fragrant, and appear after the leaves are fully grown. Those on the Japanese plant turn brilliantly in the autumn. The fruit is succulent, ovoid or globose, one-third of an inch long. Another plant here (*E. parvifolia* of Wall. and of gardens) is evidently the Himalayan form of the species. This is a larger and stouter plant, growing into a broad bush ten or twelve feet high, with rather narrower pale green leaves, but not otherwise distinguished from the Japanese plant; it is less hardy, however, and suffers seriously sometimes during severe winters. *E. umbellata*, as now defined by botanists, is a widely-distributed plant from Japan (where it abounds in the northern islands, covering the sandy banks of streams, just as the American species does those in the northern

Rocky Mountains), through northern China to the Himalayas and Afghanistan.

The India form is an old inhabitant of gardens, and is not infrequently seen in those of the middle States.

June 4th.

J.

The Forest.

Forest Interests in Pennsylvania.—I.

I HAVE been looking around in Pennsylvania for a few weeks examining the condition of the mountain woods, and calling on journalists and other leading citizens, with the object of stimulating interest in forestry subjects, and especially in the work of the State Forestry Association. As I was present at the inception of this organization, and encouraged its founders at that time by pointing out some of the difficulties they would encounter, I have always felt much interest in its work. It was established chiefly by the efforts of two or three earnest women, and its history illustrates very well the nature of some of the opportunities for service to the public welfare which have recently been opened to public-spirited women in our country.

During this visit to the principal towns of the state I had, as always, the cordial co-operation of journalists everywhere, and Governor Beaver gave me all possible assistance, as did also Mr. Edge, who is at the head of the State Department of Agriculture, the officers of the State College and Experiment Station and prominent men generally. The next annual meeting of the American Forestry Congress, of which Governor Beaver is President, is to be held in Philadelphia on the 16th, 17th and 18th days of October of this year, and the recent energetic action of the State Forestry Association will, doubtless, prepare the way for an interesting and useful session of the national body.

There is still a great deal of fine timber in some portions of the mountain forest-region of Pennsylvania. Most of the original growth was cut off many years ago; much of it for charcoal, and the various uses for wood connected with the manufacture of iron and the construction and operation of railroads, as well as for making lumber. The timber now standing is chiefly second growth. A great deal of it is very vigorous, growing rapidly and constantly increasing in value. I saw some wonderful groves of young White Pine. One in Centre County, to which I made an excursion with Professor Buckhout, of the State College, is one of the most beautiful and interesting tracts of young timber that I have ever seen. It is not extensive, but it is a piece of pure forest of White Pine, remarkably dense, and the trees are nearly uniform in size, except that some of the weaker ones are being dwarfed by overcrowding.

Professor Buckhout has begun some experiments in tree-planting, having set out about 3,500 small White Pines and Chestnuts, a few hundred of them on land belonging to the State College, near the Agricultural Experiment Station, but most of them on a small area from which the timber had been removed, up in the mountains, five or six miles from the college. His object is observation, experiment, comparison of results, as a means of increasing his own knowledge of tree-culture. There is, of course, no need of forest-planting in this part of the country, as the trees will come in themselves everywhere, if the ground is protected from fire and from pasturage. But there is need of tree-planting by farmers on small areas which are unsuited to other crops, and which are now mostly occupied by worthless trees, bushes or briars. Such nooks and corners are often nurseries and seeding-places for mischievous weeds, which stock the entire farm or neighborhood. They might as well be devoted to growing useful trees, and farmers need more knowledge than they now possess regarding the best kinds to plant. Professor Buckhout and some of the most intelligent farmers of Centre County believe that the Chestnut does not succeed on the limestone land of that region, though it grows well on the sandstone soil higher up in the mountains.

In nearly every part of the state there is much complaint of the failure and decay of small tracts of woodland. No matter how vigorous the trees may be in a large forest area, when farms are opened and much of the land is cleared, the trees in tracts which are left for timber soon begin to die at the top and to blow down. The most observant farmers believe that this results from the desiccating effect of the wind, which increases in force as more and more of the forest of the region is cut away. In many parts of the state it is noticeable that the remaining woodlands have very little underbrush. This indicates that when the larger trees mature and are removed the woods will come to an end. In many cases wood-

lands are destroyed by the encroachment of grass, which appropriates the nutriment in the soil which the trees require, so that they die of starvation. Of course, pasturing is always fatal to woodlands, though some farmers appear never to have observed this fact, or thought of the relation between cause and effect in their own experience in this matter.

Planting belts of White Pine or other suitable evergreen trees all around a tract of woodland might be some protection from the desiccating influence of the wind, but farmers say they do not know how the grass is to be kept out, especially after the process of thinning the woods is begun by the removal of some of the trees for use. If the farm woodlands continue to die out it may become more needful than it has been hitherto to consider the matter of planting trees. But it seems evident in such cases that the present generation of trees perishes by reason of the increasing dryness and impoverishment of the soil, and tree-planting would not remedy this unless we can find some kinds of trees which will live and thrive on dryer and poorer soil. Perhaps planting evergreens thickly among the trees might be useful in protecting the surface from desiccation and from light, and also by detaining the leaves for a mulch, which now mostly blow away from the woods which are nearly destitute of undergrowth. The best kinds of trees to plant are, in nearly all cases, those which are already growing well in similar soil and conditions in each region.

In the towns of the state and on the grounds about public buildings and private dwellings, as well as around old farm-houses, there are many thousands of trees which should at once be cut down, as they are mature, over-crowded, ugly, or for various reasons unsuited to the places they occupy. In most cases there are far too many of them, they having been planted much too thickly and never adequately thinned. This is true of the grounds around the Capitol at Harrisburg, and of those of the State College in Centre County. Many of the trees in the State-house grounds are misshapen, dwarfed and ugly, and are every year causing increased injury to better trees. At the State College nearly all the trees should be cut down. They are only valuable as an illustration of what ought not to be.

On one side of the principal walk leading up to the college from the main entrance to the grounds there is a close line of Norway Spruces, and on the other a row of White Maples. A more incongruous and unattractive arrangement I have scarcely ever seen. But nobody planned or intended it. It was not designed at all. As in so many similar cases, it simply happened so. There was a nursery there once, and some of the rows of young trees were removed, while others were, unfortunately, left to grow, and they have grown until now it is probable that nobody in the state would dare to cut them down. Yet they are intolerable as a feature of an important educational institution, established and conducted by the state, and which therefore represents the civilization of one of the most important and vital communities of our nation.

It would be an excellent thing to devote the next Arbor Day in this state to cutting down trees, and to begin the work on the grounds which belong to the state around the Capitol and the State College.

Snow Shoe, Pa., June 8th, 1889.

J. B. Harrison,
Cor. Sec. American Forestry Congress.

Recent Publications.

West American Oaks. Illustrations of West American Oaks from drawings by the late Albert Kellogg, M.D., with text by Edward L. Greene.

Dr. Kellogg devoted the last years of his life to the preparation of a series of botanical drawings of the Oaks, Pines and other trees of California and the adjacent regions, which he intended to publish with detailed descriptions. He did not live, however, to see this important work completed, and some of his old friends and associates have now secured the publication of his excellent figures of the Oaks, in handsome style, with full descriptive and critical notes from the pen of Mr. Edward L. Greene, the necessary funds being provided through the liberality of Mr. James M. McDonald.

The Oaks of California are perhaps the most difficult of all our trees to rightly understand and properly characterize. Some of the species are widely distributed over regions of varied climate, and show marked and striking varieties in different individuals; others of more restricted range vary greatly, some individuals growing as large trees, or as low and humble shrubs within an area, a few miles in extent. Leaves with entire and with sharply-toothed margins appear sometimes upon the same branch, and it is impossible without opportunity for wide and long study in the fields to reach anything

like an exact idea of their specific characters. Such opportunities Mr. Greene has enjoyed, to a fuller extent than any one who has studied these trees; and the results of his investigations cannot fail to be of the greatest value to dendrologists. Without undertaking, at this time, to criticise his conclusions, for which sufficient material does not exist in any of the eastern herbaria we will, in referring such of our readers as are interested in the trees of California to the work itself, simply note the following changes which Mr. Greene proposes.

Quercus Morehus, a species so named by Dr. Kellogg, but referred by Engelmann to *Q. Wislizeni*, Mr. Greene maintains as a species related to this last, but differing from it in habit and in the size and outlines of the leaves. It has been suggested that this may be a natural hybrid between *Q. Wislizeni* and *Q. Kelloggii* (a deciduous-leaved species) but Mr. Greene finds it abundant at Berkeley, many miles from any known station of *Q. Kelloggii*. *Quercus Breweri*, of Engelmann, as Mr. Watson has already pointed out (*Proc. Am. Acad.* xxii., 477) must give way to the older name of *Q. Erstediana*, of R. Brown Campst. *Quercus Gambellii*, of Nuttall, the south-eastern representative of our eastern White Oak, and considered by Engelmann as a variety of the Rocky Mountain *Q. undulata* is reinstated as a species, while *Q. grisea*, and *Q. oblongifolia* are considered, so far as concerns the New Mexican and Arizona plants, forms of *Q. undulata*; and a new species, *Q. Engelmanni* is proposed for the common evergreen White Oak, of southern California, heretofore considered identical with the New Mexican *Q. oblongifolia*. Another new species, *Quercus McDonaldi* is proposed for a small deciduous White Oak, found upon the Island of Santa Cruz with a var. *elegantula* from the borders of streams in the southern part of the state.

A new Scrub Oak, from the Peninsula of Lower California, discovered as late as last year, is described as *Q. turbinella*.

So little is known yet accurately about the trees of Western North America, their characters and life histories that we hail with delight all contributions toward a better knowledge of them. The most important of recent contributions of this nature, is certainly the work that is now before us.

Periodical Literature.

The chief value of an article called "The Migrations of Plants," published in the last number of the *Edinburgh Review* is that it directs attention to four books which have a wide fame with professed students in natural history. These are De Candolle's "Origin of Cultivated Plants" (1884), Mehn's "Wanderings of Plants and Animals from the First Home" (1885), Wallace's "Island Life" (1880), and Sir Joseph Hooker's "Address on Geographical Distribution," printed in the reports of the fifty-third meeting of the British Association for the Advancement of Science, held at York in 1881. Of course, however, since the article is based upon such works as these and intelligently summarizes many of their theories and reproduces some of the more curious facts they give, it has an intrinsic interest of its own and will be found pleasant and instructive reading by those who have not the time to study the authorities which it follows at first hand. Perhaps only one passage needs to be quoted with a word of warning. When the author says that "Darwin thought that the varying forms of florists' flowers and garden vegetables must convince us that selection is everything, and the choice of the particular species to be operated upon is by comparison nothing," he surely exaggerates a little; and when he adds, "you can convert such common subjects as Pelargoniums and Potatoes, Turnips, Radishes and Carnations to every size, shape and color by a few years' breeding and selection," he makes a palpable misstatement. If he can show the gardener how to take such flowers as Carnations, Pelargoniums, Tulips and Narcissi out of those ranges of color, which the careful cultivation of centuries has been unable to break through; if he can teach us how to grow blue Tulips, Carnations or Pelargoniums, for example, or scarlet Narcissi, or yellow *Phlox Drummondii*, he will earn the respect of the horticultural world and make a name for himself which it will be impossible for him to hide even under the discreet anonymity so carefully preserved for its writers by the *Edinburgh Review*.

Correspondence.

West American Oaks.

To the Editor of GARDEN AND FOREST:

Sir.—The publication of the late Dr. Albert Kellogg's drawings of Pacific Coast Oaks in quarto form, with text by that

most careful botanist, Edward L. Greene, of the State University, deserves, I think, some especial mention. The funds for the publication were furnished by Captain James M. McDonald a wealthy pioneer, one of the directors of the Overland Monthly Company, a director of the Art School and an ex-Supervisor of San Francisco. He is said to be furnishing funds for the publication of another monograph similar in character, to be devoted to the Californian Pines.

The monograph on the "West American Oaks" will attract the interest of all botanists, and I only wish to note here a few things about some of the men concerned in the work, chiefly about Dr. Kellogg. I first knew Dr. Albert Kellogg in 1878, when I became editor of the *Californian Horticulturist*. He was so child-like and so sincere a person that I came to have a great liking for him. In his own field he was a hard worker. He lived as one of the "Poor Scholars" of the Middle Ages, apart from the bread-and-butter struggle that went on about him. He gave up his profession many years before his death, and lived in poverty, devoting his entire time to botanical investigations. In 1853 he and six others founded the California Academy of Sciences, now so munificently endowed for original research by the gifts of Charles Crocker and James Lick. He left his drawings and papers on botany to his co-workers, Mr. W. G. W. Harford and Dr. W. P. Gibbons. I do not know how extensive his researches were, but I know something about his contributions to the early periodical literature of the Pacific Coast: All of the early publications, such as *Hutchings' Magazine*, the *Hesperian* and the *Pioneer* contained short but constant notes on our native plants, usually accompanied by drawings. The old *California Farmer*, the *California Culturist*, the early issues of the *Rural Press* and the special editions of other San Francisco weeklies contained many articles of value from Dr. Kellogg's pen. For years he was the only botanical writer on the Pacific Coast. He could have prepared and illustrated a better California botany for children than any we are now likely to have, so simple and fresh was his style. Day after day, month after month, year after year, he was at work in the old Church building, where the struggling Academy of Sciences had its home. Mr. Harford, Dr. Behr, Dr. Gibbons, Dr. Kellogg and a few others were always there, except when in the woods and mountains. It was a wonderful and loving little group of friends and workers in the midst of a great city, as yet too much devoted to material things. The daily newspapers hardly mention the lives of such men, but they shape the future, nevertheless. Men of broader scientific training came to work with them and carry on their plans to a higher fulfillment. Men of wealth put money in their hands to use in researches "for the good of humanity." To my mind the "West American Oaks" is a monument of a single-hearted, brave old botanical pioneer, and of the friendship of a group of men, rich and poor, who loved and honored him.

San Francisco.

Charles Howard Shinn.

Magnolias Near Baltimore.

To the Editor of GARDEN AND FOREST:

Sir.—Professor Sargent's paper on Chinese Magnolias reminds me that perhaps one of the oldest and finest specimens of *Magnolia Soulangeana* in America stands on the grounds of "Hampton," the seat of the Ridgely family, near Baltimore. This tree branches within two or three feet from the ground, and spreads over a large area. Five years ago the stem below the branches measured nearly eight feet in circumference. The tree was planted by the late Samuel Feast, since well known as a florist, nearly sixty years ago, when he was the head gardener at Hampton, and his brother, the late John Feast, was his foreman. Of the same importation the Feasts planted at Hampton a Purple Beech, a Cedar of Lebanon and other rare trees. The Beech is worth a long journey to see. It stands on a smooth lawn unencumbered by other trees, and its branches sweep the ground in a circle fully fifty feet in diameter, while its symmetrical head rises like a copper dome over fifty feet in the air. In the grounds of this old place, which has now been in the hands of professional gardeners for over a century, are many other magnificent specimen trees, particularly a row of native Cedars (*Juniperus Virginiana*) along the top of the old-fashioned terraced garden, of gigantic size, and covered with Ivy from bottom to top. Here is also, perhaps, the oldest green-house now standing in America. It is an orangery, built in the old style, with perpendicular glass on the south side and east end, and heavy stone walls on the other sides. The roof is shingled, and the ceiling overhead is lathed and plastered. This house was built about the same time as the old mansion (1784), and still shelters as fine a collection of the Citrus family as exists in this country,

with individual trees said to have been among its first inhabitants.

In the grounds at "Clifton Park," Baltimore, the property of Johns Hopkins University, are a number of large specimens of *Magnolia conspicua*, probably as large as any of this variety in the country. It is greatly to be feared that the fine trees in this park, of nearly four hundred acres, are doomed, as it is said that the financial needs of the university require that it be divided into city blocks and sold. The founder of the university intended this park for its site, but its managers have thought it better to buy and tear down brick blocks in the heart of the city on which to locate its buildings, and now will sell their useless but extremely valuable park, and sacrifice its wealth of trees.

Crozel, Va.

W. F. Massey.

To the Editor of GARDEN AND FOREST:

Sir.—Here is an old sun-dial motto which seems to me prettier than any of those you recently quoted, and which I do not find in Mrs. Gatty's book. I have, however, only the first edition:

"I am a Shade:
A Shadowe, too, art thou:
I marke the Time:
Saye, Gossip, dost thou so?"

New Haven, Conn.

F. L. M.

The United States Nurseries.

To the Editor of GARDEN AND FOREST:

Sir.—Some ten miles inland from Newark, New Jersey, where the Watchung Mountain range falls away sufficiently to allow a railroad to pass over it to the west, lies the town of Short Hills. It is a high and breezy situation, and the town is practically a spacious park, with villas scattered among the trees. Here for some years has been the home of Mr. James R. Pitcher, and his place has become famous for its interesting collection of plants, and particularly of Orchids. Not long since Mr. Pitcher determined to make his private collection the nucleus of a commercial nursery, and in this business venture he associated with him ten months ago Mr. W. A. Manda, who was at that time head gardener of the Botanic Garden in Cambridge. Unlike the other establishments which I have recently visited, the United States Nurseries have no history. They did not grow up from small beginnings, but started fully equipped for operations on a grand scale. Here are twenty-one green-houses, constructed in the most substantial manner, and stocked with Orchids, Palms, Ferns, Dracænas, Amaryllises and other ornamental plants, while seven acres of ground are entirely occupied with the best of hardy herbaceous plants. The first catalogue of the firm was devoted exclusively to Cyripediums, and it not only attracted attention for the beauty of its mechanical execution, but for the remarkable richness of the collection it offered. The catalogues of special classes of plants which have followed have been equally sumptuous, and the variety and completeness of the lists offered prove that the entire field, which the house proposes to occupy, has been carefully studied and provided for.

In a letter like this only general impressions can be given, for a detailed description of the noteworthy plants in any one of the houses would more than consume the space allotted to me. But a house full of Anthuriums makes a dazzling display, even when no close inspection is made of the nice shades of distinction among the twenty-five varieties that are in flower. In the Cool-Orchid house, too, where 3,000 Masdevallias are showing every tint of color, from vermilion to crimson and purple, the eye finds delight in the combined effect of the mass, even before time is taken to study the particular charms of individuals which represent seventy-five species and varieties. On the opposite stage of the same house are 6,000 plants of *Odontoglossum Alexandrae*, not all in bloom, but many of them white with flowers, and every one thrifty and promising. It would be difficult to find elsewhere as many Cyripediums in one collection. The list includes something like 400 species and varieties, while the number of individual plants approaches 20,000. Among them are many forms of the stately *C. Lawrenceanum*; a plant of *C. superbiens*, carrying eleven flowers, and admirable specimens of *C. Schraderea*, *C. grande* and *C. bellatulum*. Among other Orchids of conspicuous excellence in bloom I noted a variety of *Lælia purpurata*, with petals and sepals of deep rose, while the lip shows the intense purple of the species, and near it was a striking variety of *Oncidium crispum*, with flowers of an indescribable copper color.

Immense cases of imported Orchids are constantly arriving, but Mr. Manda is ambitious to originate some Cyripediums of his own, and the process of raising hybrid seedlings is interesting to amateurs. After the pollen has been transferred from the anther of one flower to the stigmatic surface of another flower of a different species, from six to twelve months elapse before the seed is ripe. The seed is fine as dust, and Mr. Manda sows it on the pots and among the moss where his plants are growing, so that it has the same temperature and moisture which the plants enjoy. The seeds do not begin to germinate until from four to six months after they are sown, and then the grower must wait patiently from four to twelve years for his plant to bloom. The species with thick leaves, as a rule, are longer coming into flower than others. Faith and hope are plainly virtues essential in one who would raise seedling Orchids.

Passing through a large Palm-house, where the most interesting specimen to me was a great *Encephalartos (Zamia) pungens*, we came at last to a house set full of Chrysanthemums, and chiefly of the famous Mrs. Hardy. Messrs. Pitcher & Manda paid a larger sum for this plant than was ever given before in this country for a similar plant of this class. But no other plant of the year has attracted so much attention or has been talked about so much since its figure appeared in the first number of GARDEN AND FOREST. Without doubt the enterprising purchasers have received already much more money than they paid for the plant, and even if they had not done so the Mrs. Hardy would have proved exactly the kind of advertisement which the new firm needed. The plants here look strong and vigorous, and seem to indicate that strength of constitution which was always claimed for this variety. Chrysanthemums, by the way, are one of the specialties of these nurseries, and all the more promising new kinds, including select importations from Japan, are here on trial.

Among the hardy herbaceous perennials I observed a large block of Pæonias. Mr. Manda finds that there is a growing demand for these plants, and he is gathering as rich a collection as possible. Tree-Pæonies, too, receive much attention, as do the Poppies, Phloxes, Primulas, Single Dahlias and Alpine plants. Hardy Orchids form another feature of special interest, and one must go far to find a better collection of native species. These native Orchids and other American plants, and with them certain Mexican and Japanese plants are now sent to Europe from these nurseries in very considerable quantities.

As was said at the beginning of this letter, these nurseries have their history yet to make; there are few places in the country, however, which can show collections of plants better worth visiting, and the very fact that such an establishment has been created within a few months is a striking illustration of the faith of forward-looking men that the gardens of the country will absorb an almost unlimited supply of the best material. Ten years ago an enterprise of this magnitude would have been looked upon as a venture of the wildest character.

S.

Short Hills, N. J., June 15th.

Recent Plant Portraits.

Botanical Magazine, May.

LICUALA VEITCHII, t. 7053; a handsome dwarf Palm (the *Pritchardia grandis* of Veitch's Catalogue), a native of Sarawak, in Borneo.

SMILAX OFFICINALIS, t. 7054; the plant which supplies the true Sarsaparilla of the British Pharmacopæia.

PENTSTEMON ROTUNDIFOLIUS, t. 7055; a shrubby Mexican species discovered by Mr. Pringle and figured in GARDEN AND FOREST, i., f. 73.

SAXIFRAGA LATEPETIOLATA, t. 7056; a rare biennial species, being known to grow only on a single Spanish mountain, the Sierra Sta. Maria, one of the Cerro de Chiva, in Valentia; and remarkable owing to the great breadth of the petioles.

LAPORTEA MOROIDES, t. 7057; one of the "virulently stinging Nettles that infest the humid forests of eastern tropical and sub-tropical Australia"—a shrub or small tree clothed with very fine virulently stinging hairs.

PHILLYREA VILMORINIANA, *Revue Horticole*, May 1st; a fruiting branch of this well-known broad-leaved evergreen shrub of the Orient.

AMPELOVITIS DAVIDII, *Revue Horticole*, May 1st; this, the *Vitis Romaneti* of some authors, is an interesting hardy plant from the north of China, of very considerable ornamental value.

HIPPEASTRUM RETICULATUM, *Gartenflora*, May 1st.

Notes.

The Legislature of California, at its last session, amended the state revenue laws so as to exempt fruit-trees and Grape-vines from taxation.

Syringa Pekinensis, Rupr., is in flower this year in the Arnold Arboretum. This is probably the first time that this plant has flowered in cultivation. A photograph of a panicle of flowers has been made, and will be reproduced in the pages of this journal.

On Friday last 2,200 plants of *Cycas revoluta* were sold at auction by Messrs. Young & Elliott, of this city. This was the largest importation of these plants ever disposed of here at a single sale. They varied from six to eighteen inches high and from twelve to sixteen inches in circumference, and were in excellent condition.

The collection of Orchids belonging to Mr. J. Wallace, of Paterson, New Jersey, was sold on Tuesday last at the auction-rooms of Messrs. Young & Elliott. The lot consisted of 1,700 established plants, and the prices realized were good. A strong plant of the beautiful hybrid *Cattleya Exoniensis* brought the highest price, which was seventy dollars.

The plant most commonly used in Japan for the making of lawns is said by a German horticultural paper to be the Shiba Grass (*Arundinella anomala*). It is an evergreen which grows to but four or five inches in height and requires to be cut only twice in the year. It must be propagated by division, as it rarely bears good seed, and plants grown from the seed do not, it is said, have the soft gray-green color which is so highly prized by the Japanese.

The retail florists of Brooklyn have been lately offering for sale fine plants of Pomponé Dahlias, about eighteen inches high and full of flowers. They are in four-inch pots, and sell for twenty-five cents each. Dahlias of such size are unusual in this market in early June, and a little investigation brings out the fact that most, if not all, of the plants come from the establishment of Kritchsmar Brothers, Flatbush, Long Island. This firm raised some 10,000 plants, 1,000 of which were sold to the Brooklyn Jockey Club for decorating their grounds. A large proportion of the Dahlias are of the old white variety, known as *Camelliaeflora*, but there are also colored Pomponé varieties which seem equally well-grown. The same growers every year plant a house full of the white Dahlia, mentioned above, for winter flowers.

It is proposed, in connection with the International Exposition of Geographical, Commercial and Industrial Botany, which will be held in Antwerp next year, to celebrate the third centennial of the invention of the microscope. An historical exhibit will be arranged, and another of the different forms of the microscope, as at present perfected; and these exhibits will be illustrated by a series of descriptive lectures, which can hardly fail to be interesting and instructive. The compound microscope was invented by two brothers, Hans and Zacharia Janssen, of Middelburg, in 1590. It was little employed, however, until the end of the first quarter of the present century, when the great improvements invented by Charles Chevallier led to its general use by men of science and made possible the discoveries to which the human race owes so much.

The play-ground in Franklin Park, Boston, a broad and beautiful meadow, one of the purest and simplest of Mr. Olmsted's creations, was formally dedicated to the public use on Wednesday of last week, in the presence of the Governor of the Commonwealth, the Mayor of Boston, 8,000 pupils of the public schools, and a vast concourse of spectators, before whom the School Regiment, made up of battalions from the High Schools of the city, paraded. The school children joined in singing "The Star Spangled Banner" when the flag was displayed from the tall staff in the middle of the meadow, and the people of Boston realized for the first time what it is to have a park. A few passing clouds and some drops of rain served to temper the heat of the day, and neither interfered with the success nor detracted from the beauty of one of the most picturesque and important events in the recent history of the New England metropolis.

Everyone knows that the stork is almost superstitiously beloved by the peasants of northern Germany and the Low Countries, and that iron supports upon which he may build his nest are set on cottage-gables in the belief that where a stork has his brood fire will never come. Nevertheless, travelers are often surprised when they see how tame the great birds become, following the agriculturalist through field and furrow, and often sleeping on one tall red leg close to where

he is at work and within sound of the rumble of the passing railroad train. So fond is the Dutchman of having storks about him, indeed, that he makes provision for its nests even in the centre of his bulb-fields. Here one may often see slender poles some twenty or thirty feet in height, supported by braces and bearing at the top a small round platform similarly strengthened. On these the storks build their nests, and here they perch, like sentinels protecting the beautiful crops.

The Woman's Division of the German Academic Association recently decided to promote the education of women in the art of gardening, "partly in order to enable the future housewife to care for her own garden, but chiefly to open new sources of income to the unmarried." A committee of the Association for the Promotion of Horticulture at once concerned itself with the matter, and announced that it would be considered at a general meeting on May 23d. Meanwhile, however, the subject was broached at an open horticultural conference in Berlin on the 8th of May, where 600 gardeners were present. An hour and a half was spent in discussing the advisability of educating women as gardeners, thirty speakers making themselves heard for or against the idea. A vote was then taken, and the following resolution submitted to the ladies' committee of the Academic Association: "The conference feels itself compelled to oppose the projects of the Academic Association in the interest of German gardening, as well as in those of womankind itself, because gardening demands much greater physical powers than usually are found in women, and because the industry is already at this moment suffering from overcrowding."

A writer in the *Garden* speaking of the American White Pine by the name most commonly employed in England, says: "When we consider how valuable a timber-producing tree the Weymouth Pine is, how rapid of growth, how easy of culture, and, withal, how distinct and beautiful, the wonder is that it is not more extensively cultivated on this side of the Atlantic. It is becoming a rare tree in its native wilds, the demand for its beautifully-grained and easily-worked wood being far in excess of the supply." It is true that our supply of White Pine for commercial purposes has been greatly reduced, partly by legitimate use, but still more largely by wasteful methods of cutting and destructive forest fires. But it is a great exaggeration to say that *Pinus Strobus* is becoming a "rare tree" in this country. Fine specimens of noble height, such as were easy to obtain a generation ago, are indeed rare to-day; but any one who has seen the way in which young White Pines spring up on deserted pastures and fields in New England can hardly fear that it is in danger of perishing from the land. It still gives a distinctive character to many broad districts of New England, but, all the same, the counsels which the English writer offers his countrymen with regard to the advisability of cultivating this tree, are even more insistently needed in this country. White Pines will grow whether we plant them or not; but it would be greatly to our advantage did we plant them more generally and systematically in regions where they once flourished in such stately forests.

More than one correspondent of a certain English horticultural journal has spoken with approval of the idea of growing Roses and Asparagus together, as conducing to a fine display of the beauty of the Roses, while not incompatible with good economical results as regards the Asparagus. "The two plants match," says one, "on the principle of strong contrast," and he exclaims with rapture over the effect when one comes upon "a glorious Rose-bed in the flower-garden overflowing with beauty and verdure, each drooping Rose resting its beautiful cheek on the soft, feathery fronds of bending Asparagus foliage." To many readers this will seem a singular perversion of taste. Not the principle of strong contrast, but the principle of harmony, is that which guides the man of true taste in arranging his growing plants or his cut flowers; and when a plant has such beautiful foliage as a Rose-tree, it seems perversity indeed to seek to enhance its effect by an intermixture of green of a totally different character. The massive loveliness of a double Rose is surely seen to better advantage resting its cheek on its own leaves or drooping in isolated perfection than swathed in the fluff of Asparagus shoots. In ancient times Plutarch wrote that there was no better way to show off the beauty of Roses than to plant them among Cabages. But such a mixture of alien forms is generally condemned to-day, while we have so long been accustomed to separating useful from ornamental plants in our gardens, that the mere fact of a utilitarian crop being grown in a Rose-bed would give a slight shock to the feelings, even though the effect might be better to the eye than the one which these English horticulturists admire.

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Thinning Plantations.

IN "Observations on the Treatment of Public Plantations; More Especially Relating to the Use of the Axe," by F. L. Olmsted and J. B. Harrison, we have a more direct and explicit discussion of the evil of overcrowding trees in parks and public grounds, and of the necessity of proper thinning than has before been presented in this country in popular form. The Report is addressed to Mr. Killian Van Rensselaer, as it was prepared at his suggestion, in behalf of the West End Improvement Association, the Torrey Botanical Club, the Park Commissioners of New York and others interested. It had its origin in the popular outcry which arose in this city last winter in protest against thinning the trees in Central Park. Mr. Olmsted was one of the designers of the park, and he has had as much both of culture and experience in landscape-art as any member of his profession, and his judgment in all that pertains to the use of trees and their relations to each other, in parks and public grounds, is probably not surpassed by that of any living artist. The Report sets forth precisely what any man, possessing the technical knowledge, which is the only possible basis for an intelligent judgment of the matter, would be compelled to say under the circumstances.

One of the most serious hindrances to progress and success in the management of public parks in this country has, for many years, been the fact that a public sentiment has been cultivated, the effect of which, in numerous instances, has been to keep trees standing that should have been cut out, and, in a general way, as this Report observes, "to prevent the free exercise of any specially competent judgment upon the question of thinning public plantations." The popular feeling on the subject is natural and, at present, inevitable. It is only a special form or development of the general conviction that in this country men are competent to decide almost any question without special training or preparation. There has been, hitherto, little respect in America for technical knowledge, except in connection with the industrial and money-making

arts, and the popular mind is still inclined to reject the idea of its necessity. But the changes in the conditions of life here during the last twenty-five years have rendered it far more necessary than it was before. The need of special training in the management of public parks increases steadily, just as the requirement for technical knowledge in the other pursuits of civilized life is made more imperative by the increasing variety, complexity and costliness of modern ways of living.

The people of an entire community, or its principal citizens, may be possessed of a high degree of general intelligence, and may have much special culture of various kinds, without the special equipment or training which would enable them to determine whether the trees in a park have been properly thinned and developed or not. Their judgment regarding the question of cutting out particular trees is probably not more apt to be right than their judgment of the special medical treatment required in a case of pneumonia or yellow fever. But it will be a long time before this truth will be generally recognized and understood, and the work of the few men who have any special knowledge of matters pertaining to park management will often be thwarted by vexatious interference, or defeated altogether by attacks inspired by untrained and erroneous opinion. The development of a higher degree of special knowledge in the public mind is necessarily a slow work, as is also such an advance in civilization and general attainment as will enable our people to recognize the necessity for special training wherever it is required, and will also incline them to leave to men who possess adequate training and equipment the decision of whatever belongs to their special art or department of knowledge.

If this Report could be carefully considered by the most intelligent men and women of our principal cities it would help to prepare the way for an advance in the methods of park management in the matter with which it deals, but the entire discussion will have to be repeated again and again, with varying special illustrations as new cases of difficulty and error arise from time to time. Most communities are impatient for immediate effect in tree-planting, and trees are put in at first which every competent landscape-artist knows should be removed in a few years. But when the time for their removal has come, no one is likely to recognize its necessity unless he is qualified to judge of the matter by the special training and technical knowledge of a competent landscape-artist.

The Report is enriched by a great number of quotations from the leading writers of this country and Europe, bearing directly and most pertinently upon the question discussed. The authors conclude, after a very thorough examination of the park, that the tree-cutting, of which complaint was made, was not excessive, but that additional removals should be made, especially of trees which were not originally intended to remain permanently, and this conclusion is undoubtedly correct.

The manufacture of Red Cedar pencil-wood has for years been almost exclusively confined to Florida, where this tree grows to a large size and in great perfection. The business has been in the hands of a large foreign house, which supplies a good part of the world with lead pencils, and has been profitable. Large Cedar timber, straight grained, and of a suitable quality for pencil-stuff has become scarce in Florida along the streams on the west coast, where the best was found; and factories are springing up in different parts of the south, especially in Alabama, where, at Gurley, sawing pencil-stuff is already a considerable industry. The best Red Cedar, however, now left will be found near the Red River, in Texas, and in the Indian Territory, where this tree attains a greater size than it reaches in Florida, while the quality of the lumber is not, probably, in any way inferior.

The world has become so accustomed to using pencils made of red cedar that it will not readily adapt itself to any others. The supply of this lumber of suitable quality,

however, is not large in proportion to the demand, and cannot hold out many years longer.

The Red Cedar is the most widely distributed of North American conifers, and in some parts of the country it is one of the most common trees; but it is in a few favored localities only that it grows in a way to produce the straight-grained material essential for pencil-making.

The distillation of oil of Cedar, for which there is now a large commercial demand, from the sawdust and other refuse, has been profitable in the pencil-mills at Cedar Keys in Florida, and might be carried on to advantage in other parts of the country. It can be made, of course, from wood of the poorest quality.

Topiary Gardening in Japan.

WE have published, in recent issues of this journal (vol. ii., pp. 103, 211), good examples of topiary gardening as practiced in New England and in Old England, while the illustration upon page 307 of the present issue represents a garden in Tokio, in which the chief features are clipped Pines. They are specimens of *Pinus densiflora*, the species most often used by the Japanese for this purpose. An examination of these three pictures will show that the Japanese are not behind the Americans or the English in mechanical skill in reducing their trees to formal shapes, or in artistic skill in grouping them, so as to bring out the beauties of purely formal gardening.

We are indebted to Mr. James M. Codman for the photograph from which our illustration has been made.

Notes on the Production of Maple Sugar.

ONE of the most important and interesting of the early writings on the Sugar Maple is "An Account of the Sugar Maple-tree of the United States," by Dr. Benjamin Rush. It was written in the form of a letter to Thomas Jefferson, was read before the American Philosophical Society and published in the "Transactions" of the Society in 1792. Some of the statements hold good at this time, but others sound oddly when compared with modern knowledge and practice. Dr. Rush had a very high opinion of the merits and value of the Sugar Maple. He says: "Its small branches are so much impregnated with sugar as to afford support to the cattle, horses and sheep of the first settlers during the winter, before they are able to cultivate forage for that purpose. . . . The tree is supposed to arrive at its full growth in the woods in twenty years. . . . It is in consequence of the sap of these trees being equally diffused through every part of them, that they live three years after they are *girdled*—that is, after a circular incision is made through the bark into the substance of the tree for the purpose of destroying it." We are told that there are three methods of reducing the sap to sugar: "By freezing it," "by spontaneous evaporation" and "by boiling." After giving some figures to show that more sugar might be made from the Maple in the country than would be necessary for home consumption, Dr. Rush, in speaking of the benefits he expects from its general use, says: "They will, I hope, extend themselves to the interests of humanity in the West Indies. With this view of the subject of this letter, I cannot help contemplating a Sugar Maple-tree with a species of affection and even veneration, for I have persuaded myself to behold in it the happy means of rendering the commerce and slavery of our African brethren in the sugar islands as unnecessary, as it has always been inhuman and unjust." In a foot-note we are told that "Mr. Jefferson uses no other sugar in his family than that which is obtained from the Sugar Maple-tree. He has lately planted an orchard of Maple-trees on his farm in Virginia."

Since Dr. Rush wrote his paper much progress has been made in the production and manufacture of syrup and sugar from the Maple, although it has not received so much attention as has fruit-growing and some other kindred industries. It is a most important source of income on many of our northern farms, and the sugar-orchard, or "sugar-bush," as it is often called, is in many districts coming to be as well looked after and cared for as a vineyard or fruit-orchard. The annual profit is probably larger than the average of farm crops occupying the same acreage of ground, and the work is done before the ordinary farm labors have begun. In many well-managed sugar-orchards the dead and diseased branches are

carefully pruned off, and the wounds covered by some protecting substance to prevent injuries by insects or fungus diseases.

Some of the more thrifty proprietors, at the end of the sap-harvest, have the holes which were bored in the trees carefully plugged with neat stoppers of dry, sound wood, cut so as not to project beyond the surface of the last ring of wood formed. At the close of the growing season the new layer of wood and bark will have completely covered the wound. This is a great improvement on the barbarous method of making a great gash in the side of the tree with an axe and using a chip for a spout. The amount of abuse which a large tree will bear when standing in the forest is surprising. In some districts there are many large old trees to be found having the trunks for five or six feet from the ground, very rough and uneven, and often a foot greater in diameter than the trunk immediately above, caused by the earlier crude way of obtaining the sap. These trees may have been subjected to such rude treatment almost every year for half a century or more, and now, tapped in the more approved way, they continue to produce abundantly without showing other signs of injury or decay than such as are found in trees under natural conditions as they attain old age.

In regard to the manner of tapping the trees writers still seem to differ in their accounts as to the depths bored. Dr. Rush, in the essay already quoted, says: "The perforation is made with an axe or an auger. The latter is preferred from experience of its advantages. The auger is introduced about three-quarters of an inch, and in an ascending direction, and is afterwards deepened gradually to the extent of two inches."

In Emerson's "Trees and Shrubs of Massachusetts" (p. 564) it is stated that the holes are bored "to the depth of from two to six inches, according to the size of the tree, and M. Ed. André, in an article in the *Revue Horticole* for 1886, p. 284, says that the holes are often bored even to the heart of the tree. There are probably very few experienced men, owning sugar-orchards now, who have the holes bored more than a couple of inches in depth, and one inch is deemed quite sufficient by many. There is little to be gained, and a much greater possibility of injury to the tree by boring deeply into its trunk. Probably nearly all of the sugar-bearing sap comes from the outer layer of wood extending less than an inch deep. Many writers have stated that the south side of the tree gave the best flow of sap, but experienced men advise tapping the side bearing the most branches.

As yet most of the sugar-orchards are made up of trees of natural growth, and comparatively few plantations have been set out for sugar-making purposes. The twenty-five years required by the trees to grow before being regularly tapped seems a long period to many, but if properly planted with other trees among them the Maple-orchard could be made self-supporting, by annual thinning of wood, after the first few years. Trees on rocky hill-sides yield more profitable sap than those on low ground, so that some of the best locations would be on New England hill-sides that are now bare and unprofitable. The French Canadians in some portions of Canada are said to be planting large quantities of the Ash-leaved Maple (*Negundo aceroides*), with the idea of producing syrup and sugar from it, and because it is a fast-growing tree.

The time may not be far distant when nurserymen will give particular attention to the propagation of the best sugar-producing strains of Maples and other native trees. Careful comparative studies of the amount of sap obtained from different species of trees, and of the same species under different conditions, and of the percentages of sugar contained in the sap are much needed. Numerous analyses have been made of saps by different investigators, but the published results are very contradictory and unsatisfactory. While, no doubt, much depends upon the surroundings, vigor and other conditions attending the trees, it seems as if some general rules might be determined upon which would be approximately reliable. Dr. G. L. Goodale gives the average amount of sugar in the sap of *Acer saccharinum* as about eight per cent. (Physiological Botany, p. 360), which seems very high when compared with the results of other experiments. In the report of the Massachusetts Board of Agriculture, 1874-75 (p. 290) the analysis by Charles Wellington gave a result of 2.777 per cent.

In recording some interesting experiments made in Indiana (Proceedings A. A. A. S., 1879, vol. xxvii., p. 234) Dr. H. W. Wiley gives the highest percentage as 4.30, from a tree noted for the sweetness of its sap. In a series of experiments conducted at Lunenburg, Vermont, under the direction of Dr. Wiley, and published in Bulletin No. 5 (1885) of the Chemical Division of the Department of Agriculture, the highest percentage recorded was 10.20 in a small flow of sap from a speci-

men of Sugar Maple during one of the last days of the flow, the average being 5.01 per cent., and 9.88 per cent. was obtained from a similar flow of sap from an isolated White Maple (*Acer dasycarpum*), which averaged 4.36 per cent. of sugar during the season. The average of all the analyses from all the trees experimented upon is considerably less than 4 per cent. of sugar.

In making some experiments on the sap of the Ash-leaved Maple (*Negundo aceroides*), Dr. B. J. Harrington, of McGill College, Montreal, found in a series of careful experiments that the average amount of sugar in the sap of these trees was very nearly 2.50 per cent. In a slight test of the sap from a tree of *Acer saccharinum* on the college grounds he found a little over 5 per cent. of sugar. The detailed account of the experiments with the Negundo sap is published in the "Transactions of the Royal Society of Canada," vol. v., sect. iii., 1887.

Adulterations and imitations of both sugar and syrup are very common. An extract obtained from the bark of Hickory (*Carya*) is said to resemble the Maple flavor very closely when mixed with cane syrups. Such imitations may tend to lower the price of the pure product a little, but there will always be a demand for the true article. It is not likely that Maple will take the place of cane-sugar, as Dr. Rush hoped, but the consumption and perfection of production will continue to advance.

Arnold Arboretum.

J. G. Jack.

Foreign Correspondence.

London Letter.

NEVER were the florists of London so busy as they now are, at the very height of the season. Every day they must provide sumptuous and extravagant feasts of flowers at the houses of the great, where flowers seem to be more highly appreciated than ever. Those who are not behind the scenes wonder where the material comes from to supply the London fashionable world, and to many such an opportunity was afforded the other night to see for themselves the inner life of our great flower-market at Covent Garden. The market-growers and florists have interested themselves in a most commendable way on behalf of a charity established last year as the Gardeners' Orphan Fund, and in order to augment the funds they organized a public fête or show of their own productions, such as they send every day throughout the year to our central flower-emporium. The flower feast, for such it was, was greatly appreciated by thousands who never before saw a wholesale flower-market, and not a few seemed astonished at the gorgeous sight. The perfection to which popular plants are grown for sale astonished even professional gardeners, who have to grow miscellaneous collections of plants, whereas most of the great market-growers devote their sole attention to a few classes of plants, the result being that they bring the plants to absolute perfection.

The great flower-market at Covent Garden is truly a gorgeous sight, though there is necessarily a good deal of sameness among the plants exhibited. The flowers of the season were, of course, in strongest force, for the show was just on the eve of "bedding out" week, when millions of plants come through the market to be dispersed throughout the suburbs. Among the most prominent kinds of plants were Pelargoniums of all kinds, but especially the old Scarlet Vesuvius. It is surprising to see how comparatively few sorts are grown for the market, and it is equally remarkable how very few among the infinite variety of Pelargonium are able to conform to the market-growers idea of a standard sort. Forced Roses were plentiful, especially the delicate Tea-scented sorts, which seem to take with the public more than the high colored kinds, and this is, I fancy, on account of their perfume. Niphetos is the leading sort with all the growers. Stand after stand was filled with nothing but double Poet's Narcissus, which, for the time, quite usurps the proud position the Gardenia holds for the adornment of the coat. The florists have a clever way of making this Narcissus look so like a Gardenia that it puzzles one to detect the fraud. They "dress" the petals—that is, they extract the small ones, flatten the big ones and surround the bloom with a few leaves of the green Japanese Euonymus, whose shining foliage passes well for that of Gardenia.

Iris of all varieties of the Japonica group are coming into public favor more and more, especially now that a famous grower at Twickenham has turned his attention to them and has planted the best sorts by the acre. But the Iris is not everybody's flower, and only those who have the gift of artistically arranging flowers can make the Iris look as it should in a vase. The sorts most in demand are the dark purples and

clear yellows and whites. Marguerites are as popular as ever, and their culture is so remunerative that some of the smaller growers produce very little beside them. They were here to be seen of all sizes in pots, from plants a yard through to the tiny bits in thumb-pots for bedding out. The yellow sorts, such as *Compte de Chambord* and *Etoile d'or*, seem to be more difficult to grow than the white, as they were not nearly so fine. Among other popular flowers were Fuchsias, Violets and Pansies, Stocks, Petunias, Lilies of the Valley, Tulips, Scillas, Heaths, Spiræas and Miss Joliffe Carnations, which sort is undoubtedly the best for the market. The pyramidal Saxifrage (*S. Cotyledon*, var. *pyramidalis*) is now largely grown, and a group of a hundred plants, all with tall clusters of small white flowers, was one of the prettiest things I saw.

Orchids, singularly enough, were not plentiful, though there was evidence that these fashionable but expensive flowers are becoming more in demand as market flowers. The chief lots of cut blooms were of the Alexandrian Odontoglossum, which for wreaths, sprays and the like, are matchless. Cattleyas, Lælias, and other showy common kinds, were represented by a few flowers, but it is apparent that this Orchid does not find favor with the great growers yet. There was nothing very remarkable among the foliage plants, which, though not so plentiful as the flowers, were to be seen by the thousand. The plants with highly-colored leaves, such as Coleus, Caladiums, Dracænas, Crotons and the like, seem to be regaining their former popularity, and I am told by the great London nurserymen that fine foliage plants are likely to be as much in demand as they were a dozen years ago, when bright-leaved plants were as popular, almost, as Orchids are now.

W. Goldring.

New or Little Known Plants.

A Hybrid Catalpa.

THE name *Catalpa* × *J. C. Teas*,* is suggested for a plant whose hybrid origin is probable. The history of the plant is, briefly, this: J. C. Teas of Carthage, Missouri, while living in Indiana, in 1864, purchased a seedling *Catalpa* from Mahlon Moon of Morrisville, Pennsylvania, who had raised it from seed procured from Japan by Hovey & Co., the Boston seedsmen. According to the statement of Mr. Teas, to whom I am indebted for the facts in the case, this tree, which proved to be *C. Kämpferi*, was planted in his nursery among or near plants of *C. bignonioides* and *C. speciosa*, the two North American species; and it produced in due time one pod of seeds which were quite unlike those of any *Catalpa* with which Mr. Teas was acquainted. The seeds were planted and gave rise to a tree almost intermediate in character between *C. Kämpferi* and one of the American species. The appearance of this seedling tree and its progeny suggests that the pollen from a flower of one of the American *Catalpas* had fertilized a flower of the Japanese tree. The American parent was probably *C. bignonioides*, although Mr. Teas is inclined to believe that it was *C. speciosa*. The latter flowers two or three weeks earlier than the Japanese species, whereas the former flowers contemporaneously with that species during the first week of July.

Whatever may have been its origin, the hybrid of which a figure appears upon page 305 is an erect, vigorous, and rapid-growing tree, with the thin, scaly bark of the American species. The leaves are sharply three-lobed, or rarely entire, and more or less cordate at the base; they are slightly pubescent on the lower surface, and the mid-rib and primary veins are covered with scattered hairs; they are twelve to fifteen inches long and ten to twelve inches broad. The inflorescence, which is eighteen to twenty inches long by ten inches wide, is composed of two or three hundred fragrant flowers about an inch long, the corolla slightly tinged with yellow in the throat, and handsomely marked with broad purple stripes. The fruit is from twelve

* *Catalpa*, J. C. Teas; nov. hybr. Arbor excelsa, ramis horizontalibus; foliis amplis, longe petiolatis, ovatis acuminatis, basi rotundatis vel cordatis, integris vel sæpissime 2-3 lobis, lobo medio attenuato-acuminato, lateralibus brevibus divergentibus, subtus villosis-hirsutis; paniculis terminalibus amplis, floribus gracile pedicellatis, calycis labiis rotundatis mucronatisque, corollæ tubo campanulato, limbi 2-labiati, lobis 5, rotundatis, flavis vel albidis laniato-punctatis; capsula cylindracea seminibus alatis mollior villosis utrinque in caudas capillares-fissas productis.

to fifteen inches in length and not more than a quarter of an inch thick in the middle. The wings of the seed are half an inch in length and one-eighth of an inch in width, and like the others of the genus are tufted with long white hairs.

The leaves of this tree are much larger than those of either of its parents, having when they first appear the velvety character and the purple color peculiar to those of the Japanese plant, and the reddish spot at the insertion of the petiole with the leaf-blade which characterizes that species. They more generally resemble those of the Japanese species in shape, color and texture, while the pubescence which covers the lower surface is almost intermediate in character between those of the American and of the Japanese species. The inflorescence is much larger than that of the American or of the Japanese plants, being fully twice as large as that of *C. bignonioides*, and more than three times the size of *C. Kämpferi*. The flowers are intermediate in size; in color and in markings they most resemble those of the American species, although a tinge of yellow in the throat of the corolla points to their Japanese descent. The fruit of the hybrid is almost intermediate in size between those of the two parents, as are the seeds, which are perfectly fertile and often reproduce the original form in every particular. When, however, seedlings show a tendency to vary from the original form the variation is generally in the direction of the Japanese rather than of the American parent.

The hybrid is a more vigorous tree than either of the American or the Japanese species, and it grows rather more rapidly. It is too soon to speak of its value as a timber-tree, as the largest specimens in the western states, where this tree has been much more generally planted than at the east, are, according to Mr. Teas, only forty to fifty feet high, with trunks which do not exceed yet a diameter of eighteen inches. Of its value as an ornamental tree there can be no doubt. Its larger size and more rapid growth, its better habit and more showy inflorescence make it a far more valuable ornamental tree than the Japanese species; it is more hardy than either of the North American species, and although the flowers are smaller, the panicles and the number of individual flowers are much larger.

The best forms, from an ornamental point of view, are those in which the flower most nearly approaches those of the American species in size and color; and, as the seedlings show a decided tendency to revert, so far as the flower is concerned, to the Japanese parent, it will be necessary to perpetuate selected varieties by grafting. The great vigor of the seedlings of the hybrid will, no doubt, make these the best stocks for this purpose. Among a number of these seedlings sent to the Arnold Arboretum by Mr. Teas there is one in which the corolla is doubled.

If it is true that the plant is a hybrid, and there seems no good reason for doubting that it is, this tree illustrates in a remarkable manner the advantage in vigor and hardiness which the progeny resulting from the crossing of two species may obtain over either of its parents. The fact is doubly interesting, moreover, because hybrid trees, whose origin is known with as much certainty even as that of this Catalpa, are rare. Some fruit-trees are doubtless derived from crosses of nearly allied species or distinct forms of a widely-distributed species. Oaks, Walnuts and Willows, which are believed to be hybrids between related species are not uncommon, and it has been suggested that some of the varieties of *Cinchona* which produce the most valuable bark may be hybrids. The origin of such plants, however, is always veiled in doubt, and I do not at this moment recall any other hybrid tree, with the exception of *Magnolia Soulangeana* and the other hybrids between *M. conspicua* and *M. obovata*, whose history is as little doubtful as is that of this Catalpa, which seems destined, whatever its economic value may be, to become a valuable ornament in the decoration of parks and gardens.

C. S. S.

Cultural Department.

Forcing the Gladiolus.

THE Gladiolus, when grown as a forced flower, is appreciated to a greater extent than when grown out-of-doors. Like many other flowers, it is better under the protection of glass when well cared for, as the flowers are larger, the colors purer and the spikes longer. To force the Gladiolus successfully, however, requires attention at just the right time, and its wants should always be anticipated and supplied. Here is the routine of my practice: The bulbs I forced this year were also forced last year. They were then planted February 8th, and the first twenty-five flowers were cut May 30th. This year's work began December 27th by potting each bulb in a four-inch pot, using sandy loam, without manure, and placing the bulb on the top, pressing it down to hold it without any other covering; they were watered and then placed underneath the benches of a Carnation-house until the beginning of February. At that time those plants which had grown to the height of four inches were brought to the light and again watered. Placing them close together on a bench near the light, a little water was given from time to time, retarding the top growth, and encouraging root-action as much as possible. By the 20th of the month the plants were gone over, and all those of an even size were planted together in rows about a foot apart and nine inches apart in the rows. After planting those of one size, then another batch a size less was handled. This selecting into sizes pays for all the trouble it costs in preventing strong plants from overcrowding the weaker ones. My soil is rather a heavy sandy loam, and in this the Gladioli were planted, the depth of the entire bed being a little more than four inches. The bulbs were scarcely covered even at this time, and this, I find, prevents the damping off of the plants during dull days, when they have commenced to grow rapidly, and are checked either by dark weather or by a cold spell. By the middle of March each plant was tied securely to prevent its falling over, which is generally ruinous to the flower-spike; a light mulching of stable-manure was then put on and well watered. From that time until the flowers were cut a good soaking of liquid-manure was given each week. The Gladiolus delights in abundant moisture when well along in growth, but in its earlier stages too much water is death to it.

The first twenty-five flowers were cut for Easter, or six weeks earlier than last year. The temperature was never higher than 50° at night, and during the day-time the house was ventilated whenever it could be kept above 70°. Three things I find are necessary to successfully force the Gladiolus.

(1) The pots must be well filled with roots before the plants are finally set out.

(2) The nearer the bulbs are to the surface the less liable are the plants to damp off.

(3) The bulbs must be well ripened—and if so, small ones are as good as very large ones.

Pearl River, N. Y.

John Thorpe.

Spring Bulbs.

NOTWITHSTANDING the wet season of 1888, bulbs have made a very good show in my garden this spring, and I will mention a few which are worthy of general cultivation, though as yet little known except to specialists. Among the new Tulips introduced of late years from Asia, there are four of surpassing beauty, all equal or superior in size, color and form to the very best of the Dutch early-bedding Tulips.

T. Kaufmanni is the earliest of them. Of its three varieties, figured in the *Botanical Magazine* from my garden, the yellow is, perhaps, the finest, and throws up its large flower better than the rose-colored one, which seems more tender and easily spoilt by bad weather. This is the earliest of all large-flowered species of Tulip, and one of the finest and most distinct.

T. Oculus-solis var. *Mervensis* is a real giant in flower, more than twice as large as any other form of this species, and a third larger than any Dutch Tulip known to me. It measures over six inches in diameter when expanded, and seems quite hardy; but my single bulb has not yet produced offsets. Of its origin I know but little, but it is said to have been brought from Merv by Mr. Donovan.

T. Greigi is better known, but has somewhat degenerated since I first got it, and though quite hardy, does not increase. It remains, however, one of the finest species.

T. suaveolens typica, received from Dr. von Regel also under the name of *Lanata*, is very distinct in its downy leaves, and, when well grown, is an extremely fine Tulip in size, form and color. The flower is a pure deep crimson without any eye; the height is variable, but when increased sufficiently I think this will prove one of the best bedding Tulips of the Dutch



Hybrid Catalpa × J. C. Teas.

varieties not commonly used for bedding. I find Wouwerman's Joost van Voondel in its white form, *Adelaine* and *La Remarquable* all very fine sorts. The latter I never had till this year. It is very perfect in form, and reminds me of one that I specially admired in Mr. Van Eeden's nursery at Haarlem some years ago, and which he proposed to call Mrs. H. Elwes. This is ten days earlier than any of the Van Thol Tulips, very beautiful in color, bright cerise with yellow centre, and per-

fect in form. I shall be glad to hear if it has been sent out, and if so, under what name.

Of other new or rare bulbous plants I have admired nothing so much as *Erythronium Smithi*, which seems a form of *E. grandiflorum album*. It is by far the finest of the *Erythroniums* I know, though the yellow *E. Nuttallianum*, when seen in masses as we saw it in the Yellowstone Park, runs it close.

I do not know who called it *Smithi*, but it is much larger in

flower than *grandiflorum*, with large blotched leaves flat on the ground and a tall flower-stem carrying two or three large white or pale-pink flowers. I believe it was introduced by Mr. Ware two years ago.

Of *Fritillarias* I find that the finest form of *Imperialis* is not generally known. It is much more robust and taller than the forms usually cultivated, and has flowers about three inches long. The form known in Holland as Lord Derby is something like it, but has smaller and more copper-colored flowers. The lately introduced form, *Inodora*, though variable in size and color of flowers, which are usually much smaller than those of the old Crown Imperial, is at least a fortnight earlier and is now quite over. Of other uncommon *Fritillarias* I think *F. pallidiflora* and *F. Moggridgei* are the best; the latter is perhaps only a form of the old *F. latifolia*. But when seen in large quantity there is no prettier *Fritillary* than the white *Meleagris*, of which there are many thousands in a meadow in this neighborhood, and which is easily raised from seed, though a few of the seedlings come to the usual color.

With the exception of *N. cyclamineus*, *N. Johnstoni*, and a small pretty form of *N. moschatus*, the *Narcissi* collected in Spain by Mr. Barr are disappointing, and I think we have pretty nearly exhausted the variety which exists in this genus, unless something can be done by hybridizing with the *Glenais* variety of *N. triandrus*, which is one of the most graceful and best of its tribe, though not hardy enough for a border plant.

Puschkinia Libanotica and *Chionodoxa Lucilia*, though two of the best early spring bulbs, are becoming perfect weeds with me, and seed themselves on the grass and everywhere. Of *Muscari* there is none equal for ordinary garden purposes to one which I believe was brought from Rome by the late Mr. Harper Crewe as *M. conicum*. It is not so early as several others, and not so pretty in color as *ligulatum*, but far better than most of the sorts usually grown, and a perfect weed in the rapidity with which it increases.

H. J. Elwes, in *Gardeners' Chronicle*.

Notes on Wild Flowers.

THE Showy Lady Slipper (*Cypripedium spectabile*), now in flower, is by far the finest species we have. It grows about two feet high, with numerous, large, light green leaves along the stem, which terminates in one or more—rarely four or five—large, white, pink and purple flowers. These remain fresh several days. In the right location it is not a difficult plant to grow. In sandy, gravelly, or slaty soil, plenty of peat or leaf-mould must be added. It is a lover of moisture, and does best in the shade. It is often found in the open sunlight growing naturally, but in very moist locations, and such plants are seldom as large as those found in partial shade. Too much shade, however, is worse than none. We have noticed in thick Cedar-swamps plants growing year after year in a weak, sickly way, without flowering, when if a few rays of the sun could have reached them they would have been as strong as possible.

Habenaria viridis, var. *bracteata*, and *H. Hookeri*, two of the Rein-Orchis family, are now in flower. Both are low-growing (six to twelve inches), greenish-flowered species, not showy, but grown in collections of hardy Orchids, to some extent, both in this country and in Europe. The two large orbicular leaves in the latter, lying close to the ground, from between which comes the flowering stem, make it the more desirable of the two. As seen growing, these plants are interesting, and remain green a good portion of the season, but the flowers are too near the foliage in color to be of much value. They are easily grown, and would thrive in the shade where grass would not grow.

Saxifraga aizoon is a rare northern species, more generally cultivated in Europe than in this country. The flowers are white or cream-colored, and rather pretty. Its natural location is on moist rocks, and when planted in ordinary soil in the sun it is apt to become too dry. Placed in the shade, it seems to be weak and sickly. On the whole, we do not think it desirable except for moist rock-work, where it would be quite valuable.

Draba arabisans, now in flower, is as pretty a plant, perhaps, as either *Saxifraga aizoon* or *S. Virginensis*. It grows on dry rocky banks, and would thrive in localities where few other plants would live. Its height is from four to twelve inches. It often grows in dense tufts bearing its white flowers in great profusion. We have never cultivated this plant, but believe it might be valuable in some locations, and could probably be obtained from seed better than from living plants.

Lewisia rediviva is a little, low plant, three to four inches high, from northern California and Oregon, where it is said

to grow naturally in granite sand and on ledges. Its flowers are large and showy, from one to two inches in diameter, with thin, membranaceous, light purple sepals, and nearly pure white petals. We have grown it two years in a clay loam, and it has stood the winters without protection.

The Meadow-Rues (*Thalictrum Cornuti*, now in flower, which is the taller, and *T. dioicum*, which is much earlier, and not so tall, but a prettier plant), are both more desirable for their beautiful foliage than for their flowers, though the flowers of the former are pretty. But their foliage, especially that of *T. dioicum*, is very fine, and lasts from the time it is in flower until late in autumn. It will thrive on dryer ground than *T. Cornuti*, and is a desirable plant for shaded corners where other plants would not live; while *T. Cornuti* would be more suitable for wet places.

Calochortus lilacinus, one of the many species of Butterfly Tulips, is now in flower. It was sent to us from Modoc County, California. The plant is quite small, only three or four inches high, and the flowers come from near the ground on stems so short as to be worthless for cutting. They are three-fourths of an inch in diameter, white, tinged with purple, and quite handsome. The bulbs may be wintered in dry earth in the cellar. We have not tested the hardiness of the plant. Two Columbines from Oregon (*Aquilegia formosa* and *A. flavescens*) are now in flower. The former closely resembles our common *A. Canadense* in color. It is a taller and stronger growing plant, and later in flowering. *A. flavescens* has paleish-yellow flowers, in shape much like *A. Canadense*, but not showy. Both are desirable plants and easy of culture.

One of the prettiest wild Anemones, and a hardy one, too, when once established, is the Pennsylvania Anemone, now called *A. dichotoma*. The flowers are almost pure white, and an inch or more wide. It likes a rich, moist soil, and continues in flower for a long time.

Charlotte, Vt., June 10th.

F. H. Horsford.

Orchid Notes.

Calanthe Dominii is an attractive and useful Orchid belonging to the evergreen section. It is one of the earliest hybrids, and is the result of crossing *C. masuca* with *C. furcata*. The broad, plicate leaves are deep green, and will remain in good condition until the new growths are well advanced. The scapes are erect, about two feet high and bear a profusion of mauve-colored flowers, about an inch across. This may be successfully grown in rich stove-plant soil in an intermediate temperature, and kept moist all the year round.

Vanda Batemannii. This noble species is now in flower. It is of immense growth, only suitable for large houses, as it will grow to a great height. The stem is stout, closely clasped with long, narrow, deeply channelled, leathery leaves. The racemes which spring from the axils of these are erect, stout and about six feet long, bearing a great many very handsome flowers. These are thick, dull, flesh-colored, blotched with crimson in front, while the back is rosy-purple. The racemes last nearly the whole summer, growing, and developing new flowers from the apex. The plant was introduced nearly fifty years ago from the Moluccas, and requires the most liberal treatment in respect to heat and water. The pots should be well drained and the potting material should consist of lumps of peat, chopped moss and nodules of charcoal, with a few lumps of dry cow-manure. It blooms very freely with us, and should it ever become "leggy" the head can be cut off in early summer and potted, when it will quickly become established. The old stem will produce a number of shoots, and these may be taken off as soon as the new roots appear, and will make better looking plants than when left on the old plant.

Epidendrum vitellinum is an Orchid to be commended. It flowers at a somewhat dull season, and a few spikes of its gay and unique colored flowers go a long way to brighten and bring out the sober tints of the *Odontoglossums*, with which this species should be grown. It is generally distributed through Mexico and the adjoining states, usually found growing on rocks or stumps of trees at high altitudes and under such conditions as the cooler *Odontoglossums* need, and it requires the same treatment as recommended for these. It grows freely, however, on blocks or rafts of wood, and should be kept somewhat dryer during the resting season. The clustered bulbs are ovate-lanceolate, with two acute, oblong ligulate leaves, both leaves and bulbs being of a peculiar glaucous hue. The erect racemes are often branched, and bear from twenty to thirty flowers about an inch across, the color being a vermilion-orange. The acute lip and the column is of bright yellow, while the anther-cap is red. The flowers last about two months

in perfection. The variety Majus is distinguished by its stronger inflorescence, and this is developed earlier in the season than that of the type.

Kenwood, N. Y.

F. Goldring.

Spraying Fruit-trees.

THE most important accession to recent horticultural practice is the spraying of fruit-trees with arsenical poisons for the destruction of various insects. No orchardist can afford to neglect this practice. The codlin-moth, curclio, canker-worm, tent-caterpillar and other insects are destroyed by this operation, and sometimes three or more species are killed by the same application. Experience has shown the best methods of applying the poisons, and we now know that the essential points of the operation are to use a very dilute mixture, and to apply it with great thoroughness. London Purple, when pure, is better than Paris Green, and is cheaper. A pound of

pump and one to drive and hold the hose is a profitable outfit. With such an outfit two men can spray from 250 to 300 Apple-trees, thirty years old, in about half a day. Pear-trees are treated in the same manner as Apple-trees. The mixing of flour with London Purple, in order to make the poison stick to the leaves, does not appear to meet with much favor among practical men.

Cornell University.

L. H. Bailey.

Heating Green-houses.—At the recent Convention of American Nurserymen Mr. Peter Henderson read a paper on this subject, from which we make the following extracts:

"In my judgment, when the range of glass is sufficient to justify the employment of a night watchman, say 50,000 square feet, steam has several advantages over hot water, chief of which are the exact regulation of temperature, which can be obtained by close attention, consequent economy of fuel, and the convenience of placing the heating furnaces all at one



A Japanese Garden.—See page 302.

the London Purple to 250 or 300 gallons of water is sufficient. Apply it until the liquid drips from the foliage in all parts of the tree. The apparatus should be such that the liquid will be driven with great force in a fine spray. A gallon of liquid will cover an Apple-tree twenty-five or thirty years of age.

A single spraying of Apple-trees, if the operation is not immediately succeeded by heavy rains, is usually sufficient, although a second application is always advantageous. Two or three applications should be made upon Plums, Cherries and Peaches, and I have met growers who make as many as five applications. Even five applications are much cheaper and easier than any other method of destroying the curclio, and the practice is much more effective. In young and open orchards the spraying can be well done with a machine which works from the wagon-wheel, but in large and thick orchards—those most in need of treatment—the operator must stop at each tree if the work is to be thoroughly done. A tank or cask upon a wagon, a pump with much power, one man to

point. For example: We have a range of glass where the extreme point is about 600 feet away from the boilers; it would hardly be practicable to heat by hot water at that distance. And yet for all medium and small-sized green-house establishments, whether for commercial or private purposes, we recommend the use of hot water. The size of the green-house or green-houses to be heated must determine the capacity of the boiler wanted; but the boiler being properly apportioned to the length of pipe, the following data from our own establishment, where the houses are twenty feet wide and 100 feet long, may be useful: When a night temperature of seventy degrees is required in the coldest weather, ten rows of four-inch pipe, five on each side, are used; when sixty degrees are wanted, eight rows of pipe, four on each side; when fifty degrees are wanted, six rows of pipe; and when only thirty-five or forty degrees are wanted, four rows of pipe. This is for the latitude of New York City, where the temperature rarely falls lower than ten degrees below zero. Latitudes north or

south of New York should be graded accordingly. If estimated by glass surface, about one foot in length of four-inch pipe is necessary for every three and a half square feet of glass surface, when the temperature is at ten degrees below zero, to keep a temperature of fifty degrees in the green-house. A one and a quarter inch pipe when heated by steam does almost exactly the same amount of heating as a four-inch pipe heated by hot water.

Aster alpinus albus is probably the earliest species of this genus to bloom. The flowers are produced with the early summer, and, for this reason alone, the plant is worth cultivating, but the flowers are two inches in diameter, with bright yellow discs and double rows of white ray-petals. It has been written of this plant that, in comparison with the type, *A. alpinus albus*, it is poor and difficult to cultivate. With *A. alpinus* we have had no experience, having tried in vain to obtain the true plant. But here in the open border the white form thrives and increases rapidly, making bushy plants about six inches high, which, in early summer, produce numbers of pretty white flowers on stems just above the leaves.

Gillenia trifoliata has recently been noticed in GARDEN AND FOREST as a desirable border plant; and for cutting and decorative purposes there can be no more useful one, the flowers have such a light, graceful appearance, and blend so nicely with other flowers for in-door decoration. The genus *Gillenia* contains but two species, the other being *G. stipulacea*. To the casual observer this plant, when in flower, appears to be the same as *G. trifoliata*, but on close examination the specific difference is easily distinguished. *G. stipulacea*, as the name implies, has large and well-developed stipules, and commences to flower when *G. trifoliata* is about done blooming, and so makes a good succession. It is singular that, although indigenous to this state, *G. trifoliata* never produces seed with us under cultivation, while *G. stipulacea* every year seeds freely. The seeds, if sown as soon as ripe in a shady place, germinate the second year after sowing. This may seem a long time, but, taking into consideration the fact that this genus is included in the family of *Rosaceæ*, it is not difficult to comprehend.

Silene Pumilio is one of the very best of the tufted Catchflies, and is suitable alike for cultivation in the rock-garden or open border. This plant has dense tufts of bright green foliage, now almost hidden by the profusion of pretty rose-pink flowers, the inflated calyxes of which are of the same rosy hue as the flowers. *S. Pumilio* is a native of the Alps, and succeeds well in the open border without protection. The plant may be readily increased by division, but seeds are freely produced, and these, when sown as soon as ripe, germinate the following spring, and soon form strong plants.

O.

Notes from the Arnold Arboretum.

Celastrus scandens, the Climbing Bitter-Sweet or Roxbury Wax-work, as it is known in eastern New England, is now in flower. This plant should be so well known that even a bare mention of it would be superfluous. It is a common native species, climbing high over bushes and trees; and although the small white flowers are inconspicuous the foliage is good, and the orange and scarlet fruit is so showy and hangs so late in the autumn, that this is really one of the most desirable of hardy climbing plants. It is well suited to plant where it can display its brilliant fruit, either on trellises or in the wild garden, where it will stretch over rocks or among trees and other shrubs.

Two other species in the collection are worth notice. They are *C. articulata*, Thunb. (a misprint, no doubt, for *orbiculata*, as M. Maximowicz has pointed out, *Mel. Biol.*, xi. 200), a widely distributed Japanese species, with broadly obovate, crenately serrate, membranaceous leaves. They are three and a half to four inches long, contracted at the base into a stout petiole an inch and a half long, and usually terminated by a short, broad point. The flowers are small and green, in short axillary clusters, which are quite hidden by the ample foliage. The fruit is smaller than that of our American species, but it is very brilliantly colored, and, as it is produced here in the greatest profusion along the whole length of the spur-like lateral branches, it makes a great show after the leaves have fallen, remaining fresh and bright until nearly the end of winter. *C. articulata* is a hardy and vigorous plant, growing rampantly when once established in rich soil, and then sometimes producing stems twelve or fifteen feet long during a single season, and immense masses of foliage. It is a good plant for covering quickly

rocky slopes or walls, out-buildings and other structures. It has inhabited the Arboretum for several years, having been sent here from the Parsons' Nursery at Flushing. *Orixa Japonica*, No. 1,215 of the Kew Arboretum herbarium, is our plant.

It may be well to mention here that *Orixa Japonica* (often known as *Celastrus Orixa*) is perfectly hardy here. It is a tall shrub, already some six or eight feet high, with rather slender, spreading branches, and lustrous dark green, obovate leaves. The minute green flowers, which appeared a month ago, are produced in axillary clusters. The male plant, unfortunately, is the only one in the collection, so that fruit has not been produced here. The bruised foliage and the wood are pleasantly and pungently fragrant with the odor of our Spice-bush or Benzoin. This shrub is very generally used as a hedge-plant by the Japanese of the central island.

The second exotic *Celastrus* in the collection, now in flower, is one of the Himalaya species, in which the branches are covered with pale lenticular warts, and the flowers are borne in short terminal racemose cymes. The persistent style crowning the fruit points to *C. stylosa*, to which our plant probably belongs, although I am unable to verify this determination by a reference to an authentic specimen or to a figure. This plant was received from the *Arboretum Segrezianum* several years ago as *C. paniculata*, a tropical or subtropical Indian species, with pendulous panicles of flowers. Our plant, although perfectly hardy, is a less vigorous grower than either the North American or the Japanese species, not climbing here to a greater height than six or eight feet. The leaves, when fully grown, are four and a half inches long, elliptical or ovate-oblong; they are acute, crenately serrate, and borne on rather stout petioles an inch long. The pale green or nearly white flowers are produced in terminal racemose cymes, which, in fruit, are about three inches long. The fruit is orange, crowned with the style, and rather showy. This plant, if our determination is correct, is widely distributed through the Sikkin Himalaya, and in the Khasia Hills, ascending to an elevation of 6,000 feet above the sea level. It is the least desirable of the species in the collection as an ornamental plant.

A handsome Japanese arborescent *Euonymus* received from the Flushing Nurseries is now covered with flowers. M. Maximowicz, to whom specimens were submitted last year, pronounced it to be the Japanese form of the widely-distributed *E. Europæa*—his var. *Hamiltoniana*—which is found also from Cashmere through the Himalayas, Mongolia, northern China and Manchuria, and which has been described by botanists under a multitude of names. As it grows here it is a bushy tree six feet high, with a stout trunk covered with smooth gray bark, spreading branches, terete, or slightly angled bright green branchlets, and abundant foliage. The leaves are oblong, acuminate, serrate, two or three inches long, and deep dark green. The cymes of small greenish-white flowers are axillary and dichotomous, and these are followed by four-lobed, wingless, yellow capsules, which are not particularly showy. According to Brandis (*Forest Flora of India*), whose figure (*t. 16*) represents a form with much narrower leaves than those of our Japanese plant, this variety is common in the forests of the outer Himalaya ranges up to 8,500 feet, growing, under favorable circumstances into a tree thirty to thirty-five feet high, with a short, straight trunk four to five feet round. The wood, he says, is beautifully white, compact and close grained, and used for making spoons. The Japanese plant is so hardy, it grows with such vigor, its foliage is so abundant and of so rich a green, that it promises to be a good addition to the number of small, hardy trees which can be successfully cultivated in this climate.

Spiræa Cantonensis (*S. Reevesiana* of many gardens) is rarely seen in such great beauty in this climate as it has been this season. This plant suffers generally from cold, losing much of its wood, but this year the mild winter has been favorable to it, and both the single and the double-flowered varieties have bloomed in perfection. It is not only one of the very handsomest of all the *Spiræas* which produce their flowers in flat corymbs at the ends of short lateral branches of the year, being only surpassed in beauty of flowers, perhaps, by *S. Van Houttei*, but it has the additional merit of flowering considerably later than the other plants of its class. In climates less severe than that of New England, *Spiræa Cantonensis*, especially the single-flowered variety, is one of the most beautiful spring-flowering shrubs which can be planted in the garden.

Cotoneaster tomentosa is a hardy shrub of good habit, agreeable foliage and rather pretty flowers, which are followed by showy fruit, as is the case with nearly all the species of this

genus, which is not made enough of in our gardens. This species grows here to a height of two or three feet, with upright branches, covered with elliptical, obtuse leaves, densely covered on the lower surface with pale pubescence, as are the peduncles and calyxes of the small pink flowers. The fruit is black. This is a widely-distributed plant through the mountainous regions of central and southern Europe.

Cotoneaster laxiflora is a more showy plant than the last, growing to a height of four or five feet, with slender diverging branches covered with dark-brown lustrous bark. The leaves are oblong, obtuse, smooth on the upper, somewhat pubescent on the lower surface, as are the nodding, elongated racemes of pink flowers, to which succeed showy, scarlet berries. This is certainly one of the most showy and desirable of the perfectly hardy species of this genus in the collection. The origin and relationship of this plant are rather obscure. It is possibly a form only of *C. vulgaris*, and it may have been brought originally from Siberia. According to Loudon (Arboretum, ii., 871) it was first made known from plants raised in the garden of the Royal Horticultural Society at Chiswick, from seeds sent by Professor Jacquin in 1826. But whatever may be the origin and the native country of this plant, it well deserves a place in the garden.

Syringa villosa (see GARDEN AND FOREST, vol. i., pp. 222, 520 and f. 83) has, now that the plants are thoroughly established, and of large size, flowered here more abundantly than it ever has before. It is certainly an ornamental plant of the first-class and one of the most important introductions of late years among hardy shrubs. It has, moreover, the merit of flowering late, and long after the flowers of other Lilacs with long-tubed corollas, with the exception of those of *Syringa Josikaea*, now believed to be a variety of our plant, have faded. Two quite distinct varieties of *S. villosa* occur here. The first with narrower leaves and narrower panicles of lighter-colored flowers than the second, which is of more vigorous habit, and promises to grow into a much larger plant. This last, which was raised from seed sent from Pelkin by Dr. Bretschneider, flowers about ten days later than the first. It is worth noticing that the terminal bud, which is never developed in *S. vulgaris*, grows always in this species, generally producing a cluster of flowers, so that the branch may be terminated by three instead of by two panicles. The flowers of this species, unfortunately, have not an agreeable perfume, the slight odor which they emit resembling that of the flowers of the Privet, and therefore rather disagreeable.

Vaccinium erythrocarpon, one of the "Bearberries" of the southern Alleghanies, is beautifully in flower. This is a handsome plant, and botanically a most interesting one, serving, as it does, to connect the Cranberry and the ordinary forms of *Vaccinium*—that is, it has the foliage and fruit of the Blueberries and the flowers of *Oxycoccus*. It is a tall, rather slender, divergently-branching, graceful shrub, growing sometimes in the Carolina mountains to a height of eight or ten feet. The leaves are thin, oblong-lanceolate, finely serrate with bristle-tipped teeth. From the axils of the upper ones the scarlet or flesh-colored slender flowers hang from long nodding pedicels. The fruit, which before it is quite ripe, is scarlet (whence the inappropriate name), becomes at maturity deep shining black in color, and is then much more juicy than the fruit of any other species of *Vaccinium*. The flavor, however, is insipid, and the fruit is nowhere greatly esteemed except by bears, who, when it is ripe, resort to the high mountain-tops, where this plant often covers extensive areas, for the purpose of feasting upon it. *V. erythrocarpon* is not a very easy plant to manage in cultivation. Perhaps it is not quite hardy here, although it now seems well established and to promise well for the future.

It may be of interest to note that the plants of the white-fruited Huckleberry, described in GARDEN AND FOREST (vol. ii., p. 10) and sent to the Arboretum by Mr. B. A. Westbrook, of Montague, New Jersey, are now finely in flower and promise to produce a crop of fruit.

Rosa multiflora is certainly one of the most beautiful of the Japanese plants cultivated in our gardens, and it is a matter of surprise that the natural single form is so rarely seen and so little known. The origin, in a large part at least, of the so-called Polyantha Roses, none of its descendants compare in beauty with the plant which Thunberg first made known to science a century ago. This is a stout bush with long, robust stems, arching above the middle, growing to a height of eight or ten feet and forming a broad mass of pleasant green foliage, ten or twelve feet through. The stems are round, smooth, bright green and armed with remote, broad, recurved spines, and terminated by great compound racemes, twelve to fifteen inches long by eight or ten broad, of flowers the size of a shil-

ling, the pure white petals contrasting charmingly with the golden stamens. So abundant are the flowers that the plants at this season are completely hidden by them, and as all the flowers in each raceme do not open at once, but gradually, a couple of weeks often elapsing between the opening of the first and the last, the plants are in flower for a long time. There are two forms here. One of them flowers ten days before the other; this is a less robust plant than the other, with much smaller flowers, and generally a less desirable subject for cultivation. *Rosa multiflora* should be planted in rich soil, where it will not be crowded by other plants, and where it can have sufficient room to grow naturally and spread out its branches in all directions. It is not easy to imagine a more beautiful object than a well-established specimen, planted in this way, when it is in flower. The fruit, which is hardly larger than a pea, is produced in the greatest profusion, and is rather ornamental, remaining upon the plants until the appearance of the leaves the following spring.

The Arboretum is indebted to Max Leichtlin for this plant, who sent seeds here several years ago. It has been somewhat distributed from the Arboretum among American collections, but it is hardly known yet or properly appreciated. 7.

June 12.

The Forest.

Forest Interests in Pennsylvania.—II.

THE soil of a large proportion of the mountain region of Pennsylvania was originally of good quality, strong and fertile, as compared with most of the mountain land of the northern and eastern States, and it was well adapted to sustain a valuable and permanent forest-growth. Of course, if the mountain forest-land was properly treated it would become steadily richer, would continue to increase in fertility forever. It would thus not only produce more and more timber as time goes on, but the timber growing upon it would perpetually improve in quality also. That such is not now the case does not result from any poverty or incompleteness of the natural resources and adaptations of the region, but is the effect of human ignorance and mismanagement. Much of the land is now poorer than it has been for thousands of years before, and even if it could be well taken care of henceforth—of which there is, of course, no prospect—it could produce only inferior timber for ages to come.

The principal agent in the injury and destruction of the forests here is fire. Every year vast values are totally blotted out. Timber worth hundreds of thousands of dollars is consumed. But this loss is trivial compared with the mischief of the permanent impairment of the fertility of the soil, which results from burning the forests.

The most intelligent and observing men in all parts of the state say that a very large proportion of forest fires are purposely started. In some of the mountain counties the law permits cattle to run at large for pasturage, and owners of stock set the woods on fire to promote the growth of grass. The people who gather berries are also interested in having the forests burned frequently; and fires are convenient for hunters, because they maintain and extend areas of open woods. Large tracts of valuable timber are often set on fire by men who want the job of cutting it off, as they know that it must be utilized immediately after it is burned over, or it will be worthless. Some fires result from sparks thrown out by railway engines, but the people of Pennsylvania do not believe very much in the accidental origin of forest fires in their state.

The law which permits owners of cattle to pasture them on other peoples' land should be changed. Pasturage is, in itself, fatal to the perpetuity of forest conditions, and nothing effective can be done for the preservation of the woods while cattle are allowed to run at large in them. When this arrangement for forest-pasturage operates as an inducement to set the woods on fire it is idle and useless to talk of devising means for preserving the forests unless this premium on their destruction is abolished. It is comparatively easy to obtain almost any legislation that may be desired. A little systematic and intelligent agitation is all that is required for this object. It would, doubtless, be worth while and profitable for the people of the state to undertake the care of the mountain woods, if any plan for their preservation could be made effective. Differences in details, in organization and methods would be of slight importance if the essential object—the protection of the woods from fire—could be accomplished by any system of forest guardianship.

The maintenance of forest conditions on the mountains of the state is indispensable to the permanent prosperity of the people. The woods have most important and vital relations

to the steady and equable flow of the streams which have their sources in them. If the woods on the mountains become extinct the streams will be destructive torrents in the spring season, and their channels will be dusty and wind-swept in summer, so that, as now in the West, the course of a river can be traced from afar by the clouds of dust always rising from its bed in dry weather. The soil will be washed down from the mountains into the streams, the inert clay, sand and gravel will follow, and will bury the fertile lands near the foot-hills. The area of farm land will thus be diminished more and more, and the fertility and productiveness of what is still cultivated will steadily decline.

It is in every way probable that this is what will, in time, actually occur. If existing conditions and tendencies are continued—that is, if the mountain forests are still burned as now—the time will inevitably come when there will be no trees or verdure on the mountains of Pennsylvania, and no soil. Instead of the noble and satisfying sylvan beauty which is now the pride of the state, there will remain only the wrecks and skeletons of the mountain chains, unsightly mounds and ridges, eroded by the wind (which will fill the air of the low-land regions with dust), seamed and scarred by torrents, and rent by horrid gulfs and chasms; a blasted and ruined land, the result and monument of man's incapacity.

To prevent these consequences would require the consent and coöperation of conditions and agencies which do not now exist. The processes of forest destruction which are now in use belong to and represent exactly our present stage and degree of civilization. The perpetuation and rational treatment of forests would be a feature of a stage and degree of civilization which we have not attained. The question whether we can save our forests is really the question whether a distinct and specific advance in civilization is now possible for us, and whether it can be made in a very short time. Some of the indispensable changes, to be availing, must be provided for by prompt and decisive action. But this is precisely what is least likely to be done.

Let us use a little analysis, and try thus to distinguish the essential features and conditions of the problem. Prompt, decisive and intelligent action is required, but there is nobody to take such action. The central difficulty lies in the fact that the results of destroying mountain forests become apparent, so slowly, that men are not impressed by them, do not care, are not interested about them. We are not sufficiently intelligent or civilized to understand or realize the effect or ultimate results of existing conditions and tendencies.

The prompt and decisive action which the situation requires is the establishment of a system of preliminary educational work. No efficient or successful system of forest-management is possible with our present national character and degree of intelligence. We have not sufficient thought, foresight, patience, or organizing capacity. We need in each state a considerable number of persons possessed of a degree of acquaintance and familiarity with the subject of forestry, in all its principal aspects and relations, such as very few of our people have reached. If such a journal as GARDEN AND FOREST, with its thorough, coherent and continuous discussion of forestry subjects, could be read habitually for some years in every school and institution of learning in this state, and by ten or twenty thousand of its leading citizens, we might then have here such conditions of knowledge and thought as would constitute the soil and atmosphere needed to produce a better civilization, and a practical and effective system or method of forest preservation and management might then be evolved.

J. B. Harrison,

Snow Shoe, Pa., June 10th.

Cor. Sec. American Forestry Congress.

Correspondence.

The Purple Beech at Throgg's Neck.

To the Editor of GARDEN AND FOREST:

Sir.—In your article of May 8th upon "The Purple Beech" you mention two notable specimens of the variety—the great tree on the Lyman Estate, at Waltham, of which you give an illustration, and the tree spoken of by Downing as growing on Throgg's Neck, Westchester County, New York, and declared by him to be the finest in the United States. You add the remark that this tree, if still alive, is probably much larger than the one at Waltham.

Thinking that the record should be completed, I have made the necessary inquiries. It appears that the Westchester tree died about six years ago. It grew on what is known as the Van Schaick Place, which was in former years owned by Mr. Thomas Ash, and was a place of resort of the distinguished

guests of the old Astor House in the palmy days of Stetson. Hence the tree is mentioned, as I am informed, by Dickens in his American Notes.

Tradition has it that the tree was brought from England about one hundred years ago. It stood in an open field with no other tree near it, and was perfectly symmetrical in form, the lower limbs sweeping the ground and "spreading about thirty feet on each side." At one foot above the ground it measured four feet eight inches in diameter, and at a height of five feet, four feet three inches.

It would therefore appear to have been no larger than the Waltham tree in the trunk, and to have had a somewhat less spread of limbs. But the measurement of these old Beeches is a very uncertain matter, from the buttressed, gnarled and embossed nature of their trunks. It is sufficiently evident, however, that these two trees were of about the same age and of substantially the same size, the Westchester tree being of the finer form.

The cause of the death of the Westchester tree is said to have been an overdose of manure. I am sceptical on this point, chiefly for the reason that some years ago the Waltham tree also showed ominous signs of failing. It recovered, however, under a course of nutrition at once set on foot by the late G. W. Lyman, which has been continued by his successor. May it not rather have been that the symptoms in the Westchester tree were not soon enough observed? At all events all lovers of fine trees must mourn its untimely end. I may add that Dr. Asa Gray stated a few years ago that the Waltham tree was the largest he had ever seen, either in this country or in Europe.

Relleport, N. Y.

George Theo. Lyman.

Peter Henderson's Plant Factory.

To the Editor of GARDEN AND FOREST:

Sir.—No title which now occurs to me would so accurately characterize the great establishment on Jersey City Heights as the one I have used as the head-line to this letter. In money value the annual sales from some of the foremost European nurseries would largely exceed, no doubt, the amount realized from the plants annually sold by Mr. Henderson. But it is probably true that the plants raised and sold here, one year with another, exceed in number those produced at any nursery in the world. This means that Mr. Henderson's business is not mainly with rare and costly plants, and that he does not take the time to prepare finely-grown specimens. His plan is rather to produce saleable plants as quickly as possible, and to market them out of the way for another lot as soon as they can be sold. With some of the plants, like *Coleus*, which root most readily, a crop can be sold every four weeks from the first of January to the middle of June. Such rapid propagation is not possible with all plants, but Mr. Henderson would not consider that he was running his establishment up to its ordinary capacity if he did not secure at least three crops a year from his entire space under glass.

Here are fifteen acres, four acres of which are under glass, devoted to the raising of plants; but this space alone can hardly be considered a measure of the productive capacity of the establishment. Every square foot is worked under high pressure. No device for saving time or labor is neglected. Improved processes are being adopted continually. Mr. Henderson is as alert to-day as he was twenty-five years ago to grasp a new idea, and the men in closest contact with him catch something of this spirit, so that a genuine advance in different points of practice is made every year. Under the complete and well-directed organization of the concern everything moves with celerity, smoothness and regularity, like a perfect machine which turns out plants by the million at the minimum cost of production. Thus it comes about that although the volume of business increases largely from year to year, there are actually fewer men on the pay-rolls than there were fifteen years ago. It should be added that the wages paid the smaller number exceed in total amount what was formerly paid, for many of the men have become so expert in some particular kind of manipulation that their services are worth a great deal more.

"It looks like slaughter," said Mr. Henderson, "to sell plants at a dollar a hundred, but it is a fact that the actual cost to us of producing these plants is often no more than thirty cents a hundred. Here are the figures: Four men will take off, make and put in the bench 10,000 cuttings a day; two men and a boy, or say three men, will pot the same when rooted in another day; three men in a day will knock the plants out of the pots and pack them in boxes. That is, ten days' work has been all that was needed to get 10,000 plants ready for market.

If we call this labor worth \$15, we can add \$15 more as a good allowance to be charged against the plants for firing and delivery, so that \$30 is a liberal estimate for the cost of the 10,000 plants. The same could be proved of some plants raised from seed—such as Asters, Balsams, Drummond's Phlox, etc., so that even with expensive structures, on land where every building lot of 100 feet by twenty-five is worth \$1,000, there is no actual loss on certain plants even at the low price mentioned when they are sold in sufficient quantities."

Of course these results can only be achieved in a large way, where the system is perfect, the labor skilled, and every motion intelligently directed. No spade is used where a plow can work. The ten acres are plowed deeply, pulverized with an acme harrow and smoothed with a disk harrow, which does finer work than any steel rake. Upon these acres, where the plants will average one to every square foot, one man constantly at work with a wheel-hoe and one day's work a week with a horse furnishes all the cultivating needed, with a little hand-weeding in the rows. To do this work on the old-fashioned plan, with hoes, would cost five times as much, and it would not be done half as well. Of course improved processes are not confined to this establishment, and many of them were not used here even five years ago. But it is true not only that improved methods are adopted here as rapidly as they are discovered, but also that many items of practice, with which every plantsman in the country is now familiar, originated here. There is no question but that the system of packing which so reduced the weight of plants, while it added to their safety in carriage, was practically begun and perfected here. Occasionally, to this day, one receives a huge box of plants still in pots, or a package in which the plants are rattling about loose, or are smothered or drowned. But perfect packing is recent, and it began here, where the plants were first knocked out of pots, wrapped in paper and set snugly, so as to carry safely for a week. It is true also that many other practical suggestions, like the "saucer system" of propagating, the snapping quality of a good cutting, and even the necessity of "firming the soil," which many another man may have known as a part of his personal experience, were first brought publicly forth and insisted upon by Mr. Henderson in some of his publications, so that while improving his own work by observation, he has done as much as any of his contemporaries, both by precept and example, to scatter the fogs of tradition and introduce simpler, cheaper and more efficacious methods in horticultural practice.

Having spoken of Mr. Henderson's writings, it is worth stating that his "Gardening for Profit" was about the first book on vegetable-gardening which was literally written out of the soil, by a man who was working with practical purpose. The intense methods of cultivation which the necessities of tilling high-priced land developed were a revelation when described in a straightforward way by one who was simply making record of his daily practice and the reasons for it. It was a lesson which many a farmer never forgot, when he learned that the market-gardeners about New York found it paid them to use seventy-five and even a hundred tons of well-rotted manure on every acre of their land—found, indeed, that their business only paid when they used this amount every year. This book has been in print twenty years, 150,000 copies have been put in circulation, and it is selling yet. A book like this does good, but it also naturally advertises its author, and, in fact, the name of Peter Henderson is as familiar as that of any other in connection with American Horticulture. He believes in printer's ink, however, and of his large catalogue alone he circulates every year 200,000 copies, at an expense for postage alone of \$14,000.

I add a list of the number of some of the more important plants sold during the year, not so much to give an idea of the volume of business transacted as to put on record the comparative demand for these staple plants in this year of grace 1889. Roses led, with a sale of 400,000 plants. The sale of Tuberoses reached 300,000, but they were not grown here. Chrysanthemums, Verbenas, and Coleus were sold to the number of 200,000 each. Then follow Geraniums, 150,000, and Alternantheras, 100,000. Ipomœas of various kinds and Dahlias, double and single, sold to the number of 75,000 each, while of Pansies and Carnations, 50,000 each were produced. Ampelopsis in variety reached 25,000, while Cannas, Echeverias and white-leaved plants like Centaurias amounted to 20,000 each. Estimating together annuals from seed and varieties on the "general list" rather more than half a million were sold, besides those named above. 3,000,000 Celery-plants is the first item on the vegetable list, with 1,000,000 Cabbage-plants and 200,000 Cauliflowers, about 100,000 each of Tomatoes and

Lettuces, 20,000 Egg-plants and 15,000 Pepper plants. Asparagus roots numbered 300,000, but these, too, were grown elsewhere, while only 5,000 plants of Rhubarb were needed. Of Strawberry plants, mostly pot-grown, 300,000 were sold; of Grape-vines, 10,000, and of Blackberries, Raspberries and Currants together, 25,000 plants.

Jersey City.

S.

Exhibitions.

The Rose and Strawberry Show of the Massachusetts Horticultural Society.

THERE is little to be said of the Rose Show held in Boston last week. It is many years since so poor an exhibition of the Queen of Flowers has been seen at her annual festival. The season has been very unfavorable for the development of good Roses. Excessive heat and constant rains have made the flowers both early and small, and they have dropped almost as soon as they opened. It is not surprising that the exhibition, under the circumstances, was not a large or a fine one. It is rather a wonder that it was as good as it was. There were few plants, or flowers besides Roses displayed, and the halls looked bare and anything but attractive. John L. Gardner, the Short Hills Nurseries and E. W. Gilmore, made small displays of Orchids. The best plant in the first collection was a well-grown, clean little specimen of *Dendrochilum filiforme*, which received a first prize for the best single Orchid. The best plant in the Short Hills collection was a very well-flowered specimen of the handsome *Trichophila crispa* from Costa Rica. The first prize for a specimen plant was taken by Mr. Gardner, with a good plant of *Gymnogramma schizophylla*, a lovely Jamaica Fern, comparatively new to cultivation, having been introduced into England as late as 1880.

Edwin Shepard & Son staged a remarkably fine collection of Delphiniums; and there were some interesting and attractive collections of wild flowers, brought from the woods and meadows by Mrs. P. D. Richards and Mr. E. H. Hitchings. The custom of exhibiting collections of wild flowers, which has grown to be a feature of all the summer shows of the Massachusetts Society, is one of the most instructive and useful things fostered by it, and has done much to make the local flora known, and its beauty appreciated.

The great collections of well-grown and tastefully arranged plants which a few years ago were always seen at the principal Boston flower-shows, and which made them the most interesting and instructive held in America, were sadly missed, as they have been of late years. The halls of this Society are not well suited for such displays, and the owners of the great gardens near Boston are tired, perhaps, of having their plants injured without any adequate return for their pains. But whatever the cause of the falling off in the number and variety of exhibits may be, the public are not the only losers, as horticultural enterprise and enthusiasm must suffer for want of healthy stimulus and friendly competition.

The first special Lyman prize for Roses was not awarded; the second went to William H. Spooner, and the third to Warren Heustis & Son. For twelve distinct-named varieties of Roses, three of a kind, Mrs. Francis B. Hayes took the first prize; W. H. Spooner the second, and Warren Heustis & Son the third. Other prizes were taken by Joseph A. White, Dr. C. G. Weld, J. B. Moore & Son and Joseph Clark.

Larger or more beautifully-colored Strawberries have not been seen in Boston. Sharpless and Belmont appear to be the favorites with Massachusetts exhibitors; and these berries were shown in great perfection. For the best two quarts, to be judged by a scale of points, the first prize was taken by Prince of Berries, shown by Thomas C. Thurlow; the second by Belmont, shown by Warren Heustis & Son, the raisers of this variety; the third for the same, shown by Isaac E. Coburn, and the fourth by Miner's Prolific, shown by Samuel Barnard. The Society's silver medal was given to Stephen Hoyt & Son, of New Canaan, Connecticut, for Yale—the "best exhibition of a seedling Strawberry introduced within the last five years, and never having taken a prize." Parry, May King, Jessie and Jucunda were shown in good condition.

Recent Plant Portraits.

LUCULA GRATISSIMA, *Bulletina dela R. Soc. Toscana di Orticultura*, April.

ÆRIDES EXPANSUM LEONLÆ, *Gartenflora*, April 15th.

PICEA ALCOCKIANA and P. AJANENSIS, *Gartenflora*, April 15th.

FORSYTHIA VIRIDISSIMA and F. SUSPENS (figures of the fruit), *Revue Horticole*, April 16th.

Notes.

The Veitch Memorial Medal, a much-coveted honor in England among gardeners, has just been bestowed upon Mr. A. F. Barron, the well-known superintendent of the Royal Horticultural Society's garden at Chiswick. In his special branch, pomology, Mr. Barron has no superior, and his latest book, "Vines and Vine Culture," in a measure supersedes all English books on the subject.

A correspondent of a foreign journal notes that in the Jardin des Plantes, in Paris, may be seen two or three old Chinese Peach-trees which, as a rule, bear double white flowers; but among these are some flowers of a rich, deep crimson, wholly free from white markings. From a long distance, he says, these crimson flowers are conspicuous, especially when a single one appears, like a brilliant little rosette, on a twig otherwise entirely white.

In reply to Mr. Orpet's enquiry whether any one has tested the hardiness of *Heuchera sanguinea*, Mr. J. N. Gerard writes that he tried several young plants last winter in his garden, at Elizabeth, New Jersey, and all perished. It is perfectly hardy in England, and the horticultural papers there all speak of its abundant bloom this year. Mr. C. G. Pringle notes the fact (GARDEN & FOREST, i., 153) that along the northern limit of its distribution this plant is exposed to many degrees of frost.

According to an ancient superstition the Beech is never struck by lightning; and so general has been this belief that a gentleman recently thought it worth while to write to an English journal that he had been told of a lightning-shattered Beech in Ireland. Beliefs of this sort are rarely without some degree of justification in fact, and it would be interesting to know whether in this country the Beech has been observed to possess any greater immunity from electrical dangers than trees of other sorts.

A recent number of *Le Jardin*, a French horticultural paper, contained some curious pictures of large human figures, rudely carved out of Tree-fern stems by the natives of the New Hebrides. They are similar in type to the grotesque colossal figures carved in stone by the Easter Islanders, which have long been familiar to all students of barbaric art. In the museum connected with the Messrs. Veitch's great horticultural establishment in Chelsea there have been for some years past a series of vases carved from Tree-fern stems; but figures in the same material are a greater novelty.

Recent trade-reports explain that the cultivation of Tobacco has been largely introduced of late years in Borneo, and that large profits are already realized from a special kind that is known as "wrap" Tobacco, and is used for the external coverings of cigars. The production of this article in the East Indies has hitherto been entirely in the hands of the Dutch; but as it is so profitable that dividends of 100 per cent. have not been uncommon, while one company has paid as much as 152 per cent., it is not strange that English colonists should now have taken it up.

An International Horticultural Congress will be held on the 19th, 20th and 21st of August in connection with the Paris Exhibition. The main subjects which will be discussed are the following: 1. Is it possible to obtain, designedly, by artificial fertilization, certain wished-for characteristics in plants cultivated for market purposes, or in floriculture generally? 2. Is it needful, in order to obtain flowers with striped corollas, that flowers with white corollas should first be obtained? 3. Consideration of rates on railroads. 4. Revision of the Phylloxera Convention of Berne. 5. The use of chemical manures in horticulture. 6. Methods to destroy the enemies of cultivated plants (fungi, insects, etc.).

The *Gardeners' Chronicle* says that the Ginkgo is proving itself one of the best trees for street-planting in smoky cities, thriving in the most impure atmospheres and having as yet been attacked by no insect or fungus disease. In this country, so far as we have learned, no extensive use has been made of the Ginkgo as a street tree except in Washington, where of course it is not subjected to the test of an atmosphere impregnated with smoke. If it is, indeed, able to withstand the most unfavorable conditions it might be more generally adopted for it grows rapidly, its shape well adapts it for association with architectural forms, and the peculiar character of its foliage always makes it interesting to the popular eye.

The true eating Banana, or "Madura" is said to be unknown in northern countries, the varieties we import being simply those which are used in the land of their growth for cooking purposes. Many varieties of the Madura are recogni-

zed, each of which is distinct in flavor; the smaller are the more delicious and the smallest of all, the so-called "Lady-finger Banana" with a skin hardly thicker than paper, is the most highly prized. Green cooking-bananas are peeled and roasted in the ashes and eaten with butter; partially ripe ones are boiled for a few minutes with the skin on and eaten with syrup or honey; and ripe ones are sliced lengthwise and fried in Olive-oil or butter.

Mr. J. M. White, who owns a Peach-orchard of several hundred trees near New Brunswick, New Jersey, reported last week to the experiment station that one of his trees was badly diseased. Professor B. D. Halsted visited the orchard and found the sick tree readily distinguishable from its healthy neighbors. There were three main branches to the top, and the smallest of them had nearly every leaf badly distorted by "leaf-curl" (*exoascus deformans*). The whole branch was, of course, cut away and the leaves disposed of, leaving the remainder of the foliage of the tree in apparent health. After prolonged search no other tree was found in the whole orchard with a single leaf exhibiting any signs of disease. This is certainly a striking instance of an isolated case of a conspicuous and widespread fungus disease, and it naturally suggests the unanswered question how the "curl" first obtained a foothold in the orchard.

The gold medal of the Linnean Society of London has been awarded this year to M. Alphonse De Candolle, of Geneva, in recognition of his important services to botany. This medal, having on the obverse a portrait bust of Linnæus, and on the reverse the arms of the Society, was established last year to commemorate the centennial anniversary of the founding of the Society, and is to be bestowed alternately upon a botanist and a zoölogist for distinguished service to biological science, although Sir Richard Owen and Sir Joseph Hooker both received it the first year. An interesting feature of the ceremony the other day was the presence of a young grandson of De Candolle to receive the gift made to the grandfather—a future botanist, it is to be hoped, and the worthy successor in the direct line of distinguished men who for a century have made the name of De Candolle illustrious by their lives and by their service in increasing the knowledge of plants.

According to a correspondent of the New York *Evening Post*, 3,200,000 bushels of Peanuts are consumed in this country every year. They come chiefly from Virginia and North Carolina, although Tennessee also produces a small crop. "Peanuts are planted at corn-planting time; each kernel produces a running vine, like crab grass, and each root produces about twenty pods. When ripe, the plough is run through the loamy soil, on a dry day, just before frost. The nuts are dried and shocked up like corn to keep dry before housing. When marketed, they go to a cleaner, where they are put through steam-power machines and polished, after which they are graded according to size and variety. This year there is but two-thirds of a crop, and they are higher in price than since 1884. The crop begins to come into the market about the first of September. The Virginia nut is the largest and finest. The Wilmington is a smaller sort, and the Spanish nut, a still smaller variety, is one whose kernels peel perfectly clean, thus making it valuable for confectionery."

It will be new to some Americans, even though they know that Peaches are commonly cultivated under glass in England, to be told that Cherries are also grown in this manner. A correspondent of the *Gardeners' Chronicle* recently described the Cherry-house at Gunnersbury Park, where many different varieties afford fruit at different times during the season. "When the trees are started into growth," he says, "a temperature of 45° by day and 40° by night is maintained. When they are in flower plenty of air is given, and the bees are encouraged to work among the blossoms as much as possible. Scarcely any fire-heat is employed; indeed it had been employed only once or twice in order to keep out frost. At the time of flowering plenty of ventilation is given top and bottom. As soon as the fruit has set, the house is closed up somewhat, and the temperature kept quite cool until the stoning process is over, then it is kept a little closer, as when the fruit has stoned it ripens quickly. It is a little difficult to thin out the fruit previous to the stoning stage, as it is uncertain which fruit will mature and which fall. A good watering is given to the trees before they get into flower, and then water is applied with moderation until the fruit has set. Cherries appear to do best, and set their fruit more freely when somewhat dry at the roots, whether the trees are planted out or in pots, and it appears to be quite certain that all flower more freely when worked on the Mahaleb than when on the Cherry stock."

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Mountain Reservoirs and Irrigation.

THERE are few subjects connected with the development of American civilization of more fascinating interest than that of irrigation. During all our early history it was "Something to read about," a feature of the life of far lands, oriental and romantic in all its suggestions and associations. There is, of course, plenty of hard and prosaic work in agriculture by irrigation, but there is also much that appeals strongly to the poetic and artistic imagination. The construction of canals and ditches, dams and reservoirs requires downright, immitigable toil. Not many kinds of labor are more severe or exhausting. But there are few spectacles ever beheld by man which are more impressive, or better fitted to awaken "vital feelings of delight," than the transformation, by means of irrigation, of an arid and barren waste into a fruitful and populous land. As the life-giving water invades, conquers and possesses the country its progress is like the march of a triumphant and liberating army, but there is no death or suffering or destruction in the gentle and pervading flow. It brings verdure, beauty and fruitfulness everywhere, and makes the desert to rejoice and blossom as the rose. Not many things of which men are capable come nearer the exercise of original creative power than the magical awakening of fertility where all had been inert and lifeless before, by the introduction of water into regions which had before been destitute of it.

We have great areas of arid land in the south-western part of this continent which can be made extremely productive, and capable of sustaining a dense population, by means of irrigation. The soil has all the elements of great fertility except water, and this can be artificially introduced and applied in great abundance. The rivers which have their sources in the mountain forests, which now belong to the nation, will supply water for the irrigation of vast tracts of arid land, if the water is properly husbanded, and its flow regulated by maintaining the mountain forests which now constitute the natural reservoirs for the storage of the water which sustains these rivers with equable flow through the whole year. If the

forests are removed in such a way that they are not reproduced, that is, if forest-conditions on these mountains are permanently destroyed, the great sponge which now covers them everywhere, composed of root-fibres, leaf-mould and decaying vegetable matter, will be destroyed and washed away. Then the water of the winter rains and snows will rush unobstructed down the smooth slopes, and so much of it will reach the channels of the streams in a short time that enormous floods will be immediately produced. The valleys will be ruinously inundated, and the fertile lands along the streams will be buried under the débris brought down from the hills. The experiment has been tried again and again in many parts of the world, and always with the same consequences. The extinction of the mountain forests results in the destruction of the mountains themselves, and in that of the streams which have their sources in them.

All this is well known to those who have studied these subjects, and the facts are easily accessible to any who wish to look for them. But as the work of arousing, enlightening and directing public sentiment so as to provide for the preservation of the mountain forests on our public lands is one of difficulty, some people propose that we shall avoid all this labor by surrendering the forests to extinction, and adopting the comforting notion, that as it is so hard to save them they are not really necessary. It is also to be observed that the splendor of the achievements of inventive and mechanical genius during our own time, seems to justify the most daring and audacious expectations for the future, and it is not wonderful that men should imagine that nature imposes no limitations which may not be removed or overcome. Some influential engineers in this country think so highly of their profession and its work that they even propose to disregard and reject the natural provision for guarding the sources and flow of rivers, and to substitute for the mountain forests, which are the natural storage reservoirs, a system of artificial storage reservoirs constructed with walls, dams, and embankments.

If this method is ever tried it will result in frequent and ruinous catastrophes. The recent awful tragedy at Johnstown, exhibits the inevitable consequence of all attempts to restrain and control a body and volume of water too great for the capabilities of an artificial structure. If the attempt is made to substitute the use of artificial storage reservoirs for the natural function of the mountain forests of California, and other similar regions, it will be found that either the dams and embankments must be constructed with sluice-ways so large as to permit the free passage and escape of the excessive volume of water in the time of great floods, in which case, the reservoirs would be nearly useless, and it would not be worth while to construct them, or, if the plan which is now talked about is carried out, in the construction of reservoirs large enough, really to store and preserve the water of the spring floods, for gradual distribution and use in time of drought, the breaking of such embankments is inevitable, and the valley below each reservoir will be fated to sudden desolation, with awful destruction of human life if there are people living in it. Why should we pay so dearly for the knowledge which we shall thus acquire? Why not accept now the lessons which time is sure to teach us? The advocates of the destruction of the mountain forests, and of the substitution of artificial storage-reservoirs, admit that such catastrophes will result, as fatalities now attend the running of railway trains. In the question of the preservation or destruction of the mountain forests on the lands belonging to the nation are involved the conditions of the life and welfare of millions of human beings.

Artificial storage-reservoirs will of course be necessary in some regions, as part of the provision for adequate and economical irrigation, and if they are properly designed and constructed they can be made successful while forest-conditions are maintained on the mountains and around the sources of the streams. But if the forests are destroyed no artificial structure will restrain the resulting floods.

THE will of the late Professor Reichenbach is a remarkable one, and his object in imposing the conditions which evidently appeared necessary to him in disposing of his invaluable collections are not very apparent, although a mistrust of the men into whose hands his cherished specimens would have fallen had they been made available for immediate use, was probably at the bottom of his determination to keep them sealed up for a quarter of a century. The following translation of a portion of the will, which we borrow from the *Gardeners' Chronicle*, tells the story of the Professor's desires, whatever may be the ultimate disposal of the collection:

"My herbarium and my botanical library, my instruments, collection of seeds, etc., accrue to the Imperial Hof Museum in Vienna, under the condition that the preserved Orchids and drawings of Orchids shall not be exhibited before twenty-five years from the date of my death have elapsed. Until this time my collections shall be preserved in sealed cases. In the event of the Vienna Institute declining to observe these conditions, the collection falls under the same conditions to the Botanical Garden at Upsala. Should the last-mentioned Institute decline the legacy, then to the Grayean Herbarium in Harvard University, Cambridge, Massachusetts. If declined by that Institute, then to the Jardin des Plantes at Paris, but always under the same conditions, namely, of being sealed up for twenty-five years, in order that the inevitable destruction of the costly collection, resulting from the present craze for Orchids, may be avoided."

It is certainly to be regretted that Cambridge was not selected as the first recipient. In no other country are the facilities for studying Orchids now so limited as they are in America, and there is no other—if it is fair to judge by the progress which has lately been made in the collection and cultivation of these plants here—in which a knowledge of Orchids will be so necessary or where the students of these plants could make a better use of the mass of material which Professor Reichenbach has left.

Since the above was written we learn that the authorities of the Imperial Hof Museum have accepted the bequest of Professor Reichenbach's botanical treasures, subject to the conditions imposed in the will, so that there remains no longer even the remote chance that they will find their way to this country.

A Mountain Meadow.

MOUNT Rainier, which rises to a height of 14,444 feet from the shores of Puget Sound, is the most beautiful of the mountains of the United States, as it is the most difficult to ascend, only two or three parties, previous to last summer, having succeeded in reaching the twin craters which occupy the summit. In August last, however, a party of nine men, including Mr. John Muir, the well-known student of the Cordilleran glaciers, gained the summit, and were fortunate in obtaining a large number of photographs of the mountain, and of various aspects of vegetation encountered during the journey. Among these photographs is the one that is reproduced upon page 319 of this issue. It represents an alpine meadow covered with flowers of *Erigeron salsuginosus*. We are indebted to Mr. Charles V. Piper, of Seattle, one of the party who made this memorable ascent, for the photograph, and for the following brief note, which he has promised to supplement later with a fuller and more detailed account of the flora of Mount Rainier.

"This particular meadow on which we encamped lies between glaciers of the Nisqually and Cowlitz rivers, on the south side of the mountain. It covers, probably, four square miles, and ranges in altitude from 5,000 to 7,000 feet. The meadow on the east side of the mountain, between the Cowlitz and Natchess glaciers, is about the same size and differs but little in vegetation. The other meadows on the main mountain are much smaller and, with one exception, difficult of access. The meadows on the summits of the surrounding lower mountains are quite extensive, however. The timber on the meadows is confined mainly to the crests of the ridges running up the mountain, and consists of *Abies subalpina*, *Tsuga Pattoniana*, *Chamaecyparis Nutkaensis*, and a few *Pinus monticola*.

Erigeron salsuginosus grows on the drier ground near the timber, together with the following equally abundant plants: *Orthocarpus pilosus*, *Lupinus*, sp., *Anemone occidentalis*, *Potentilla gelida*, *Valeriana*, sp., *Polygonum Bistorta* and *Veratrum viride*."

Erigeron salsuginosus is widely distributed from Kotzebue Sound and Unalaska, and along the high mountains as far south as California, Utah and New Mexico. It was first discovered by Dr. Richardson, of the Franklin Search Expedition, on the salt plains of the Athabasca. It is a handsome plant, with stout stems twelve to twenty inches high, and solitary or a few corymbosely-disposed flowers, with broad disks, and fifty to seventy purple or violet rays half an inch or more long. There is an early figure under *Aster salsuginosus* in the *Botanical Magazine*, t. 2, 942.

Testing and Introducing New Fruits.

THE following is the substance of a paper prepared by Mr. C. L. Watrous, of Iowa, for the meeting of the American Pomological Society at Ocala, Florida.

This subject has claimed much interest of late and is yearly assuming greater importance. The wonderful development of the means of communication and of transportation has brought the most distant lands nearer to us, practically, than were adjoining states a half century ago, while the growing cheapness of printers' ink has made it easier to spread the fame of a new fruit thousands of miles across land and sea than it was only a few years ago to properly advertise one in the next county.

Again, vast regions of our country with conditions like none hitherto known, have been settled by an eager, prosperous, enterprising race, determined to have the best and willing to pay for it. Furthermore, the universal custom of propagating all fruits by budding, grafting, layering, and the like—that is, by extending the life of the individual, to the exclusion of the method of sexual reproduction by the creative effort of two life germs from different individuals—has practically deprived us of all benefits from the use of the natural method of adapting fruits to new or changing conditions by seedling production, selection and the survival of the fittest.

No distance across sea or land has been too great for transportation. Neither has it been conceded that any change of latitude or of longitude present reasonable grounds for distrust of new comers.

A single glance at some laws of climatology involved in such work is all that time permits, but this glance will open vistas into the domain of Nature that no pomologist's life will be long enough to explore. It will be evident, at first thought, that all maritime regions must have many similar conditions, from the presence of the ever-changing, but also the ever-steadfast, sea. A certain degree of moisture and of warmth must always pervade the atmosphere near unfrozen water. It further appears that the western shores of all continents have softer climates than any other regions and are similar to each other; also, that the eastern continental shores bear a like climatic resemblance to each other, although less mild than either western shore; and, finally, that the eastern and western coasts of the same continent are extremely dissimilar.

The interiors of continents, besides differing greatly from any maritime regions, also differ profoundly from each other, each subject to comparatively sudden and violent changes, and each, of course, subject to laws and conditions peculiar to itself. The eastern continent is, in its northern part, a vast plain, open to all ocean influence from the west, extending, without any considerable barrier, from the most westerly cape of France to the most easterly sand-spit of China, more than 6,000 miles. On the western Continent, on the contrary, all long vistas are in northerly to southerly directions. There are narrow maritime belts on the east and on the west, soon interrupted by the Appalachian range near the eastern coast, and by many ranges on the west, including the Coast range, the Cascades, the Sierras and the lofty Rockies.

The broad interior region of this continent, known as the Mississippi region, swept by fierce winds north and south and subject to extreme electrical disturbances, is quite unlike either coast region, and also quite unlike any other known inland region of the earth. In this inland prairie region, not only do fruits and plants, natives of California or of Europe, generally fail, but also those from our Atlantic States as well. It was supposed that fruits from Russia formed an exception to the rule, but, with more extended experience, failures have multiplied and doubts gained force. At present there is not a

single variety of any fruit, great or small, of known Russian origin that has given good promise of permanent usefulness in any western state. Trials are still carried on, but with greatly moderated hopes.

It has been shown by Dr. Gray and others that the principal forms of plants of the northern hemisphere once flourished together in the region about the north pole, that thence they were driven southwards along the lines of least resistance by glacial cold; returning northwards with returning warmth and repeating these migrations till we now find regions of vegetation almost as distinctly marked as geographical boundaries on the map. Seedlings of conifers growing on the eastern slopes of the Rocky Mountains will flourish in the interior or Mississippi region, while seeds of the same species from the western slopes of the same mountains fail to produce seedlings able to live there, yet plants from the western seeds give full satisfaction in Europe, and to some degree, though a lesser one, in our Atlantic region.

A late horticultural report in Iowa showed in a certain county a Pear-orchard of 350 trees of over fifty varieties, not a tree of which had been destroyed by the late extreme seasons there, while in the second county, distant not more than fifty miles, Pears were not mentioned, and scarcely any varieties of Apples had escaped. The late geological survey of Indiana develops in that state at least seven distinct botanical regions marked by specific differences in the characteristic native plants.

In the cold and marshy north are found the plants that characterize the vegetation all the way up to Hudson's Bay, while in the south-west are those that dot the slopes and bottoms down to the Gulf. Nay more, sometimes on opposite sides of the same ravine, in a certain hilly region, may be found the uttermost outlying pickets of the opposing floral hosts.

The same laws hold in every region. In the new Stanford Arboretum, near San Francisco, subject to the unchanging Pacific, the trees of South America and of Siberia; of our Atlantic States and of Japan; of western Europe and of China, vie with each other in luxuriant growth along with those of Alaska, of Dakota and of Mexico—so writes Mr. Douglas, the Director.

The contrary exists in the upper Mississippi region, where trees of the native forests are sometimes injured by extreme seasons, and all strangers may well beware. Thus it appears that one must study his own condition to judge the limit of his reasonable faith in new fruits.

Experience has lately shown that trees from an extremely severe climate or from the far north are not, therefore, to be presumed well adapted and hardy in a climate much warmer. Partial unlikeness of environment—that is, unlikeness of some of the surrounding conditions, though neither great nor obvious, may quite easily be sufficient for utter disappointment. The wound of poor Mercutio was "not so deep as a well nor so wide as a church-door," but it was enough. Very short distances and slight changes in elevation are often sufficient to cause failure in new fruits. Moreover, it is found by trial that fruits and plants transported so far from their native habitats may thrive very well while young, but fail miserably in middle age or after producing fruit. Therefore it is found that no one can safely commend a new fruit for general cultivation in any region until it has been well tested there under all usual conditions, nor until thorough trial for a period at least equal to the usual life of an individual of that species.

Both these safe and conservative rules are persistently violated by introducers of foreign fruits—where such violations are most dangerous of all—as well as by those lightning operators who propagate, advertise and introduce their prodigies all in one and the same season, leaving the testing and the groaning to be done at leisure by the purchaser and planter.

There seems abundant reason to believe that every botanical region must be willing to undertake the task of originating, from seed and by selection, the bulk of its fruits, if success be expected. This is because health, vigor and adaptability of tree or plant can seldom be perfectly secured except by nature's process of creation and survival. It follows also that the purchaser of new fruits should inquire carefully as to the conditions of soil and climate characterizing the birth-place of the tree or plant offered for his money, because, if at its very best under one set of conditions it cannot possibly be also at its best under very different ones.

It is not sufficiently appreciated that plants are indicators of such extreme delicacy of climatic and soil differences that the finest instruments of men are clumsy beside them.

Is it too much to say in the light of experience that no region can reasonably hope for as good results from the plants of any other region on earth as from selected individuals from abundant seedlings produced in that very region

and subject to all its peculiarities. It seems to me that the proposition needs no argument, but that an attitude of distrust and caution towards all fruits of distant origin is the duty of every planter.

Upon every fruit-grower is equally laid another duty; that of annually planting some seeds from his best fruits, that the course of nature be kept clear for the perpetuation of a race of successful fruits, for the changed times and changing conditions in which his posterity must exist.

Foreign Correspondence.

London Letter.

I DO not remember to have seen the London parks and gardens with such a poor show of flowering shrubs as they have this season, and the same complaint comes from all parts of the country. This result is attributed to the last wretched summer, when the tree and shrub-growth was too luxuriant to form flower-buds. Notwithstanding the dearth of shrub-bloom, the public parks here are just now delightful; the glass-houses have given out their millions of bedding-plants to adorn the lawns. Ever since March the public gardens have glowed with their parterres of gorgeous bulbs, and the late Tulips are only just past. I agree with your remarks in a recent page of GARDEN AND FOREST, that Tulip-planting is an expensive luxury, considering how short their flower season is. But we are trying to reduce the expense here, for not a few bulb-growers are of the opinion that as fine bulbs can be grown in England as in Holland, and if in gardens where bulbs are planted extensively they can be grown to perfection, they must be cheaper than imported bulbs.

The Royal Horticultural Society has lately had a busy time, and it really seems that the old Society is becoming re-invigorated. No stranger who saw the magnificent exhibition the Society held a few days ago in the Temple Gardens (which is almost in the heart of the city of London) would have supposed that this show was organized by a Society which a few months ago was considered in a hopeless condition. Nowhere in the world could such a display be seen, especially of Orchids, which were contributed from the richest collections. Among amateurs I need only mention the names of Baron Schroeder and Sir Trevor Lawrence, while the trade was worthily represented by Messrs. Sander, Low and others. Such Orchids as *Odontoglossum Alexandra* were displayed by the thousand in one mass of graceful bloom. Then there were hosts of Cattleyas, Lælias, Cypripediums and all the popular genera of Orchids, besides numerous varieties that could only come from the Schroeder and Lawrence collections. In the presence of these banks of Orchids, glowing with splendid colors and most graceful in form, one is hardly surprised that the world of flower-lovers worship Orchids, at any rate, for the moment. But this comprehensive exhibition represented other classes of plants grown to perfection. There were pot Roses six or eight feet across from the Cheshunt Nurseries, similar to those that grand old florist of the past, Charles Turner, showed year after year at Regent's Park.

These fine examples of cultural skill did not excite the admiration of the crowd so much as the group of huge pot-specimen Clematises shown by the Worcester nurseries. These plants were balloon-trained, ranging about six feet high and some three or four feet through, and were masses of flowers, some of which were quite a foot across. These varieties were all of the Lanuginosa or early-flowering section, and comprised in their colors all shades of purple and mauve, besides snow-white. I need not give the names, as they are the standard sorts to be found in good Clematis lists. Since Jackmann, of Woking, ceased showing Clematis nothing has been seen in London to compare with these. There are no better climbers for the green-house at this season than these large-flowered Clematis, and they continue to bloom until the smaller-flowered *C. Jackmanni*, in its endless varieties, come in flower next month. For the lovers of hardy plants there was abundant entertainment in this show, for Ware, of Tottenham; Paret, of Cheshunt, and others put out their full strength, and showed us what a show border-plants can make when potted and grown specially for exhibition. Pæonies of the Albiflora, and other herbaceous species; Poppies, Pyrethrum, Pansies and a whole host of other things which at this season make open-air gardens so gay, made the flowerless lawns at the Temple gay in a few hours. Pot-culture of hardy plants has not been much practiced, but there is a great deal in it, and it is only from experience that we can tell which are most suitable for the purpose.

Hardy shrubs were represented by Mr. Anthony Waterer,

who contributed from his Knap Hill nurseries a bright group of new hardy Azaleas, all highly-bred seedlings, which are very different from the old sorts of Ghent Azaleas. But I must give you a special note about this most important race of new Azaleas. Messrs. Veitch showed a good many interesting things in the way of shrubs in bloom, but there was nothing that calls for notice here except the Japanese Maples, which are fast becoming so popular for green-house adornment. They are hardy in a good many places in England, but they must, on the whole, be termed half-hardy shrubs. The most attractive green-house flowers here were the Begonias, single and double, from Messrs. Laing and Messrs. Cannell, two firms who have done most to improve and popularize Begonias. Some say that they are getting the blooms too big. This may be so from an artistic standpoint, but ask the amateur, who is forever striving to produce the biggest Begonia-bloom as he is the biggest Gooseberry. Messrs. Cannell claim to have beaten the record with their flowers six inches across, looking more like double Hollyhocks than Begonias. The market-men, too, were in evidence at this grand show, and none more worthily represented this section of gardeners than Mr. May, who is chiefly a Fern-grower, and has raised so many of the beautiful new varieties. He carpeted a large area of the turf with his Ferny growth, which in every instance was the perfection of cultural skill.

W. Goldring.

New or Little Known Plants.

Spiræa Van Houttei.

THIS is by far the handsomest of all those *Spiræas* which produce their flowers from the extremities of short leafy branches of the year, and one of the very handsomest and most desirable of all hardy flowering garden-shrubs. According to a writer in the *Revue Horticole* (1866, p. 269), it was raised by a French nurseryman, Monsieur Billiard, of Fontenay-aux-Roses, from seed of *Spiræa aquilegifolia*, a form of *S. trilobata* with which we are unacquainted. Its relationship with the Siberian *S. trilobata* is evident; it is, however, a much more free-growing plant, attaining in good soil a height of six or eight feet, and forming, with its spreading and gracefully arching branches, a wide bush as much through. The foliage is somewhat paler, especially on the upper surface, than that of *S. trilobata*, the flower heads are broader and much flatter, while the individual flowers differ from those of the Siberian plant in their larger size and in their color, which is pure, clear white, while those of the parent plant are greenish white.

Cultural Department.

Cultivation of the Pecan.

THE Pecan is cultivated quite extensively now in the southern States, and it may be found growing on river-banks from Indiana to Texas. Although the tree is well known for its delicious nuts, which constitute an article of considerable commerce, it has not been cultivated systematically for profit until recently, except in a few localities in Texas and Mexico.

The tree is a species of Hickory (*Carya*), and grows tall and slender, with a very hard wood. In early days it was held in high estimation in the south on account of its beauty, and many an old plantation is now marked out by a fine growth of these trees. When the trees are confined in the forests they shoot up fifty or sixty feet without branches, but when standing alone they attain a height of from sixty to ninety feet, with straight, symmetrical trunks, and expand into well balanced, ample heads of bold, handsome, pinnated foliage.

The Pecan-nuts which come from the southern States are from an inch to an inch and a half long, smooth, cylindrical, pointed at the heads, and thin-shelled, with the kernels full of delicately-flavored meat. The demand for them in this country and in Europe far exceeds the supply, and owners of land in the south bordering on river-bottoms would do well to plant it with the thin-shelled variety of Pecan. This is being done now more or less in many of the states, and plantations or groves of Pecans are annually set out. It is an important question, not yet satisfactorily decided, whether they will not pay much better than either Oranges or Lemons. In Florida there are many acres of low, rich hummock-land, aptly called here

"flat-woods," which cannot be put to any profitable use until it has been thoroughly drained. Such drainage, owing to the nature of the soil, is an expensive undertaking, and it is doubtful if, in the end, the land would prove thoroughly dry during rainy seasons. But these "flat-woods" would make fine places for Pecan-groves. The trees do not seem to mind an overflow of water around their stems, for many of the best groves found in Texas and Mexico are situated on rich bottom-land that is often inundated once or twice a year. The low "flat-woods" can be obtained for a trifle, and the cost of a Pecan-grove is thus materially lessened. In the case of Oranges and Lemons the land to be selected must be of the best, and the prices are usually correspondingly high. Land along the river-bottoms and bayous all over the southern States is comparatively cheap, owing to destructive overflows of water, which may rise any season and flood the fields. Rice and Sugar-cane are about the only crops that can be made to thrive here, and it is not always desirable to grow either one of them along river-banks or in flat-woods.

The prospect, therefore, is that much of this waste land must be taken up by Pecan-groves, which will well repay the planter eight or ten years after the trees are put out. Several of the young groves that were planted two or three years ago in low flat-wood, as an experiment, are now doing finely, and from present indications they will repay the owners.

The period of waiting for a Pecan-grove to bear fruit is long, and often this proves a serious drawback to the cultivation of the trees. The time after planting for the trees to begin to bear so that they will pay expenses has been placed variously from ten to twelve years. The first few years the trees grow slowly, but as they increase in size and age their growth becomes rapid. Their bearing also increases, and the crop nearly doubles itself every year or two.

It is not desirable to raise the tree from seed, as it is not likely to be as good as the seed. Young nursery-trees are the best, or if one has time he can raise his own trees from the seed, and then bud them with the large, paper-shell variety. This is the most successful way here of propagating the Pecan. After the trees are once started they need little or no care. An occasional plowing between the rows and general stirring of the soil would tend to improve their growth; but such labor is really unnecessary. The trees, however, do not stand transplanting very well. They should be put in the place at first where they are intended to grow. If the land is not too low and wet, vegetables can be grown successfully between the rows of trees. Some persons plant the trees thirty or forty feet apart, but fifty or seventy feet is better. When the trees once begin to bear the only expense attached to the grove is the cost of picking, packing and shipping the nuts.

Fort Meade, Fla.

Geo. E. Walsh.

Celery Growing.

THERE is little doubt but that the method of growing Celery, which is practiced from Baltimore southward, could be profitably extended further north, particularly in private gardens and where space is valuable. I refer to the plan of growing it in beds five feet wide and of any desired length. Celery kept where it is grown is certainly superior to that which has been lifted, and when grown in beds it can be covered and kept through winter, which is impracticable in single rows.

In planting these beds we use a board six feet long and one foot wide. A garden-line is tightly stretched along one side of the bed, and the square end of the board is kept parallel to this line, so that the rows run straight across the bed one foot apart. Notches are cut on the edges of the board six inches apart, beginning six inches from the end, making eleven notches. In using the board it is laid perpendicular to the line, as before described, and the planter, standing on it, sets a plant at each notch on both sides of the board, and so continues the whole length of the bed. All that is now necessary is to keep the bed well cultivated until it is necessary to add some earth to keep the leaves erect. The earthing is done with a pair of boards ten inches wide and about seven feet long, a foot or more at each end being tapered to form a handle. In using these boards they are set on edge between two rows of plants, and kept nearly upright by pegs stuck in the ground on the outside at each end. Two men work together standing one on either side of the bed, and shovel the soil from the space left on the sides of the bed, placing it between the boards until level full. Then grasping the handles at the ends of the board they bring their upper edges together with a few sharp raps, then each man throws up the end of the board in his left hand and catches the one in his right, inserting it in the next row of plants.

The soil is thus left standing in a sharp ridge between each row of plants. After setting up these ridges between each row the boards are laid aside and the men "handle" the celery. Beginning at the middle of the bed each man grasps a plant with his left hand, holding the foliage erect, while with his right he pulls down the ridge of earth and packs it tightly around it. After the whole bed has been "handled" in this manner the boards are again used and fresh ridges are set up between the rows, so that the plants stand in little trenches and are drawn up more erect. As the plants get above the ridges and are inclined to spread the earth is again pulled down around them and another set of ridges set up. As the season gets cooler the earthing is continued as fast as the tops of the plants get above the ridges, care being taken at the same time to carry up a bank of earth a foot thick on each side of the bed. When hard freezing is evidently at hand, say late in November northward, and in mid December in Virginia, the entire bed is covered with a thick layer of earth rounded up so as to shed the rain. Forest leaves are then banked thickly over all, and corn-stalks or bean-poles laid on to keep them from blowing off. At the north a temporary board roof over the bed, packed underneath with leaves or straw, I should suppose would exclude frost. Having the bed covered in any convenient way, it is easy to get at it in winter, and the labor

Palms is good, fresh seed, and this, in the case of some species, is difficult to procure, on account of the long ocean voyage, during which the seeds invariably lose much of their vitality unless very carefully packed. It will be found that some species suffer much more than others from this cause. *Kentia Balmoreana*, for example, apparently, decays much more rapidly, than *Kentia Forsteriana* when packed in precisely the same manner and sent at the same time.

The seed of that most useful Palm, *Areca lutescens*, though easy to germinate, does not keep well, and, consequently, it should be sown as soon as possible after its arrival, and if it is fresh it will germinate in three or four weeks, and may be potted off at the end of three months.

Among the Palms in general use probably the easiest and quickest to germinate is *Livistonia Chinensis* (or, as more generally known, *Latania Borbonica*). Seeds of this species, under favorable conditions, germinate in about two weeks after planting, and are ready to pot off in two months' time.

Cocos Weddelliana is one of the easiest of its family to raise from seed, though not always making so good progress after the first potting, owing to the fact that the long, stiff tap-root, which is made during the first growth of the seedling, is very brittle, and is, in consequence, frequently broken or otherwise injured in potting. This gives the young plant a severe check;



Fig. 117.—*Spiraea Van Houttei*.—See page 316.

is much lighter than earthing up single rows and then lifting and storing the plants.

Celery should be set in the beds early in July for late fall use, and from the middle of July to the middle of August for winter and spring use. That which is intended to keep during winter should not have any earthing beyond the first handling until the last of October. White Plume Celery is especially adapted to bed-culture, but the Sandringham and Golden Heart are our favorites.

Crozet, Va.

W. F. Massey.

Seedling Palms.

THE greatly increased use of Palms for house decoration and also for filling conservatories, is being met by a corresponding increase in the number of seedling Palms raised from year to year in the establishments of many of the leading florists. That this branch of the business may be overdone in the near future is an opinion freely expressed by some florists, but as the public knowledge of the great utility of these plants becomes more general, it may reasonably be expected that the demand for well-grown plants will quite equal the supply for some years to come.

It is not, however, to the commercial side of Palm-growing that I propose to call attention, but rather to give some general remarks in regard to their culture.

The first requisite to success in the raising of seedling

and, if accompanied with a slight excess of water, such an injury often causes the death of the seedling.

The Kentias are rather slower in germinating, and sometimes take from six to eight months for the operation, and besides this it is seldom that more than fifty per cent. of the seeds prove good. This fact, coupled with that of the comparatively slow growth of the young plants, undoubtedly has much to do with the high prices at which good plants of this species are sold.

The soil for Palm-seeds should be rather lighter in composition than that in which established plants are grown, and may consist of equal portions of peat and light loam, with sand enough to make the mixture open and easy to drain, the latter point being worthy of attention, for when the soil is allowed to become too wet many of the seeds are sure to rot.

The seeds may be planted in either pots, pans or wooden boxes, an objection to the latter being their liability to breed fungus, the earthenware vessels being therefore found the most satisfactory, and for convenience four to six inch pots are preferable. As a steady bottom-heat is essential for the rapid germination of Palm-seeds, the pots containing them should be placed in the propagating house or some similar structure, and plunged in cocoa-fibre or coal-ashes, the cocoa-fibre being the better conductor of heat of the two, and also cleaner to handle.

Care should be given to watering, to keep the soil damp without making it sodden, until the seedlings have developed

their first leaves, after which water may be given much more freely without injury to the plants. As to the time for potting off, it will be found best with most species to wait until the second leaf begins to push up, but with some of the free-growing sorts, such as *Areca lutescens* and *Livistonia Chinensis*, it is not necessary to prolong the time to this extent, and plants may be potted as soon as the first leaf is fully expanded; but they should in any case be kept in a warm house and shaded from the direct sunlight until they are well established.

Holmesburg, Pa.

W. H. Taplin.

Orchid Notes.

Cattleya Mossiae.—Ever since the flowers of this grand Cattleya first developed themselves under cultivation they have been the admiration of all beholders. Some fifty years have elapsed since its introduction, and where Orchids are grown it is invariably found occupying a prominent position among the other species. It is by no means a difficult plant to grow. The flowers are very showy and durable and most remarkable for their great variation in form and color. There are two beautiful white forms of this Orchid, but, like the majority of white-flowered Cattleyas, they are extremely rare. These are *C. Wagerii* with large flowers, having a yellow blotch on the labellum, and *C. Reineckiana*, a variety with pure white sepals and petals and a broad, rich-purple labellum and yellow throat. The flowers of *C. Mossiae* are borne on stout stems, four or five together on each, and they measure, individually, six or eight inches in diameter, with broad rosy sepals and petals, and a lip large and exquisitely fringed. They make their appearance during the months of May and June, and if removed to a cool temperature will remain four weeks in good condition on the plant. After the flowering period is past the plants that require it should be repotted before root-action begins. If this is not done at the proper season, the most careful cultivator may break or injure the roots in potting and thereby check the plant for a considerable time. The usual compost given to Cattleyas will suit this species, that is, good fibrous peat with a little sphagnum, and ample drainage, and during the period of growth an abundance of air and moisture.

Lælia majalis.—Mr. Charles Carpender, of New Brunswick, New Jersey, is the possessor of some remarkable specimens of this Orchid. On a recent visit to this collection I observed a plant carrying numbers of its enormous flowers, which in many instances measured seven inches in diameter, their broad lips beautifully penciled with fine purple, forming a pleasing contrast with the lilac color of the sepals and petals. This is one of the largest-flowered Orchids in cultivation. It is somewhat objected to on account of its shy-flowering habit. The plants here noted were attached to wooden blocks and suspended well to the light where a plentiful supply of air reaches them at all times. After the bulbs are fully grown a thorough rest is given to the plants by placing them in a cooler and drier atmosphere.

Summit, N. J.

A. Dimmock.

Raspberries.—The variety of this fruit which is best for the market is seldom the one for the home-garden. A red raspberry, like the Brandywine, which is so dry and firm that it keeps its shape and bright color in transportation and produces large crops, will suit the market-grower, but in our home-garden we want better fruit—we want a raspberry of good size and full of juice, such a berry as the market-grower cannot handle. It is a great misfortune for private gardeners that nearly all the efforts at so-called improvements in the Raspberry have been in the direction of getting a large cropper and a good shipping fruit, so that quality and juiciness have been largely sacrificed. Among all the new Raspberries we have none to compare in quality for home use with Brinkle's Orange, Fastolf, Franconia, Hornet and others of the old tribe, which nurserymen have almost ceased to grow, because every one in planting follows the lead of the market-men.

For a combination of good qualities for home use the old Hornet is still unsurpassed, and with me has always been as hardy as any of the newer red varieties. Herstine is close to it and rather more productive. Brinkle's Orange is unsurpassed in flavor, but very tender. But in our gardens hardness is a minor consideration. It is a small job to bend the canes down late in autumn and throw a few shovelfuls of earth on them after the old canes have been cut out. I plant them four by six feet and tie to a single wire stretched about four feet from the ground. If space is valuable, and this seems to be too much to occupy, it can be utilized by Cucumbers planted in the row between the Raspberry-plants about the time the fruit is ripe; and the winter-supply for pickles can thus be easily grown, for

the shade of the canes will not interfere with the Cucumbers.

I have said nothing about the Black Cap Raspberries. Those who like fine fruit do not care for them, and, from sad experience, I know that, owing to their abundant seeds, Black Caps are dangerous if eaten too freely by children. B. R.

Albemarle Co., Va.

Manure is the leading topic of inquiry among all classes of farmers and gardeners. The values of certain substances, in fact of almost every substance, are still mooted points. We are only beginning to learn in this direction. But something is accomplished when we know what we are talking about. "Manure is plant-food" is a poor definition; "manure is a promoter of plant-growth" is better. One definition contemplates the use only of the elements of plant-growth, employing potash merely as so much potash, and nitrogen as so much nitrogen; the other admits of the mechanical improvement of soil and food for the plant at the same time. Our knowledge of the use and treatment of stable manure is yet imperfect. But we no longer hold to the notion that manure applied in the fall leaches away and is lost, or that its essential elements vaporize. On the contrary, we know that the best results come from application in the fall, and the more vegetable matter the soil contains the more complete will be the retention of the soluble ingredients. In barn-yards the soluble materials may pass into the underlying soils or be carried down gutters, but in compost piles which are four or five feet high, or even less, it is doubtful if the rain-fall of any season is sufficient to wash away the elements of fertility. But we do not recommend composting manure; there is no necessity for such an operation. But the refuse of the garden, the vines of Squashes, Potatoes, Tomatoes, the trimmings of Cabbage, Celery, and vegetable refuse, become valuable when composted. Of commercial substances, no doubt wood-ashes, finely-ground bone and nitrate of soda are the best for the gardener. But ashes are often of doubtful history, and should be purchased cautiously.

Weeds.—I never saw a good gardener who knew or cared much about weeds. In fact, ignorance of weeds is commonly a proof of good gardening. It matters not whether certain weeds are ten per cent. bad or ninety per cent. bad; they all succumb to good culture; all perish by the same process. When we all come to realize that we till for the good of the crop and not for the sole purpose of killing weeds, we shall have no occasion to study the tares, for they will never find the chance of growing. But some people cultivate only when the weeds force them to do so, and here the credit accrues to the weeds. Weeds are oftener a blessing than a curse. Even Virgil knew this.

L. H. Bailey.

Cornell University.

Spiræas.—One of the finest herbaceous Spiræas is *S. Aruncus*, or Goat's Beard. It is indigenous to the Alleghany and Catskill Mountains, and is cultivated considerably in European gardens, where it is used in groups on lawns with fine effect. It is a plant of noble habit, and in rich soil, with plenty of water, its panicles of cream-white flowers develop into magnificent proportions. *S. astilboides* is a recent addition to the list of garden-plants, as it is also one of the best. It resembles *S. Aruncus* in many respects, but the latter, under liberal treatment, often grows five feet high, while *S. astilboides* does not exceed two feet. The flowers are similar in color, and have the same massive appearance, and for forcing it is far superior to *Astilbe Japonica*. *S. palmata* is perhaps the brightest-colored species of all. Its large corymbose panicles of brilliant crimson flowers make it one of the most striking and effective species in cultivation. We have never been so successful with this plant as during the past season, when it was planted in low, marshy soil with *Iris Kämpferi*, where it thrives luxuriantly. *S. lobata*, or Queen of the Prairies, is a native species, and well worthy of cultivation. There are, apparently, two forms of this plant—one having much darker-colored flowers than the other. The better of them rivals *S. palmata*, with its bright rose-colored flowers, and has also a delightful fragrance. *S. filipendula* is a distinct plant, with large loose cymes of white flowers on stems two feet high, with the leaves flat on the soil. There is also a double form of this species much dwarfer in habit and with very beautiful double flowers. We have also a tall-growing Spiræa from Japan, the name of which we have never been able to ascertain. It grows six feet high, with large whitish flowers, the whole plant resembling a gigantic *S. ulmaria*. This plant makes an excellent plant for the back row of the flower-border. All of the above are desirable garden-plants, and are at their best just now, adding considerably to the attractions of the garden.

O.

Passaic, N. J.



A Meadow on Mount Rainier.—See page 314.

Notes from the Arnold Arboretum.

Lonicera Iberica, or the species which is known by that name in gardens, is the latest of the bush Honeysuckles in the collection to flower. It is a stout shrub, with upright branches covered with light gray bark, which separates readily into thin scales. The leaves are small, barely more than an inch long, short-petioled, ovate-cordate, or sub-rotund, contracted at the apex into a short point. They are dark, dull green, with a few scattered hairs on the upper, and pale on the lower, surface, which is densely covered, as are the shoots of the year, with a short pubescence. The flowers are bright yellow, an inch long, the corolla covered on the exterior with scattered hairs. The fruit is scarlet and conspicuous. This is a perfectly hardy plant, which, owing to the lateness of its time of blooming principally, has considerable value for the

decoration of the garden. It is a native of the Trans-Caucasian country.

A number of the so-called Chinese Honey-suckles are now in flower. They all belong to one species, however, and are all—that is, all the plants found in our gardens—Japanese, and not Chinese. These plants have long been cultivated and are familiar in some form or other to all persons who have ever had anything to do with a garden. The true name of this plant is *Lonicera Japonica*, and it was discovered a century ago by Thunberg at the time of his journey in Japan. The most familiar form of this plant, or rather the form which was until the last few years most frequently met with in gardens, is a slender climbing plant, with pubescent, reddish stems, dark green leaves, with rather conspicuous red veins, and long tubular, slender corollas, pale red on the outside, yellow on the interior, and always fading yellow. This is the *Lonicera flexicaulis* of many old gardens. There is an excellent colored figure of this form in the "Dendrologia Britanica," t. 117, under the name of *Lonicera Chinensis*. Another form of this plant differs from the first in the color of the flowers only, which are white, fading to yellow, and in the absence of the red tinge on the stems and the veins of the leaves. This is sometimes known as *Lonicera brachypoda*. The showy yellow-leaved Honeysuckle which has appeared so generally of late years in gardens and which is known as *Lonicera brachypoda*, var. *reticulata* and as *L. brachypoda*, var. *foliis aureo-reticulatis*, is a variety, merely, of this same species. Another form which has been quite generally distributed of late in American gardens as *Lonicera Hallii*, so named because it was first sent to this country from Japan by Dr. Hall, is perhaps the most beautiful of them all. It flowers about ten days later than the other varieties; the leaves are broader, rather paler, and more densely covered with pubescence. It is a strong-growing plant, and will cover a large space in a single year with its flexible, twining stems. These various plants look quite different as they are seen growing side by side, but they all have characters which unite them. The flowers are in pairs at the end of a long (or sometimes quite short) common peduncle, upon which just below the flowers are two large leafy bracts, which are almost identical in shape with the true leaves, although they are much smaller, and generally not more than half an inch long. The corollas have slender hairs of the same character upon their exterior surface. The fruit is black and the same in all; the flowers all fade yellow, and all possess the same delicious fragrance, which is most powerful in the evening; and upon all these forms, although rather more commonly upon the golden-leaved variety, a few leaves grow near the base of the stem, with the margins deeply cut and lobed like those of a White Oak. *Lonicera Japonica* has escaped from gardens to the woods in some parts of the southern

States, and has become well established, and practically naturalized. It is very largely planted in the middle States, where it is certainly one of the very best vines for covering buildings or rocky banks, or any rough waste spots over which it is desirable to spread a thick mantle of brilliant foliage and fragrant flowers. Here in New England this plant is not quite hardy, and is often killed back during severe winters, but as it flowers on the branches of the year, this killing back only serves to develop the growth of stronger shoots, and to retard, a little, the flowering time. Here the leaves fall in January generally, after having remained perfectly fresh and green during the autumn and early winter; further south the plant is evergreen, the old leaves remaining upon the branches until the appearance of the new crop in the spring. The branches keep on growing until stopped by frost, and, as flowers are produced upon these new growths, the plants are generally in

bloom all summer long. *Lonicera Japonica* is a widely-distributed plant in Japan, Formosa and in China, from Peking to Shanghai, and far into the interior. Its tenderness in this climate seems to point to a somewhat southern origin for the plants now in cultivation; and it would be an interesting and probably a valuable experiment to test plants of this same species raised from seed gathered at Peking or at some other northern station, where the climate resembles that of our extreme northern states.

Lonicera Etrusca is in flower. It is a very pretty, slender, graceful plant, with twining stems, ovate-obtuse leaves, which are pubescent on the under surface, the lower on short petioles, the upper pairs joined together. The flowers are delicately fragrant with long, slender corollas, purple without and yellow within. They are arranged in verticillate many-flowered heads, of which there are generally two or three at the end of each branch. It is a native of southern Europe, and although a very pretty plant, less desirable, perhaps, for general cultivation than the more robust and showier *L. Periclymenum*, the Woodbine of English gardens.

Viburnum molle is now in flower. It is a southern plant, only just reaching New England on the islands of Nantucket and Naushon. It is a stout shrub very like our common *V. dentatum* in habit and general appearance. The young shoots, petioles and cymes are, however, covered with stellate pubescence, and the leaves are rather more crenately-toothed and rather longer than those of *V. dentatum*. Like all our native *Viburnums*, with the exception of *V. lantanoides*, it takes kindly to cultivation, and like them all, it is a desirable garden-plant. It is only because these beautiful plants are "natives," a word which, when applied to a plant, has come to mean with some people common or homely, or because they are not known at all to persons who plant gardens, that they are not esteemed at their true value.

The Dwarf Huckleberry (*Gaylussacia dumosa*) is an ornamental plant, which, like many of its relatives, may wisely be transferred to the garden, where it should just now be covered with its pure waxy-white flowers. It is found growing naturally in low situations, generally in sandy soil, and never very far from the Atlantic sea-board. Generally a low plant, it may be seen sometimes four or five feet high. The leaves are green on both surfaces, thick and rather shining when fully grown, tipped with a point, and covered with the resinous dots peculiar to our deciduous-leaved Huckleberries. The nodding bell-shaped flowers are large—a third of an inch long—pure white and very abundant; and these are followed by large, showy black fruit, which has little but its beauty to recommend it, as the flavor is insipid and very inferior to that of the common Black Huckleberry (*G. resinosa*). The Dangleberry (*G. frondosa*) is a handsome garden-plant also. It is taller than the other Huckleberries, being found sometimes five or six feet high, with slender spreading branches. The berries, which are oblong and blunt at the apex, are pale and glaucous on the lower surface. The handsome white globular, bell-shaped flowers hang in loose slender racemes, on rather long drooping pedicels. The fruit is large and showy, dark blue, covered with a white bloom, and sweet and edible. This is the most ornamental of our Huckleberries as a garden-plant; and like the others not difficult to establish in the garden, if a little care is taken in lifting the plants in the woods.

Euonymus radicans, as the climbing Japanese evergreen *Euonymus* is generally called, is gradually, as its value becomes better known, working its way into popular favor. It is really a valuable plant in this climate, where the Ivy is not hardy, and where no other climbing plant with evergreen foliage can be grown in the open air. *Euonymus radicans* grows very slowly when it is first planted, but being once well-established it grows, never rampantly, but with some rapidity, and will climb, with the aid of its stem-roots, to a height of twenty or thirty feet. It will cling to masonry, but it seems to prefer to grow over the stumps or trunks of trees (as it does naturally in the forests of Japan), and an old stump covered with its dark green, lustrous foliage is certainly a beautiful object. The leaves are small, but as the plants grow older they increase in size, especially on the young shoots, and are then sometimes two inches or more long. There are varieties of this plant in cultivation with white-marked and yellow-marked and blotched leaves, but none of these are as handsome or as vigorous as the green-leaved form. *Euonymus radicans* is believed by botanists to be a form of the evergreen *E. Japonicus*, and it is said by M. Maximowicz, who has studied these plants, that he has never seen flowers of this variety. This year they have appeared in this neighborhood in several different gardens, and a figure of them has been prepared for GARDEN AND FOREST.

June 18th.

J.

The Forest.

Forest Interests in Pennsylvania.—III.

AT present very few, even of the friends of forestry or of the people in this country who are more or less active in efforts for forest-conservation, adequately understand the necessity of this preliminary work of the diffusion of knowledge and propagation of just ideas relating to forestry subjects. We need to work on long lines for objects which lie far ahead, but we have not the intellectual quality or temper which would enable us to do this. I am aware that it is a question among students of history and civilization, whether such an advance in national character and action as I have here referred to is ever consciously brought about, by men who plan and intend such a result, and organize and direct the action which is necessary to secure it. Some think that all advances in civilization come without having been thought about or intelligently aimed at by anybody, but I incline to the opposite opinion, to the view that most of man's steps forward have been taken because somebody foresaw the need for them, and felt an impulse to work to prepare for them and to urge others to do the same. I think that with ten years of work for that object, and the expenditure of one or two hundred thousand dollars, we might bring about such a condition and education of the public mind in this country as would render possible effective work for the perpetuation and successful management of our forests.

But we are probably not yet civilized enough for this in our country. Even the best races of men usually learn very slowly the things which are necessary for national success and prosperity, and nations acquire wisdom by the severe discipline of suffering and loss. Very likely we may not learn in any other way the importance of our forest interests in our national housekeeping.

Yet there is more of encouragement to hope for the beginning of real growth here in Pennsylvania than anywhere else in our country. The public men of the state are becoming much interested in forestry subjects; the State Forestry Association is doing a useful work, and its organ, *Forest Leaves*, attracts the attention of many persons who had not before thought of this topic. But the most favorable condition which I have anywhere observed is the superior character of a large proportion of the people of the mountain regions of the state. In some districts most of them are of German origin, and one constantly hears the dialect known as "Pennsylvania Dutch." These people constitute one of the most valuable and promising elements of the state's population. I have been much impressed by the frequent evidences of poetic feeling and a real sense of natural beauty among them, such as I have not found among the natives of mountain regions in any other part of the country. They have the old-fashioned virtues of industry, veracity, hospitality and silent verity. I know of no other class of laboring people who work so many hours of the twenty-four as they. Many of their children and young people have fine natures, and they are certain to be numerously represented hereafter among the foremost men of the state and of the nation. They know a great deal about the woods, and think about them, too. A writer in GARDEN AND FOREST last year made a most sensible suggestion regarding these people which I am glad to quote in this report. "Some plan for taking care of these woods ought to form part of the education of the people of this part of the country. They are hard-working, sensible men and women, with a great deal of character; most of them poor. How can they be reached and taught what they need to know and think of and practice in regard to the forest interests of their region, and the best ways of managing their own woodlands?" Some kind of educational work regarding forests and tree-culture should be constantly maintained among them, and among all classes of the people of the state.

This state should have a Commissioner of Forests and Rivers, who should be not only a well-trained engineer, but a man of superior mind, with what military men call "an eye for country," who could hold the entire river-basin and watershed system of the state in his brain. He should have supervision of the location of buildings along the streams of the state, and of the construction of dams and reservoirs. The complex conditions of our modern life require more comprehensive co-operation and direction in matters pertaining to the general welfare of our densely-populated communities than we have hitherto practiced. The individualism which insists upon the right of every man to build his house where he chooses, and which permits corporations to construct dams and reservoirs without restriction or supervision, is barbaric,

and is not adapted to an advanced state of civilization. In connection with other lessons of the recent awful tragedy in this state, it should be kept in mind that the plan of destroying the forests which constitute the natural reservoirs for the water of the mountain regions of California and Colorado, and of constructing enormous artificial reservoirs for the storage of this water for irrigating purposes, is being pushed forward with much energy. If it is carried out, catastrophes resembling the one at Johnstown will be inevitable. The advocates of the plan admit that calamities resulting from the breaking of reservoirs and dams will occur, and compare the liability to such disasters to the liability to accident which now attends the running of rail-road trains. There is no reason to suppose that engineering ability will ever enable us to dispense with the natural function of mountain forests in storing water and regulating its flow.

Harrisburg, Pa.

J. B. Harrison,

Cor. Sec. American Forestry Congress.

Recent Publications.

The Industries of Japan; Together with an Account of its Agriculture, Forestry, Arts and Commerce. By J. J. Rein, Professor of Geography in the University of Bonn. Illustrated. New York: A. C. Armstrong & Co., 1889. (Translated from the German.)

Five years ago Professor Rein published a large volume which, in its English translation, bore the title, "Japan, Travels and Researches," and was universally accepted as the most thorough and scientific treatise of its class. In the present book he extends and completes the account of his researches which, it may be explained, were prosecuted at the cost of the Prussian Government. He is conscious, he modestly says in the preface, that all he can offer is "only patchwork," notwithstanding many years of care and labor; that all subjects are not treated with equal fulness, and that the pictorial arts of Japan, in especial, are but meagerly treated. Nevertheless, the book is a marvel of painstaking thoroughness in almost all its parts, and is more systematically arranged and clearly written than is customary in a work from a German hand. Here and there one finds an ambiguous or awkward expression, but it seems due not to the author himself but to a hasty translator or careless proof-reader.

About half of the large octavo volume is devoted to agriculture and forestry and the industries dependent upon them, the other half being absorbed by artistic industries, trade and commerce. The general condition of Japanese agriculture is passed in review, its food-plants are separately considered and then what are called its "plants of commerce;" cattle-raising and silk-growing are described; the forests of the country are passed in review, and the nature and uses of the various kinds of Japanese woods explained; and then follows a chapter on gardening and another on the acclimatization and extension of Japanese ornamental and useful plants in Europe. There is scarcely a page in any of these chapters from which we might not quote with profit to our readers; but, of course, their chief value lies in that systematic completeness to which no citation of special parts can do justice. Unlike most writers who speak of industrial and commercial facts, Professor Rein has a scientific knowledge of botany, and everything he reports is thus of great interest to the student of plants as well as to the student of economic conditions. In speaking of any plant of commercial value he is careful to note its place in the botanical systems, its relation to allied plants in other lands and its aspect to the eye; and then he follows it through the industries in which it is of service, explaining processes of manufacture and final results with equal care. Seven closely-printed pages are given, for example, to the Camphor-tree (*Cinnamomum camphora*), and from them we learn the geographical distribution of the tree, its nature and habits as seen at home and as affected by the climate of different European regions where it has been introduced, the size and aspect of conspicuous individuals in Japan, the processes by which gum-campor is produced (with a picture of the apparatus used), the uses to which it is put by the Japanese, and the commercial results of the industry. The Tea-plant and the industries dependent upon it are treated in a most thorough and illuminative way; and fruits, vegetables and condiments, leguminous plants, dye-plants, oil-producing plants, drugs, and many other groups are as carefully described.

In the forestry chapters Professor Rein refers back to his earlier volume with regard to certain general facts. Yet those he gives are sufficient to explain with great clearness the nature and aspect of Japanese forests, facts of geographical distribution, and the difference between the wild and the cultivated woodlands of the country. The chief building-woods, he says, are furnished by *Cryptomeria Japonica*, *Abies firma*,

Pinus densiflora and *Pinus Thunbergii*. It is highly probable, he thinks, that all the forests which furnish these woods, "and also those of *Chamæcyparis* and *Thuyopsis* have been planted since experience has shown that their self-propagation, like that of most conifers, is difficult, and wherever a Pine-forest disappears its place is usually filled by Blackberry-bushes, Wild Roses and other almost worthless deciduous plants." These trees, other useful sorts, like *Castanea vulgaris*, several deciduous Oaks, the evergreen *Quercus cuspidata* and some others less widely known, for example, the so-called "Screen-Fir," (*Sciadopitys verticillata*) "are raised from the seed in nurseries, as with us, and the seedlings transplanted after two years' growth. The cultivation of the plants during these two years, as well as the laying out of the plantation, is very carefully managed and based on all the teachings of past experience. There is also no lack of printed instructions with all necessary illustrations. The ground chosen for such a plantation is prepared as thoroughly as for a fruit-tree nursery or a tea-garden, and is well enclosed with a light, Bamboo-hedge from three to six feet high, which does not cut off light and air. In snowy districts a further protection is provided in winter in the shape of a straw roof, . . . and in case it becomes necessary to shelter the young plants from the cold, . . . straw fastened to a Bamboo-framework is spread over them. The greatest care is also observed in taking up the young seedlings, cutting back their perpendicular roots, making ready the plant-holes with the hoe, and planting again in the ground laid out for the new forest. I did not find, however, that our system of planting in rows was very much adhered to; much more regard was had to the nature of the ground, and to the peculiar taste which has a dislike for systematic regularity on a wide scale except where it is necessary, as in agriculture. The cultivated forests of Japan are seldom very large. Poor, gravelly soil, fixed dunes and other sandy districts are, as a rule, devoted to the above-mentioned Pine-trees. . . . The other species of cultivated conifers need a deeper and better soil, which is to be found only in the plains. They are sometimes found, however (as the *Chamæcyparis* and *Thuyopsis*), on the lower gentle slopes of mountains. In case the soil here is too stony and unfruitful, the Chestnut is planted, while the Oak is better adapted to the saddles and hollows. It is seldom, however, that forest cultivation of any kind goes higher than 3,000 feet." Many interesting facts are given with regard to the cultivation of different kinds of trees in different districts, and the economical or religious reasons which cause a demand for special kinds of wood. "The Bamboo-groves may also be ranked as cultivated forests. They serve the most manifold purposes, making an agreeable diversion in the landscape, and are especially frequent on the boundaries of the larger cities, where great use is made of the cane. . . . As is more carefully noted in Volume I., the deciduous forest of Japan, in contrast to the dark Pine-forests and to our own woods with their few species, is made up of a great mixture of large numbers of trees and bushes in all stages of growth. It is exceptional, and generally due to special cultivation, when we find Chestnuts and the varieties of Oak forming separate plantations. Creepers and climbing plants, parasitic and rooted Ferns are seen in greater variety and of larger growth than with us. . . . The most common constituents of these forests are Oaks, Beeches, Hornbeams, Maples, Birches, Horse-chestnuts, Magnolias, Aralias, Walnuts, Elms, Planes, various *Rosaceæ* and, in moister places, Ashes and Alders." The Japanese deciduous forest, Professor Rein explains, is, however, "not at all a primeval forest. It may here and there even be a plantation on what was once a field, but it has the stamp of a thoroughly natural growth, and is left to itself and renews itself. The woodman visits it with his axe, it is true, but only for the sake of the most valuable and scattered timber, such as *Magnolia hypoleuca*, *Stuartia monadelphæ*, *Actinidia volubilis* and some others, and this does not in any way affect the settled character of the forest. This is accomplished by means of thorough destruction by forest fires." When these occur the place of the trees is taken by a "brushwood in which the Fire Weed (*Epilobium angustifolium*) springs up here and there, as in our burnt forest-grounds, and stiff Bamboo-grass (*Phyllostachys bambusoides*), and in high, damp places also the *Polygonum cuspidatum* more than eight feet high. The forest generally takes on its original character by degrees and after a long time." Of course these brief citations give but a glimpse at the interest which the forestry chapters of Professor Rein offer to the general reader. The multitudinous facts of scientific import must be sought by the student in his own pages.

In the chapters devoted to gardening we find brief descrip-

tions of the different sorts of Japanese pleasure-grounds and lists of the plants most commonly used to adorn them. No page is without its interest and significance, but Professor Rein speaks with less enthusiasm than most travelers of the effects beloved by Japanese gardeners. He does not seem to accept their point of view and recognize that it is thoroughly artistic although quite unlike the European point of view. He sees little but a painful artificiality in Japanese attempts to make pictures of wide landscapes on a miniature scale—he sees only the process and not the illusive effect upon which a Japanese eye would dwell. With regard to the methods employed for dwarfing plants and the extraordinary results achieved he gives some interesting facts. "To produce a slow growth they choose particularly small seeds from a poorly developed individual plant. Frequent cutting back has been found even more effective, also planting in pots of insufficient size. Twisting the twigs and stems in a horizontal spiral direction has the same effect, and the refrigeration of the ground and roots by evaporation, using porous pots. Grafting is often also a means to this end, *i. e.*, it serves to check natural development. It is employed especially in the many varieties of *Acer polymorphum*, and is usually effected according to the oldest methods known to gardening—grafting by approach, as it is called. Some of the results obtained in Chinese and Japanese gardening in dwarfing species are very surprising. Kämpfer relates that he once saw growing together in a small box, four inches long, one and one-half inches broad and six inches high, a Bamboo-cane, a Pine-tree and a blooming Plum-tree. The price of this group of dwarfs was nearly £100—an evidence of the difficulty and tediousness of the accomplishment, and also a token of the high estimation of such abnormal forms. Whoever visits a Japanese art and trade-garden in spring will notice in company with these dwarf forms yet another kind of popular plant-maiming which is usually practiced on the Mume Plum. Young and blooming shoots from stumps, four to twelve inches in height, are wound about these or bent over them umbrella-fashion. Often the trunk is cut down even to the ground so that the small blooming offshoot looks like an independent tree." The great number of plants with variegated leaves, produced in Japan, is likewise noted by the author, with wise advice as to the danger run by European gardeners in introducing them profusely into their plantations. He speaks also of the fact that the Japanese do not like to separate flowers from their stems and gather them in bunches, admiring far more their individual beauty under natural conditions—"lovely blossoms and leaves on their stem or slender twigs, the Iris and the Lotus-flowers on its long stem." But he adds that "one would scarcely suppose that under such circumstances there could be such a thing as 'the art of arranging flowers' in set pieces;" thinks that the art which goes by this name depends too much upon the forms of vases and other receptacles, and seems to deplore the fact that "the arrangement and coloring of bouquets is not understood by the Japanese." This very fact is usually cited with admiration by visitors to Japan, and once again Professor Rein shows a lack of sympathetic artistic instinct. But this lack should not, of course, be weighed in the balance against the numerous gifts and merits which his volume, as a whole, reveals, and we can heartily recommend it to all who desire a knowledge either of the natural products of Japan or of the industries dependent upon them. Its greatest value springs from the fact that these two subjects, so often disassociated in print, are considered together, and, are systematically, clearly and fully set forth in their mutual relationships.

Periodical Literature.

It is pleasant to find that our architectural journals are turning their attention to the allied art of landscape-gardening. The connection between the two arts is so close as to be of vital importance to the welfare of both; and we hope that many architects will inwardly digest the excellent articles on "Landscape-gardening and its Relations to Rural Architecture," by the late J. A. McKenzie, and recently published in *Building*. The first chapter is devoted to the general principles which underlie the subject. To quote from it at length would merely be to repeat what has already often been said in these columns; yet it can hardly be too often repeated that while we have comparatively few good landscape-gardeners in this country, we have some of the very best; that an intelligent demand for more will surely create a supply; that no body of men can "promote this demand with greater influence than architects," and that "they are really interested in its promotion as much, if not more, than any others." The writer

does not over-state the case when he says that to start to lay out a place without some comprehensive preliminary scheme is as great a piece of folly as it would be to essay to "erect a mansion piecemeal, room by room or wing by wing, ignoring the general appearance of the whole structure when completed; each individual section as it is constructed may be perfect, but the *tout ensemble*, unless by some happy and remote accident, will, to a certainty, be a failure, lacking coherence and harmony." A significant paragraph is likewise the following: "One reason for the hesitation of owners to seek the assistance of experts when about to lay out their properties may be traced to the damage done by the innumerable so-called landscape-gardeners, who generally combine with their professional (?) work the more appropriate and modest calling of 'jobbing gardener.' If these are the specimens from whom any one deducts his opinion of landscape-gardening, no wonder he is disgusted and prefers to do the work himself or allow his gardener to do as he pleases. For these men never think it worth while to prepare a design, and the result is that where they do not entirely obliterate what natural beauty the place possessed before their ruthless spades started to work, they wholly fail to grasp the opportunities for enhancing those beauties and natural effects which have really stared them in the face. And their work usually runs into enormous expenditure in proportion to what is done; for, owing to their gross ignorance, useless work is often executed, and work done has as often to be torn down and executed afresh." Truly, it is not such men as these whom we have had in mind in claiming, so often, a wider and franker recognition of the claims of the landscape-gardener to be the architect's-helper on equal terms. It is the thoroughly trained and experienced artist who should be chosen; and any proprietor who really desires to find him can do so without a great deal of trouble. As the lamented writer says, the fact that make-believe artists have any standing in the community is simply because their employers are not "as appreciative of the difficulties of landscape-gardening as they are of those of architecture." His second chapter is devoted to a systematic consideration of the various tasks which the landscape-gardener must execute, such as choosing the location of buildings, grading, forming carriage approaches, roads and walks, managing lakes and waterscenery, planting, and treating small properties and suburban lots; and with regard to all points wise advice of a general sort is given. "As to the future of landscape-gardening in this country," the author remarks towards the end of his valuable sermon, "there can be no doubt; there are already substantial signs that a taste for it has taken hold of a considerable class of country residents. What is wanted is to extend that taste and develop it and interest all property-owners in its cultivation." And we may conclude with another brief quotation, which concisely expresses the gist of the whole matter: "The question is often asked, What is really the proper work of the landscape-gardener? The answer is, Everything that is done to a property which will in any way alter its appearance comes naturally and properly within his scope."

Correspondence.

Unappreciated Trees.

To the Editor of GARDEN AND FOREST:

Sir.—He who plants a tree, of any kind, is almost always so certainly a public benefactor, that it appears ungracious to find any fault with him; nevertheless, I feel like quarreling with park-superintendents and landscape-designers, as well as with the less pretentious planters, for their indifference towards certain of our most beautiful indigenous trees.

The Beech, *Fagus sylvatica*, unites the sturdiness of the Oak, the shapeliness of the Maple and the dignity of the Elm. It is the cleanest limbed of all trees, its smooth ash-colored bark being almost unbroken from base to summit. No tree has a denser or a richer foliage than the Beech, and its buds are nearly as beautiful as its perfect leaf; long, tapering and pointed, with a ruddy tinge, perceptible even in midwinter. Standing a little distance off and in the right light, the body of the tree upon a winter's day appears suffused with a faint blush, which, upon the approach of spring, becomes a full coral tint, such as fringes the afterglow of a November sunset. The Beech is a tree of remarkable symmetry, preserving the same proportion in trunk, limb and leaf. It is persistent to one type, always and everywhere a thoroughbred.

The Yellow Birch, *Betula lutea*, has the fineness of limb and of foliage which distinguishes all the Birches, but its chief attraction is the thin, film-like pellicle or scurf-skin forming the outermost part of its bark. This fine covering peels partially off from the trunk and larger branches, remaining

attached thereto in dainty waves and ringlets, flaxen-colored, with a kind of satin finish. Those parts of the surface from which the pellicle does not loosen often take on a metallic lustre, of a shade between that of nickel and of brass. This apparel of the Yellow Birch varies with different specimens, appearing to be most perfect upon those well exposed to the sun during the period of their early prime.

Both these superb trees are unique, and beyond comparison with all other trees in the beauty of their bark. They are as attractive without their foliage as with it, since its loss makes their special feature more prominent. If it were in my power I should, instead of building for my fellow citizens a cathedral or a university, buy and lay out for them a park which should be set wholly with the Beech and the Yellow Birch. Whoever shall bring those two ornaments of our woods into the same favor for shade-trees as the Elm and Maple, will do more toward nourishing among us the spirit of beauty than if he were to import and donate to his countrymen the gallery of the Louvre.

Thus much for my deciduous favorites. But no less do I complain of the scant regard paid to the most graceful of evergreens—our native Hemlock, *Tsuga Canadensis*. This noble conifer has not the majestic port and solemn beauty of the White Pine, but it surpasses that monarch in general comeliness, and has in its order no other peer. The delicacy and richness of its foliage, bright green upon the upper and glaucous upon the under surface, is excelled only by the Club Mosses. The Hemlock is lithe and elastic, and its limbs are wind-proof, and it is the least disposed to rust or to the attack of insect pests of any of the conifers. Besides these qualities, the Hemlock has a special facility of adaptation. It can be a stately tree, a wide-spreading shrub, or a most effective hedge-plant, as you choose to make it. Yet, in place of this matchless evergreen, we have imported the coarse Norway Spruce, and the still coarser Scotch and Austrian Pines, as our grandfathers imported the miserable and short-lived Lombardy Poplar, than which they could have found nothing more unsightly among our entire native flora.

Poughkeepsie, N. Y.

Alfred H. Peters.

Insensibility to Certain Odors.

To the Editor of GARDEN AND FOREST:

Sir.—It is well-known that certain persons are color-blind, that others are "note-deaf," or unable to appreciate the difference between musical and unmusical sounds, and that some are entirely deficient in the senses of taste and smell. But I think it is not so generally realized that many persons whose sense of smell on the whole seems as keen as that of the average man, are powerless to perceive certain special perfumes. Delicate odors, like that of the Pansy, are naturally those with regard to which this deficiency is most often found. But some years ago I discovered that a friend, sitting near an avenue of European Lindens, the perfume of which was almost overpowering, could not perceive it at all, though as regarded other scents his sense was normal. Afterwards I found the same insensibility to the perfume of Linden-blossoms in other individuals. My sister declares that she can perceive in the great flowers of the green-house *Datura* no odor whatever except a certain earth-like smell proper to growing things in general, and I myself cannot realize that *Olea fragrans* deserves its name even to the faintest degree. Yet we are both susceptible to even the faintest perfumes of other flowers. I have no trouble with Orange-blossoms, so similar in scent, I am told, to those of *Olea fragrans*, and as to the *Datura*, the odor is so strong to me that I know a blossom is in the house the moment I enter the front-door, and can hardly sit in the room with one. This total deficiency of sensibility in certain directions is a different thing from that dislike to certain odors, agreeable to most people, which is more often recognized. I should like to know whether any of your readers can cite other instances, and whether there is any scientific explanation of facts which seem so odd.

New York City.

T. B. F.

Temperature and Germination.

To the Editor of GARDEN AND FOREST:

Sir.—Referring to Mr. Allen's observations on the slow germination of corn in cool temperature, allow me to recall some very careful trials to determine the lowest germinative temperature for Indian Corn, the results of which have been published in full in the Report of the New York Agricultural Experiment Station for 1884 and 1885, and a partial summary in the "Proceedings of the American Association for the Advancement of Science," Vol. XXXIV. As the figures are inter-

esting, I may again put them on record in GARDEN AND FOREST.

When the apparatus was maintained within the extremes of 37° and 42° F., a sample of Dent Corn germinated in 430 hours, and one of Flint Corn in 460 hours.

Within the variation of 41°–43.7° F., samples of various varieties of Dent Corn germinated in 233, 233, 401, 401, 479 and 521 hours respectively; of Flint Corn, 331, 331, 498 and 498 hours respectively; of Pop-corn, 378, 378 and 498 hours respectively; of Sweet Corn, 452, 498, 479, 498, 616, 616 and 521 hours respectively.

South Framingham, Mass.

E. Lewis Sturtevant.

Another New Palm.

To the Editor of GARDEN AND FOREST:

Sir.—While visiting a few of the south keys of this state, Mr. R. D. Hoyt, of Bay View, noticed large specimens of what appeared, at first sight, to be *Thrinax argentea*, but on closer inspection were found to be totally unlike this common Palm. Leaves and seeds were sent to botanists of this state for identification, but in their lack of suitable botanical works could not determine it. We recently found the description of *Thrinax excelsa*, Grisebach, to correctly apply to these specimens, many of which, eighteen feet in height, grace the tropical jungles of a few of the keys east of Key West. Thus another beautiful addition is made to the Palms of the United States.

Manatee, Fla., June 24th.

E. N. Reasoner.

Recent Plant Portraits.

SKIMMIA FOREMANI, *Gardeners' Chronicle*, May 4th; a form, according to the raiser for whom it is named, derived from *S. oblata* of gardens, fertilized with the pollen of *S. fragrans*, and thus not a hybrid, but merely a form of *S. japonica*; but in Dr. Masters' opinion this statement of the origin of this plant is open to some doubt; and it is possible that *S. Fortunei* had some part in its parentage.

ANOIGANTHUS BREVIFLORUS, *Gardeners' Chronicle*, May 4th; a Cape bulb formerly referred to *Cystanthus*, but now considered by Mr. Baker the type of a distinct genus. The flowers are yellow, with a short tube and spreading perianth-segments. It is recommended as a cool green-house spring-flowering plant.

CHRYSANTHEMUM MAXIMUM, *Gardeners' Chronicle*, May 11th; a hardy perennial plant, native of the Pyrenees and of Switzerland, which, if "cultivated properly," says the Rev. C. Wolly Dod, by whom this plant has been distributed, "that is, by being pulled to pieces and re-planted within a fortnight of Michaelmas every year in rich soil—it is quite a 'sensational plant.' The flowers sometimes measure four inches across."

CHRYSANTHEMUM LACUSTRE, *Gardeners' Chronicle*, May 11th; a native of Portugal.

Botanical Magazine, June.

SOBRALIA LEUCOXANTHA, *t.* 7,058; one of the largest-flowered of this beautiful genus, closely related to *S. macrantha*, from which it differs by the smaller limb of the lip and the pure white color of all parts of the flower, except the disk of the lip, which is orange. It is a native of Costa Rica, whence it was introduced into cultivation by the Messrs. Sanders, of St. Albans.

ENKIANTHUS CAMPANULATUS, *t.* 7,059; a native of northern Japan, and described as a small deciduous-leaved tree, with small, dull-red, pendulous, ball-shaped flowers. The genus *Enkianthus*, of which six or seven species, distributed from the eastern Himalaya to northern Japan, are known, is very closely related to *Andromeda*, the only technical difference being found in the seed-coats. *E. campanulatus* has been introduced into England, where it is perfectly hardy, by the Messrs. Veitch. It may be expected to flourish in all our northern States.

SPATHOGLOTTIS INOIDES, *t.* 7,060; a graceful terrestrial Orchid, a native of Nepal and Sikkim, of gregarious habit and with large, nodding, bright golden-colored flowers. It is easily cultivated in pans of sphagnum and peat, and blooms at midsummer.

ANGRÆCUM GERMINVANUM, *t.* 7,061; this very handsome species was discovered in 1886 by Lion Humbot, a collector of the Messrs. Sanders, in the interior of Madagascar. The plant from which this figure was made flowered at Kew in the spring of 1887, and again last spring, and is apparently the only specimen of the importation of twenty plants which survived. The stems of this beautiful and very interesting species are twelve to eighteen inches long, with alternate distichous, spreading, very thick and bright green leaves one and a half to two inches long, sessile, sub-cordate or half-clasping at the base.

The flowers are pure white and solitary, on short, slender axillary peduncles. The sepals and petals are two to three inches long, narrow and pendulous, and the lip is broad, quadrate, with rounded angles, and an inch across, the anterior margin suddenly contracted in the middle into a subulate filiform, recurved tail an inch long. This is one of the handsomest of recent Orchid introductions.

SOLANUM PENSILE, t. 7,062, a native of Guiana and of Brazil, and, although long known to botanists, a recent introduction into gardens, having been sent to Europe first in 1887. It is a tall, slender, unarmed, climbing plant with purple flowers very much like those of *S. Dulcamara*, except that they are produced in loose, spreading, terminal panicles. It requires the temperature of the tropical stove-house.

Notes.

The *California Florist and Gardener* has been merged into the *Pacific Rural Press*.

Mr. John Taylor, the well-known Rose-grower of Bayside, Long Island, cut 60,000 buds of the Madame Cusin Rose from 200 running feet of glass between July 1st, 1888, and February 1st, 1889.

A competent observer writes of the land which has been acquired by the City of Wilmington, Delaware, for a park, that it is "a most refreshing place." It is in the main a piece of rocky woodland, through which the Brandywine flows.

Eighteen thousand Japanese Orange-trees have been planted in one orchard in the southern part of Monterey County, California, and native gardeners have been imported to care for them. They are now in their second year, and the experiment promises to be successful.

The Pennsylvania Horticultural Society has accepted the offer of Messrs. Strauss & Co., of Washington, D. C., to bestow a prize of \$300 for the best twelve cut blooms of the new Souvenir de Wooton Rose, and will award the prize at a meeting of the Society in January or February next.

Over 3,000 different species of plants have been grown in the rock-garden of the Royal Botanical Gardens in Edinburgh. A list of 1,408 was published by the curator of the Gardens in the transactions of the Botanical Society for 1887-'88, as having flowered during 1887 and being not mere botanical curiosities but well selected species of plants suitable for rock-gardens and such as intending planters would do well to inspect.

It has been stated in this journal that the pamphlet entitled "Observations on the Treatment of Public Plantations" was prepared by Messrs. Olmsted and Harrison at the suggestion of a land-improvement association, the Park Commissioners of this city and the Torrey Botanical Club. We have received, however, authentic information that the Torrey Botanical Club offered no suggestion, and took no action whatever in relation to the questions discussed in the report.

Mr. T. S. Brandegee has recently returned to San Francisco from a long botanical journey in Lower California, devoted principally to the neighborhood of Magdalena and Marguerita Island and Comander, where he collected about 400 species. Later collections in the centre of the peninsular, and near San Quintin, bring the number up to 800 or 1,000 species. Mr. Brandegee on his arrival at San Diego was married to Mrs. Curran, the accomplished botanical curator of the California Academy of Sciences.

Dr. F. S. Gould, of Montecito, near Santa Barbara, California, has recently received from Italy 600 young Olive-trees of the best Italian varieties for the production of oil. They are the Cucco, Correggiolo, Frantoio, Morinello, Morchiajo and Palazzuolo. The plants are budded on seedling stock, and are two to four years old from the bud. The plants arrived in California after the three-months' journey in excellent condition, having been carefully packed, the roots of each plant separately, in a straw jacket.

Arrangements have been made under which persons who desire to attend the Convention of the Society of American Florists, in Buffalo, next month, can procure return tickets for one fare and a third. Delegates will pay full fare to Buffalo, and receive a certificate to this effect from the station-agent where the ticket is purchased, and this certificate, when signed by the Secretary of the Society, will be good for a ticket at one-third of a full fare. All the railroads east of the Missouri have practically entered into this agreement. Tickets will be good for three days before the Convention and the return tickets for three days after its close.

There is an Ash-tree standing in the little village of Cuantlan, north of the City of Mexico, which is believed to have been planted there not long after the conquest. The trunk measures at the ground thirty-three and a half feet in circumference, and the shade cast by its branches at mid-day, when the sun is just over it, covers a circumference of 335 feet. This great tree, and the other large Ash-trees, which are a conspicuous feature of the vegetation of the Valley of Mexico, are probably all *Fraxinus pistaciifolia*.

At the Arnold Arboretum, a new insect, a species of *Coccid*, has become quite noticeable and abundant on the trunks and branches of certain Elms during the past two or three years. It is doing considerable injury to young trees, and seems to be a very difficult insect to exterminate. A full record of its habits and origin has not been published yet, but it is supposed to be an importation from Europe and to be known to European entomologists. A further account of the insect and its injuries will be given in a future number of GARDEN AND FOREST.

The English Government is helping in the work of establishing a system of botanical stations throughout the smaller West Indian Islands. The first station established was at Grenada, and it has grown into an attractive, as well as useful, botanic garden. The station at Dodds, in the island of Barbadoes, has distinguished itself by first succeeding in raising Sugar-canes from seed, and has done other valuable work with regard to the sugar industry. At Santa Lucia is another station which distributes useful plants among the islanders. Other posts are to be established by order of the Secretary of State for the Colonies at St. Kitts, Nevis, Dominica and Antigua, and they will receive assistance from the Botanical Department at Jamaica. One great point in the extension of these stations is that through the Jamaica establishment the resources of Kew can be made available in the remoter parts of the Archipelago.

In an address on "The Dahlia," recently delivered before a horticultural club, and reported in the *Garden*, Mr. T. W. Girdlestone says the plant was originally found growing in sandy meadows in Mexico, 5,000 feet above the sea, by Hernandez, a physician to Philip II., of Spain. It made its first appearance in Europe at Madrid, where *Dahlia variabilis* was flowered from seed in 1789, the grower naming the plant after Andreas Dahl, a Swedish pupil of Linnaeus. Lord Bute was then Ambassador at Madrid, and in the same year—just a century ago—Lady Bute sent seeds to the Royal Gardens at Kew, and thus first introduced the plant into England. Lady Holland also sent home seed from Spain in 1804, and among the plants raised at Holland House were the first two seedling double varieties seen in Europe. It was long supposed that these were literally the first double Dahlias, but it appears that figures of both single and double flowers had been published in an old work on the natural history of Mexico, printed in Rome in 1651. One of the double varieties with a yellow disk and violet ray-flowers there bore the name Cocoxochitl. Perhaps we, too, have the same flower, but fortunately under another name. About the year 1800 serious attempts were made in France to introduce the tubers of the Dahlia as an article of food, but the public seemed to prefer to consider it a purely ornamental plant.

The largest tree in Great Britain, and one of the most famous, is the Cowthorpe Oak, in Yorkshire, which is believed to be some 1,500 years old. When Evelyn wrote his "Sylva," in the seventeenth century, its circumference at the ground was seventy-eight feet, but later, earth was banked up around it, which covered some considerable projections and reduced its girth. At the beginning of the last century its branches overshadowed an area of half an acre of ground. The top or leading branch fell at some unrecorded date, curiously slipping down into the hollow trunk where it remained. In the last century one of the main branches which was blown down proved to be ninety feet in length, and yielded five tons of timber. When carefully measured by Dr. Jessop in 1829 the girth of the tree at the ground was sixty feet, and at a yard above forty-five feet; the chief remaining limb was fifty feet long and its circumference eight feet, and the height of the tree was forty-five feet. It was then hollow to the top. For many years saplings raised from this tree were sold in pots by the villagers for as much as a guinea apiece. It is now a venerable ruin, but most picturesque in its decay. It stands in a green paddock, carefully protected from injury, with its ancient limbs supported by props. An idea of its size may be gathered from the statement that at least forty persons can stand within its cavity, and that its circumference is greater than that of the Eddystone Lighthouse, which was confessedly designed on the model of an Oak.

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Railroads and the Adirondack Reservation.

DURING the last session of the legislature at Albany a bill was introduced to prevent railroads from crossing any of the forest-lands owned by the state. The bill at once met with strongly-organized opposition, was amended so as to destroy its efficiency, and ultimately was killed outright. It was evident that some powerful corporations were anxious to get at the hard-wood forests which had hitherto been preserved because they were practically inaccessible. The great bulk of the pine and spruce has been cut already, or is doomed to early removal, because this timber can be floated down the small streams to mills and markets. These conifers, however, form a comparatively small portion of the forest, and if the hard-wood trees were left standing the advantages which the people of the state gain from the forests would still remain. It is true that the waste from the evergreens is too often left in the woods by the lumberman, and this is an invitation to fire, which may consume the standing timber, but it is possible to prevent these conflagrations or to hold them in check.

But when a railroad penetrates the recesses of a hard-wood forest its destruction is absolutely certain. These roads are often constructed for the avowed purpose of stripping the land of its timber, and stripping it clean. Besides this, they necessarily increase the danger from fires, not only by kindling them with sparks from locomotives, but by multiplying the number of loggers, and squatters and hunters, who light camp-fires along their course. That it was railroad interests which killed the bill alluded to, and killed it because they were meditating an immediate invasion of the forest through the state-lands is evident from what has happened since the legislature adjourned. According to a careful statement in *The Tribune*, of this city, no less than four railroads—one from the north, one from the south, one from the east, and one from the west—have already begun, or are about to begin, extensions of their lines into the very heart of the Reservation, so as to reach the best blocks of timber which still remain in the North Woods.

The Northern Adirondack Railroad, which runs south-

ward to Paul Smith's, is now pushing onward through a region of dense forest to Tupper's Lake. It is built primarily as a lumber road, and it means the extinction of this forest. The Carthage & Adirondack Railroad has been extended eastward this summer almost to Cranberry Lake; and, besides its purpose as a lumber road, its connection with iron works will incite more charcoal-burning, an industry which obliterates every vestige of a tree when it is conducted on the methods prevalent in the Adirondacks. The Delaware & Hudson Canal Company, having recently acquired the Adirondack Railroad, propose, it is said, to extend it northward across the Wilderness to unite with the Northern Adirondack Road. At all events, the extension is now surveyed as far north as Long Lake. Finally, the Chateaugay Railway, coming into the Wilderness from the east is planning to stretch on beyond Saranac, its present terminus, to Lake Placid. West of Lyon Mountain is a dense, hard-wood forest which is now owned for twenty-four miles by this Chateaugay Company, and through this it is proposed to cut a swath six miles wide, three miles on either side of the track, taking every stick for charcoal, and leaving behind a verdureless desolation. After the charcoal kilns have swallowed up the last available bit of wood, the chips and branches are gathered into heaps about the stumps and fired, until everything inflammable is consumed, including the thick mat upon the forest floor, which can only be felted together by the slow processes of Nature carried on through centuries. This means not only death to every green thing, but to every hope of renewed forest-growth for generations to come. The reason offered for this effacement of all life is that it insures protection to the adjacent forests owned by the same company. Sparks from their locomotives will fall into no tinder, and tourists will kindle no camp-fires after the charcoal-burners have left the land. The entire strip will be as bare and barren as so many miles of sand upon the sea-coast.

The only way to protect the Adirondack Woods from being utterly swept from the face of the earth is for the state to acquire the land in fee-simple. Something beyond this is, no doubt, essential: an administration which is above the mutations of party politics; a policy which is adapted not to temporary conditions, but which looks forward to results in the far future; an educated public sentiment which will tolerate no ignorance nor inefficiency in the men who have executive authority over the Reservation and which will insure abundant moral and financial support to worthy officers—but, after all, the state must own the land, and the sooner it begins to acquire a title the better. No doubt it would be wise to begin with moderation—that is, with a comparatively small appropriation and a maximum limit of price per acre. But a beginning should be made, and the public spirit and intelligence of the state should organize itself to enforce a judicious administration of the trust.

A writer in the *London Lancet*, in reviewing Mr. Henry Gannett's paper, in which the ground was taken that the forests upon the mountain ranges in our western States and Territories had the effect of decreasing the supply of water available for irrigation, and therefore that the sooner they could be wiped out of existence the better it would be for the country—a view which we have already shown could not be substantiated by any scientific data—says:

"He (Mr. Gannett) admits that land under tillage retains its moisture better than land not so treated, and that woods equalize temperatures and air currents and act as water reservoirs. But some of his divergences from the popular view are surely inadequately reasoned out; for example, that the great superficial area made up by leaves favors evaporation and sends back to the air a large proportion of the rain which, unintercepted, would go straight to the soil, which is thus impoverished of its due supply of moisture. To this objection Ebermayer can rejoin that evaporation in the forest is two and a half times less than outside it; nay, Clavé makes it as much as five times less. If we take into account the protective covering of the soil caused by the leaves that have been shed

upon it, then, compared with the evaporation from the free or woodless ground, we get a diminution of more than eighty per cent. ! The practical question, however, lies not so much in the increase or diminution of the rain-fall as in its distribution."

Some Old American Country-Seats.

III.—BELMONT.

BEYOND Fresh Pond the road from Cambridge to Waverly ascends a gentle swell of smoothly-surfaced upland, enters the shade of arching Elms and presently discloses on the right hand a green lawn of an extent that is uncommon near Boston. The ground has a beautiful form. It descends a little from the road towards a gentle hollow which holds a small pond, and thence it rises very gradually, and with many slight irregularities of slope, to the wood which bounds the scene at the north, and to the house at the north-west. The western border of the open ground is a wood of native, deciduous trees through which the approach road goes to the house. In many places the grass runs in between the surrounding groves, so that only the lower or eastern boundary of the lawn appears in the least degree formal or stiff. A few Hickories rise in the midst of the grass. They are quite in keeping with their surroundings, but this cannot be said for the group of White Pines, or the two or three Norway Spruces, or the big Larch encircled by old plants of *Arbor-vitæ*, which are the companions of the Hickories in the open ground. Our picture, (page 330) taken from a point near the little pond, shows only the upper half of the lawn and but one of these incongruous trees, the Spruce, which appears behind the two Hickories in the foreground. This Norway is a fine specimen of its kind; its lower limbs rest upon the ground on all sides, but it should never have been planted where it is, for its formal shape is quite the opposite of every shape around it and attracts the eye to itself at once in a way which confuses the effect of the otherwise harmonious scene. The stiffly circular clump of *Arbor-vitæ* is a still more obtrusive object. Thoughtless planting like this has too often injured scenes which nature made harmoniously beautiful, and to which nature would gladly add more and more of character and beauty if she were helped and not thwarted by man.

The house is approached through a wood of trees which arch overhead to form a handsome informal avenue within which the road curves very gently; but as the whole length of the road is visible at once from the beginning, it had better have been made straight. At the house is a wide gravel space for the accommodation of waiting carriages, and here a junction is made with the service road, a branch of which leads to the stable. Thus all the necessary gravel spaces are provided at this one side of the house, so that the grass is free to sweep up to the very walls on two sides—a point of great merit in the plan. The fourth, or north, side is occupied by a walled kitchen-court and laundry-yard.

The house is a substantial structure of brick, with verandas built of stone. Its rooms command a view of the ten acres of lawn on one hand, and of the interior of the wood on the other. Over the tops of the trees at the foot of the lawn appears the shining dome of the State House on Beacon Hill, five miles away.

A broad walk leads eastward from the house to a point of view which commands Fresh Pond and the intervening diversified farms. Six Purple Beeches stand in a row beside this path near the house, but formality ceases at the view point, and the walk wanders off along the brink of the gentle eastward slope, passes among scattered Oaks of large size and around the small deer-park, and after sending off a branch to a knoll which offers a yet wider prospect over the Mystic River basin, returns to the rear of the garden.

Our picture on page 331 shows a part of the Oak-wood on the eastern slope. The trees are fairly well exhibited, but the gracefulness of the undulations of the ground surface at this point is scarcely suggested.

The garden behind the house is an enclosed square measuring 300 feet each way, level, and formally divided by broad gravel paths, as shown upon the plan. A conservatory and two long graperies, behind which are the potting-sheds and plant-houses, front upon the northern side of the garden, while two Peach-houses and many well-trained Pear-trees occupy the east and west walls. Most of the ground is smoothly grassed. There are two large masses of *Rhododendrons* mixed with similar shrubs; at the sides are long beds of perennials and foliage-plants, and grouped upon the grass near the angles of the walks, are specimens of such trees as the Flowering Magnolias, the Red-flowering Horse-

chestnut, the Weeping Elm, the Swamp Cypress, the Ginkgo, the Oriental Spruce, the Swiss Stone Pine, and the Mountain Pine (*P. Mugho*). Such specimen plants are certainly quite in place in a formal garden intended to be decorative. They should, however, be chosen for their appropriateness, and grouped with due regard to the effect upon their neighbors. The Mountain Pine just mentioned is too roughly picturesque to appear in a garden like this where elegance is the end and aim.

A glance at the sketch-plan will explain the arrangement of the numerous minor buildings and enclosures of the estate. The completeness of the equipment is remarkable. There are buildings for all purposes—they are not all named upon the plan—and elaborate facilities for the growing of everything from the Parsnip and the Potato to the Chrysanthemum and the Orchid. The land company which is now in possession has cut off the farm lands, but offers the remaining parts for sale quite intact. These lands made a country-seat, at least, as long ago as 1800, when the owner was a brother of Commodore Preble. One of the daughters of the house married Mr. Nathaniel Amory, who became the next owner, and he sold the property to Mr. R. D. Shepherd, and he to Mr. J. P. Cushing. Mr. Cushing spent many thousand dollars every year upon the place and made it, thirty-six years ago, the most famous seat near Boston. Mr. S. R. Payson, the last owner, maintained and increased this fame.

To-day the place possesses something of that priceless and poetic charm which so distinguishes the Gore Place and the Lyman Place; it is felt in the deer-park and among the Oaks, but the spell is not so potent, nor does it pervade the whole scene, as at Waltham. To define the difference is a little difficult, but it is in part accounted for by the fact that a certain unavoidable suspicion of display attaches to this place—to the great expanse of clipped lawn, the specimen trees, and the elaborate gardening. On the other hand, the gardening and the specimen-planting is generally good in its way, and it is placed where it belongs: namely, in the garden, and not in the landscape.

Boston.

Charles Eliot.

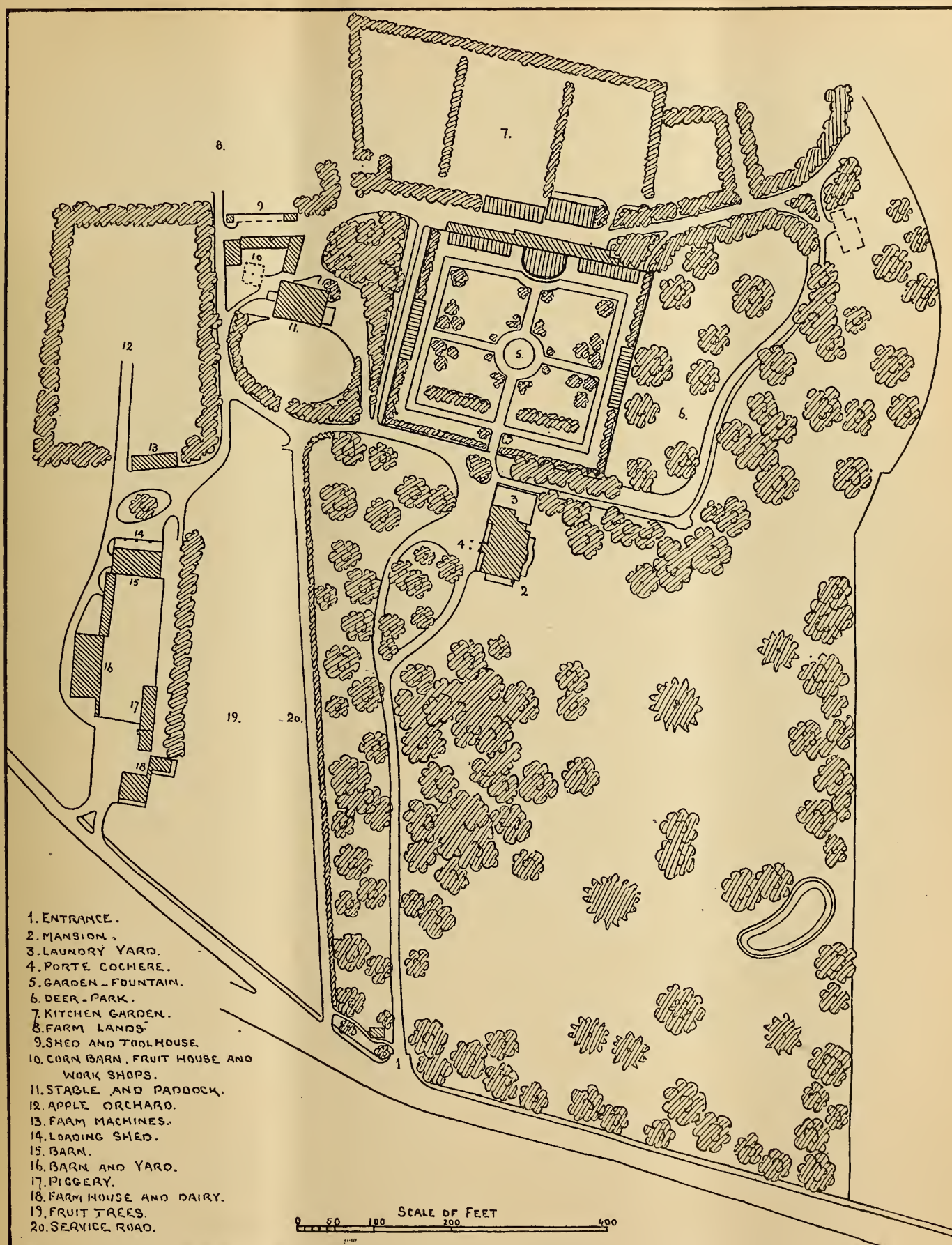
A New Race of Lilacs.

THERE may be found in some gardens still a very old variety of the common Lilac under the name of *Syringa azurea plena*. I do not know the origin of this plant. It produces small panicles of clear-colored flowers in each of which there are a number of corollas arranged one within the other. It is a teratological curiosity, but as an ornamental plant quite destitute of value, as the rare flowers are quite hidden by the foliage. This variety, as the flowers have no stamens, and the pistils are either abortive or so hidden among the numerous corolla-lobes as to be beyond the reach of insects, does not produce seeds naturally. But it will sometimes seed with the aid of artificial fertilization; and seeds secured in this way produced the first of the double-flowered Lilacs introduced during the last few years.

It is eighteen years since this plant, artificially fertilized in my nursery with pollen of various Lilacs, bore a few seeds, which afterwards germinated. Some of the best varieties of *Syringa vulgaris*, such as Ville-de-Troyes, Sanguinea, etc., were selected as pollen-parents in this experiment, and the pollen of *Syringa oblata*, a species remarkable for its early flowers and for the brilliant coloring of its foliage in autumn, was also used. The characters of this species, to which an article recently published in GARDEN AND FOREST has called attention, were transmitted to one of the seedlings derived from this cross. This was first sold under the name of *Syringa hybrida hyacinthiflora plena*. The term "hybrida," which is found still on the catalogue of the Maison Lemoine, was used to show that this plant is a true hybrid between two species of *Syringa*.

Syringa hybrida hyacinthiflora is already out of flower, although the flowers on most of our Lilacs are only just opening; and in autumn it is exceedingly ornamental, with its brilliant red foliage. The panicles of flowers are large enough, although the corolla-lobes of the double flowers are narrow and reflexed. But the production of this plant was a step in the right direction.

The other seedlings from this first crop of seed showed no trace of the blood of *S. oblata*, but there were some of them which were handsomer than *S. hyacinthiflora plena*. The best plant of this set was sent out under the name of *S. vulgaris Lemoinei*. The thyrsus of this plant is eight inches long, and covered with lilac-blue double flowers, with numerous imbricated corolla-lobes. A number of other good varieties were in the set differing from *S. vulgaris Lemoinei* in the shape of the flowers, in their color, in the color of the flower-buds, or in the



Sketch Plan of Belmont.—See page 326.

shape and size of the thyrsus. These varieties are Renoncule, Rubella Plena, Mathieu de Dombasle and Le Gaulois. An attempt was made as soon as these different varieties flowered to get seeds from them, and the old *S. azurea plena* was dis-

carded as a seed-bearer. The best single-flowered varieties with flowers of different shapes and colors were used to cross with the new double-flowered race, and pollen from the flowers of *S. Chinensis*, even, was tried; but this last experiment pro-

duced no results. A new set of seedlings was obtained from the second cross, and among them were some very remarkable and beautiful plants. From this sowing came Alphonse Lavallée, Michel Buchner, President Grévy, Pyramidal, M. Maxime Cornu, etc. Here we have, in addition to the form and color of the flower, remarkable variations. The corollalobes in one variety are round and flat, resembling a Ranunculus; they form in another a globular head, with the lobes all incurved; in another they are all reflexed, and in another they are crumpled.

I will not give now a detailed description of each of these varieties; and it need be said only that we are constantly experimenting with double-flowered Lilacs, and that each spring-time sees a new set of flowers produced, with forms and colors entirely unknown before. Nearly all the shades of color found in the flowers of single Lilacs have been produced already in this new race. Shades of blue are represented by A. Lavallée, Michel Buchner, President Grévy and Léon Simon. The darkest reds appear in Comte Horace de Choiseul and La Tour d'Auvergne; a delicate rose in Virginité; and we have now obtained a variety with large, pure blue flowers. This has not been sent out yet, but it will appear next week at the Exposition in Paris.

Nancy, April 18th, 1889.

V. Lemoine.

Entomological.

Cut-worms.

THIS is the popular and expressive term usually employed to designate the larvæ of certain species of the Lepidopterous family, *Noctuidæ*, and it is based upon their practice of eating off young plants at the level of the ground. The more succulent the plant, the greater the danger from Cut-worm. Usually the complaints come in just after plants are set out, and I myself have seen a field of young plants set out one evening cut off to the extent of fully one-half by the next morning. The explanation is simple: many of the larvæ of *Noctuidæ* are hatched in the autumn and hibernate about one-third or one-half grown. They are voracious in spring, and, after a cleared spot of ground is planted, the only vegetation on it must suffer. Other larvæ hatch early in spring and feed on grass, weeds and whatever may be on the ground until it is cleared for the garden plants. Then the enforced fast until vegetation returns to their neighborhood makes them dangerous to whatever is set out. They are nocturnal in habit, lying hid just under the surface of the ground during the day, and feeding at night. In the morning they can be most usually found at or near the base of the plants cut off by them during the night.

Various means have been tried to keep them from the plants—lime, salt, gas-tar and a variety of other repellants have been employed, all with a variable, usually small, degree of success. Later, as the habits of the worms became better known, traps were prepared for them. Holes were driven with a dibble, around the newly-set plants, and the Cut-worms wandering about fell into them, and, being unable to climb up the smooth sides, perished there. Traps were set in the form of chips and short pieces of board, which proved convenient hiding places for the larvæ, and there they could be readily found during the day and destroyed. Still later, balls of grass and succulent leaves were scattered about the fields, and there the worms congregated, and were easily destroyed during the day. Most recently, the grass balls were poisoned, by being soaked in a pail of water into which a tablespoonful of London Purple had been stirred, and the Cut-worms were thus killed without the labor attendant upon a daily visitation of the lures. The trapping system with the aid of poisoned lures has, on the whole, proved most satisfactory; but, as in the case of all applications of insecticides, the element of time is a most important factor, and in many cases really determines success or failure.

There is comparatively little success from lures placed after a field has been set out and where vegetation has started, since the worms will prefer young, growing plants, to the lures, and after the larvæ become full grown and ready for pupation, lures, of course, fail in attracting more than a very few belated specimens. The proper time for a Cut-worm campaign is indicated by what has been said in the previous part of the paper. Just after the ground has been prepared for the crop to go in it, and while it is clear and free from vegetation—if possible only a day or two before planting—the poisoned lures should be spread about liberally, and the vast majority of all the Cut-worms in the prepared ground will be attracted and destroyed. It is, of course, not likely that the destruction will be complete, but the percentage of plants lost will be very much lessened, and will be insignificant in comparison to the damage that would have been otherwise caused. It has quite frequently

happened that fully-grown larvæ have been sent me, and, after recommending lures, I received word that they did not attract. The explanation in such cases has been given: the larvæ were ready for pupation and their work had ceased. Lures are always successful in proportion to the lack of other vegetable matter in an infested field; and they are more successful when used early in the stage of growth than when the larvæ approach maturity. For the readers of this paper the species of Cut-worm is not important. They have all similar habits, and the same remedy is applicable to nearly all of them—certainly to all cutting plants at the level of the ground.

Rutgers College.

John B. Smith.

Foreign Correspondence.

London Letter.

THERE was a bright display of flowers at the last meeting of the Royal Horticultural Society, but a conspicuous absence of new Orchids, although this date was fixed for Mr. Harry Veitch's paper on "The Cultivation of Orchids." Such Orchid fanciers as Baron Schroeder and Sir Trevor Lawrence do not give the public a treat very often, and, considering the risk that attends the transportation of Orchids in flower (in most cases of enormous value) for a journey of thirty miles, it is not surprising that these two staunch supporters of the society do not show more frequently. Among the few Orchids sent yesterday was a remarkable group of some two dozen specimens of *Epidendrum vitellinum majus*, every plant carrying tall branched spikes of large orange-vermilion flowers. Rarely, indeed, has such a perfect group of this Orchid been exhibited, and it is evident that the grower has hit upon the peculiar treatment this Mexican species requires. I could not ascertain how long the plants had been imported, but the bulbs seem to have been home-grown. If Mr. Partington can show this same group in such perfect condition five years hence, he might well lay claim to being the champion grower of this fastidious plant, which, though it grows well for a time, is, like *Cattleya citrina* from the same country, not to be depended upon for a great number of years. *Cattleya Mossia Schroederiana* was shown fairly well, but I fail to see much distinction in this variety, so named, from many others one could single out of a large collection. It has certainly a large, fine flower, and there is a delicacy about the lilac-mauve tint of the broad sepals, but the lip is not nearly so richly adorned with gold and purple as many unnamed forms I have lately seen.

Amongst a collection of Tea Roses from the well-known Tea Rose-grower, Mr. Prince, of Oxford, was the new white sport from the old Souvenir d'un Ami, which is named Souvenir de S. A. Prince. Mr. Prince catalogues it as "Undoubtedly the finest white Tea Rose offered to the public of late years, as it possesses all the good qualities of Souvenir d'un Ami combined with a more robust growth." This advertisement is endorsed by our best Rose growers, some of whom sat on yesterday's committee when a first-class certificate was proposed for it and carried unanimously. It is indeed a lovely Rose, rivaling the favorite Niphetos, with even greater depth and substance in the flowers, its snowy petals set off by the broad, deep-green foliage. The other Tea Roses from Oxford included some perfect blooms of two of the loveliest Teas that Mr. Bennett has put into commerce. These are Princess of Wales and Princess Beatrice. The former has a strong resemblance to Comtesse de Nadaillac; indeed, as the blooms were ranged side by side it needed a second look to discern the difference. Another Rose of quite a different stamp that is worthy of note is Paul's Single White, a most valuable addition to our list (never too long) of hardy climbing Roses. This one has pure white flowers, nearly three inches across, produced plentifully on slender branches that have a decided rambling tendency. When I first saw it I thought it was a large form of the Rocky Mountain *Rubus deliciosus* until I saw the foliage.

The chief task of the floral committee centred in singling out the best varieties of Pæonies, Pyrethrums and Delphiniums from a magnificent collection of flowers occupying a space of 500 square feet shown by the great raisers of these plants, Messrs. Kelway of Langport, a favorable spot in wild Somersetshire. For large size of bloom, for delicacy of tint and for fragrance, no hardy flower, except, perhaps, the Rose, can equal these double Pæonies, which have all originated from the flimsy single European and Chinese species. The best varieties grown, as Kelway sends them to town, have blooms as big as a child's head, a solid mass of petals, with a delightful blending of soft tints. Usually there is a central tuft of small petals surrounded by a row of broad or guard petals of a different color, and one of the best examples of this is in

a sort called Princess Irene, which won an award of merit. The centre is creamy-white, the guard petals pale pink, and the fragrance that of a Tea Rose. Other sorts I picked out as good were Princess Christian, pale pink; Mrs. Chamberlain, soft blush pink; Prince George, deep crimson and Baroness Schroeder, delicate pink. These comprised the cream of a large number of new varieties, every one of which was a vast improvement on old sorts. There were a good many single-flowered sorts shown, but these found no favor with the committee, in fact I don't think that single Pæonies will become popular, for the æsthetic people who made the single Dahlias popular do not seem to see beauty in a flimsy, single Pæony. The typical *P. albiflora*, however, with its cup-like flowers, snow white, incurved petals with a golden centre-tuft of stamens is very beautiful.

Pyrethrums, like the double Pæonies, are quite modern flowers, and both single and double sorts take the public taste; the double flowers because they last so long in perfection, the single ones because of their gracefulness. Kelway had many new varieties but only a dark crimson flower named Pericles won an award; not because the others possessed no merit, but the committee did not recognize the novelties as improvements on older sorts. There were some beautiful white double sorts and glowing crimsons, and one was almost a yellow, though we hardly need yellows much in Pyrethrums, seeing that we have the best of golden-yellows in annual Chrysanthemums which flower at the same time. Everybody thought the Delphiniums, or perennial Larkspurs, were wonderfully fine. Some of the spikes were two feet high, and massive in proportion. Their colors ranged from pale blue to reddish-purple, and some had showy, white eyes, which made the spikes very attractive. Four sorts were voted awards of merit, their names being Faust, Orbit, Regalia and Ardite. I will not attempt to describe their distinctive features, as it cannot be done. These Larkspurs, well grown, reach six to seven feet high, and a few masses of these appropriately placed create about the finest effect one can have in a June garden. Moreover, if cut down immediately after flowering, which is about the beginning of July, they will throw up flower-spikes in autumn again if well treated with water and manure. They are gross feeders, and will repay occasionally dosing with liquid manure, not too strong, but weak and frequent. The best soil for them is a sandy loam, and in a sheltered situation.

There were a few new Begonias sent by Messrs. Laing, the Begonia-raisers, and one, because of its persistency of bloom, as well as its large size of flower and delicate color, obtained a meritorious award. It was called Mrs. Joseph Chamberlain. Its flowers are single, five inches across one way, with white petals broadly margined with pink. A first-rate new Fuchsia also won the committee's approval. It was called Dorothy Fry. It has large, single flowers, crimson sepals and a snow-white corolla, very floriferous and of excellent habit. Among other plants worthy of note was *Verbascum Olympicum*, a large hardy biennial Mullein with broad and long leaves of a grayish-green arranged in a huge tuft from which arises the much-branched flower stems about six feet high, covered thickly with bright yellow flowers. It is a very showy border plant, and one of the finest of the numerous group of large Mulleins. It is quite hardy here, and would be, I think, in America, if protected the first winter. It is a first-rate plant. *Rhododendron calophyllum*, one of the Himalayan group with large white flowers borne in clusters, was admired by many, though unfortunately it is only in large conservatories that it and its congeners can be grown successfully.

In his paper on Orchid-culture Mr. Veitch reviewed the history of the art from Philip Miller's time, when the Vanilla was the only exotic Orchid known in Europe, till the present day. He contrasted the difficulties under which our forefathers labored, owing to the want of knowledge as to the natural conditions under which Orchids grew wild, with the present system of culture when we have tolerably precise information of the conditions we have to imitate. Notwithstanding the marvelous results we obtain now, the essayist considers that we have a great deal to learn, and that our knowledge and practice will be progressive. Without entering upon the details of culture, Mr. Veitch asserted that successful Orchid-culture must depend upon carrying out a few main principles, the chief of which is abundance of light, ventilation with the minimum of artificial heat. The speakers in the discussion which followed, including Sir Trevor Lawrence, Baron Schroeder, Sir Charles Strickland, Dr. Masters, Mr. Dyer and Mr. Morris, all corroborated the correctness of the principles laid down by Mr. Veitch, and one related a fact in regard to a certain fine specimen of *Vanda cærulea* which for

some years won for itself much glory at the London shows, because it had received cool treatment from its cultivator, but when it was sold and sent to America it died the year after, presumably on account of being warmly treated. Some discussion arose concerning the future means of naming Orchids, since Dr. Reichenbach is dead. The director of Kew has intimated that he is willing to put the establishment of Kew at the service of orchidists in this respect, and, considering that the Kew Herbarium is rich in material and embodies Lindley's full Orchid collection, it is hoped that not much inconvenience will result from the action of the professor who, in his eccentric will, stipulates that his herbarium is to be sealed up for twenty-five years. The chief regret is that the Reichenbach collection contains so much material that we cannot hope to be collected again, especially the fragments that were contributed to it by travelers who sought Orchids in untrodden regions, but could not gather living plants.

London, June 12th.

W. Goldring.

Cultural Department.

The Strawberry Season of 1889.

THIS spring Strawberry plants appeared to have wintered well, and early indications seemed favorable for a fine crop of fruit; blossoms were abundant, the fruit apparently well set, and frequent rains seemed to furnish all requisite moisture, but as they began to ripen the blight or brown rust put in an appearance with more fatal effect than usual. Few varieties escaped entirely, although some were less seriously affected than others. I find that among amateurs as well as among market growers there are many who do not know what is meant by this term "blight," and when asked if they are troubled with it, reply in the negative. It appears in brown spots on the leaves, stems and fruit-stalks, destroying the circulation; the stems and calyx die, and the fruit ripens prematurely, with a poor, indifferent, and sometimes bitter, flavor. The mildew that sometimes effects the foliage is an entirely different thing. This rust, or, as generally called, blight, has troubled me for years. Last year I planted my Strawberries on entirely new ground, in the hope to escape this scourge, but it was of no avail; some varieties were so badly affected that they were picked but once, and this season it was nearly as bad. Some varieties are seemingly more susceptible to its attacks than others, and I have thought that this might be due to impaired vitality resulting from cultivating a variety a long time, but I find new varieties, young and vigorous from the hands of the originators, are sometimes as readily affected as the older sorts. I have some of the new varieties now on trial that have been introduced during the past two years, with the usual accompaniment of testimonials and praises in the superlative degree, that are absolutely worthless here on this account. One of these, in-particular, sent to me for trial a few years ago, gave much promise for productiveness, and last year I gave it the best possible chance by planting it on the ground where Strawberries had never been grown. But the rust developed to a greater extent, if possible, than on any others. It is an entire failure, and I infer that the liability to attack is due to a constitutional weakness, rather than to the age of the variety.

My old favorite, the Downing, the best berry, taken all in all, that I have ever grown, and the one I have grown longer than any other, has become so seriously affected that it must go. I gave all a spraying with sulphate of copper this season, but the application did no good, possibly because made too late. Last fall I happened on a bed of Downings on new ground three miles from here. They were so vigorous and healthy I hardly recognized them, and I felt hopeful that the owner would be able this season to show the Downings as I used to grow them. But I found later, to my disappointment, the enemy had found them also, and I have concluded to surrender my favorite and confine my planting to such as seem to possess greater power of resisting the fungus.

As soon as I discover a variety which seems to have any special liability to this disease it is at once rooted out, lest it become a breeding-place of the fungus. This scourge is annually spreading, and it is only by such caution that we can hope for any relief. The mycologists of the country are said to be studying the disease, but as yet no satisfactory remedy has been reported.

The first ripe berry I picked (May 30th) was from the Pearl, and the following day the Jessie yielded its first specimen. Of the former I formed a very favorable opinion last season, and another year's experience confirms this view. The berry is handsome, perfect in shape, conical, very uniform in appearance and of good size; the calyx is easily removed, and the

quality is very good. It compares favorably in all respects with the Jessie. The Jessie may possibly produce a few larger berries, from a tendency to irregularity not shown by the Pearl, but, in other respects, it shows no superiority here. It shows, also, a tendency to uneven ripening not seen in the Pearl. Both have a liability to blight to some extent, but I shall retain them as leaders for another season. Prince (Durand's) is the standard of excellence for quality by which others are judged. It is not quite as productive as is desirable, but it makes up in quality for its shyness in bearing. It rusts some, but I hope this tendency will not be so apparent when its more susceptible neighbors have been discarded. Jersey Queen, the Prince's twin-sister, is more vigorous and robust in habit and produces larger berries, more of them, and of more acid flavor. It rusts somewhat, but I shall keep it a little longer.

Sharpless, the largest of all and the most deformed, is not very productive, and rusts and rots so badly that it must go.

article is looked upon as an extortion. The fraudulent baskets, five of which will hardly hold four honest quarts, have also an influence in depressing prices, for not one buyer out of ten observes the scant measure. The way to get the highest satisfaction out of this luscious fruit is to grow it well at home. If that is not possible, then buy only freshly-picked berries grown near at hand.

Montclair, N. J.

E. Williams.

Some Hardy Ferns.

OF the many species and varieties of Ferns (over forty) in New England, nearly all are desirable for cultivation. All are hardy, that is, against cold weather, and many of them may be grown as easily as any of the hardy plants. The beauty of their foliage, which lasts with most of them, from early spring until it is killed by frosts in autumn, and even through the winter with a few which are evergreen makes them invaluable as hardy, ornamental plants. There are, about most



Belmont.—See page 326.

Davis, a reproduction of Sharpless, shares the same fate. Jewell, which made such a splendid record with Mr. Augur, its originator, and promised well here, rusts so badly that another season closes its career with me. Gold, Dewey and Acme are discarded this season from the same cause. Atlantic follows, and the worthless Cahanse. I have petted and coaxed these varieties in vain attempts to develop their good qualities and they utterly fail to respond.

Belmont proves unproductive here and ripens unevenly, otherwise it would be a very desirable kind, as it possesses size, quality and good looks. I shall retain it in place of Sharpless, another season, at least. Cumberland Triumph is a good-enough family berry, but its capricious fruiting and liability to blight renders it uncertain. Burt, sent out last year as likely to supersede the Wilson, proves more healthy and desirable than that old variety ever did with me. It remains healthy so far, but seems lacking in productiveness. The fruit is of fair size, solid, and so acid that it makes an unusual demand upon the sugar-bowl. Ohio looks and tastes so much like the Champion as to suggest the suspicion that it is the old variety rechristened or reproduced. Louise, sent out last season, has thus far shown no quality that encourages a hope that it will prove an acquisition on my soil.

The most promising of the new varieties I have yet tried is the Bubach. The berries are large, bright, smooth and handsome. It appears to be both vigorous and productive—two desirable features in a Strawberry—and the quality is fair to good.

If quantity and vigor alone were wanted I should name the Crescent as a most satisfactory variety, but amateurs generally want something a little better. Strawberries, owing to their delicate texture, ought to be grown very near the point of consumption, and consumers who would secure the very finest flavor should never buy a berry that has been carried far or picked long. While our markets are supplied with stale fruit grown hundreds of miles away, bruised by transportation, and so far on the road to decay that it must be sold at once, it will be difficult for local-grown fruit to command prices that will afford profit to the producer. Consumers have become so used to low prices that two or three cents' advance for a fresh, superior

country homes, bare shaded corners, too shady for grass to grow, where these Wild Ferns would thrive and might be permanently established. One of the most desirable species is the Ostrich Fern (*Onoclea Struthiopteris*). The plant varies much in size, according to location. The finest specimens we have seen were growing in the bottom of a cool, half-shaded ravine. The fronds were fully five feet in length by ten inches wide, and of a beautiful light-green color. It is an easy plant to grow in either sun or shade if in moist soil, and it may be planted in spring or autumn. Another valuable Fern often found with the Ostrich Fern, but a rarer kind, is *Aspidium Goldianum*. This beautiful Fern grows nearly as tall as the former, with broader fronds, often a foot or more in width and of a darker green color. It is usually found in the shade and likes a moist, sandy or gravelly soil.

The Cinnamon Fern (*Osmunda cinnamomea*) and *Osmunda Claytoniana* are both valuable species, with large, broad fronds, often over five feet high. They are not difficult to grow in moist soil and will thrive in either shade or sun.

The Royal or Flowering Fern (*O. regalis*) is the prettiest of the three with finer, and more divided foliage, quite distinct from the others in its general appearance. Its height is from two to four feet. We have in Vermont a finer form with narrower foliage which English dealers sell as *O. gracilis*.

Phegopteris hexagonoptera, one of the Beech Ferns, is a small plant six to ten inches high, with triangular fronds of a light-green color. It is an easy Fern to grow in half-shaded corners. *Phegopteris polypodioides* is somewhat like the preceding, with smaller and darker fronds and grows in dense tufts. It is readily established in moist, shady ground. *P. Dryopteris* the most common of the Beech Ferns, is a delicate little plant seldom over six inches high with triangular fronds four to six inches wide. It does best in peaty soil along the borders of swamps, but it can be grown in any moist and shady corner.

Woodia Ilvensis is a little low Fern growing in tufts seldom more than six inches high. The fronds are chaffy and hardly an inch wide. It is generally found on exposed rocks, but may be grown in moist, shaded soil. It is a valuable Fern for the rockery.

The Maiden-hair Fern (*Adiantum pedatum*) is one of our prettiest species, and larger numbers of this are exported to Europe than any other. It grows in tufts, about a foot high, and fine, strong clumps of it are very beautiful. It is not a difficult plant to grow, but should be set in autumn.

Asplenium Trichomanes is one of the prettiest of the smaller Ferns and not difficult to grow. It is found in tufts on shaded cliffs, but we have grown it in moist, loamy soil in the shade. It is a fine plant for sheltered corners of the rockery.

The common Wood Fern (*Aspidium marginale*) is a pretty plant and its fronds are evergreen. The plant is generally about eighteen inches high, and grows naturally on rocky hill-sides, in the shade, and in low woods. It can be successfully grown on any ordinary soil in the shade.

The Walking Leaf (*Camptosorus rhizophyllus*) is a low, evergreen Fern, growing in dense mats or tufts on shaded rocks. In the right location it spreads very rapidly, but it needs shade. We have seen it successfully grown in the shade in fine, loamy soil with ordinary culture, but for its best development it needs a light, moist soil.

Charlotte, Vt.

F. H. Horsford.

Orchid Notes.

Lalia Amesiana.—This most beautiful and rare hybrid is now in flower with us. It is the result of crossing *Cattleya maxima* with *Lalia crispa*, and is a great improvement upon both. In habit it much resembles *C. crispa*, though by no means so strong. It is a robust, free-growing kind, producing four to five flowers on a peduncle, though larger plants may produce more. They are about six inches across, the narrow, white sepals tinted with purple, which is more intense on the broader undulate petals. The lip is beautifully crisped with a pale margin, while the front lobe is a rich purple which is extended into the throat. This species is of recent introduction, and is as scarce as it is beautiful. It is named in compliment to Mr. F. L. Ames, of Boston.

Brassia verrucosa is an old and well-known Orchid which produces many-flowered racemes of curious flowers with attenuated sepals and petals of pale green, dotted near the base with dull purple. The spreading lip is white, marked with the green, wart-like excrescences which give the specific name to the plant. It is a native of Guatemala, and is particularly easy to grow in open soil of peat and moss, the temperature of the intermediate house suiting it best. At this season of the year its flowers—though by no means showy—are welcome, and their grotesque appearance always attracts attention. There is a strong-growing variety with superior flowers called *Grandiflora*.

Dendrobium moschatum is a very strong-growing, evergreen species introduced from India more than sixty years ago, and formerly to be seen in nearly every garden, where stove-plants were grown. The best grown plants I have yet seen were trained to the roof of one of the old-fashioned stove-pits, and subjected to the strong, dry heat of a brick flue. Under this treatment the immense bulbs were thoroughly ripened, and produced every year a tremendous crop of bloom which hung from the roof like bunches of grapes. Of late years this old plant has had to give way to newer and more showy kinds, and is now seldom seen. The bulbs are very stout, six to eight feet long, furnished with oblong, ovate, leathery leaves. The flowers are produced in pendant racemes about a dozen in number, usually from the sides of the leafless bulbs. They are about four inches across, creamy-buff suffused with rose; the slipper-shaped lip is pale yellow, ornamented with two large blotches of dark purple. They last about a week. This is one of the easiest Orchids to grow, preferring strong heat and abundance of water during growth. A long rest with good exposure to sunlight will insure abundance of flowers. If pot-bound, liberal applications of liquid manure will be beneficial.

Anguloa Clowesii is a Colombian Orchid found at medium elevations, and does best when treated as an intermediate. A compost of peat and loam with chopped leaves, with plenty of sand, suits it, and so do an abundance of water and air during growth, and a long and somewhat dry rest. It is a large-growing kind with oblong, ovate bulbs and plicate leaves about two feet long. The scapes are produced from the base of the young growths, and bear a single, large, Tulip-like golden-yellow flower, with a pure white lip and very fragrant.

Kenwood, N. Y.

F. Goldring.

Savoy for Winter.—For home use the coarse Drumhead class of Cabbages should be discarded for the more delicate Savoy. The Netted Savoy is best, but the American Drumhead Savoy is larger and fairly good. I set the plants generally upon a strawberry-bed after the fruit has been gathered, burying the strawberry-sod deeply with a large plow. Then a heavy coat of fine stable-manure is spread over the plowed surface, which is harrowed lightly, and rows are cut to set the plants three feet apart each way. In all late summer crops in the garden it is better to spread the manure on the surface after plowing, and keep it there by shallow culture. It thus serves the double purpose of a fertilizer and a mulch. If stable-manure is not to be had good raw-bone or bone-black superphosphate, at the rate of about 1,000 pounds per acre, is the best substitute. As soon as the plants recover from the transplanting, cultivation should begin, and the surface should be kept constantly stirred. There is an old superstition that Cabbage must not be cultivated during dog-days, but the only time when cultivation should be suspended is when the leaves are wet with dew or rain. To keep off the Cabbage caterpillars we use Pyrethrum, the *Pieris rapa*, which come first. The later enemies are the larvæ of *Plusia brassica*, which generally come in larger numbers, and are so much more difficult to destroy, that of late years we have given up the fight, and try to encourage such a rapid growth of the plants that the caterpillars cannot keep up with the increasing heads. For this purpose we use nitrate of soda, mixed with superphosphate, scattering about 100 pounds per acre at two applications, just before working the plants. Its effects are wonderful in promoting a rapid growth, and we generally succeed in outwitting the worms and making a crop in a good season. Here we defer planting our Winter Cabbage until late in July, to avoid the Harlequin Beetle. This insect has not been troublesome in the north yet, but here it is the worst mid-summer pest we have on Cabbage. Every leaf attacked withers as though fire had passed over it. North of Virginia Winter Cabbage had better be planted the first week in July.

Crozet, Va.

W. F. Massey.

Orchids in New Jersey.—Although small in comparison with the area of many other states, New Jersey possesses a surprisingly rich flora of its own. Its shady hill-sides and extensive swamps are peculiarly adapted to the growth and reproduction of the various members of the Orchid family indigenous to the eastern States. I have found places in shady woods where *Cypripedium pubescens* and *C. parviflorum* were found covering acres of ground, the fragrance of their flowers being especially noticeable. This I have never found so pronounced when plants were grown in gardens. These two plants are found growing in clumps together here, and it would appear



Oak Woods at Belmont.—See page 326.

as if the one might be a minor form of the other. *Orchis spectabilis* is plentiful in the same locality, and so are *Habenaria Hookeri* and *H. orbiculata*, all thriving luxuriantly in the rich vegetable mould, the result of ages of growth and decay. *C. acaule* grows on lower levels, and appears to thrive best in a

drier soil. Just what this plant needs to keep it in cultivation we have never been able to ascertain. During the past few days I have found whole colonies of *Pogonia ophioglossoides* and *Calopogon pulchellus*, the former noticeable for its exquisite sweetness and the richly-marked lip, while the *Calopogon* could be distinguished at a long distance by its purple flowers, an inch and a half in diameter. If these two plants were exotics how they would be sought and appreciated. The same may be said of *Cypripedium spectabile*. This plant is found near Lake Hopatcong, and is said to be quite plentiful, though we never had the good fortune to find more than a few plants. *Habenaria fimbriata*, *H. virescens* and *H. lacera* are now in flower. The two latter have inconspicuous green flowers, and are often passed by unseen. In July and August the orange-colored *H. ciliaris* will be at its best. I shall never forget the impression made by the first glimpse of a swamp of many acres tinged over with the bright golden-yellow of the Fringed Orchis. The plants were found growing literally by the thousand, and showed considerable variation in the color of their flowers. *H. tridentata* and *H. psycodes* are also found at the same place and time. I have seen quantities of *Arethusa bulbosa* that were collected near here in New Jersey, but tried in vain to learn the locality, and although it is quite plentiful in some parts of the state, it has never been my good fortune to find it. Last year I found one plant of *Habenaria rotundifolia*, which is rarely seen so far south. This year I sought it again, having carefully noted the spot, but it was gone. Some zealous collector had probably found it and taken it away.

Passaic, N. J.

O.

Scabiosa Caucasica is a first-rate hardy perennial, with beautiful flowers of a fine shade of blue, and should be more commonly grown. Frequent complaints are made that it is a difficult plant to establish, but with proper care it will grow vigorously in any deep border. Probably the failures result usually from careless shifting of seedlings, which, even in a young stage, have a long tap furnished at the lower end with fine feeding roots, which one is apt to strip off if not careful in breaking out of the seed-bed, the result of which is total failure of the plants to grow in their new quarters. It is well in planting seeds of this plant to use a good depth—say six inches—of light soil, so that the fine roots may have full run and be readily lifted without stripping.

Tridax bicolor, var. *rosea* is a pretty new composite introduced to cultivation in 1888 from north-eastern Mexico. It is a half-hardy annual, forming a neat, erect, much-branched bush about two feet high. The flower heads are borne well above the ovate foliage singly on long footstalks, and are from half an inch to one and three-quarter inches in diameter, of a pleasing rose color, the disk florets being yellow. It is very floriferous, continuing in bloom till frost. The typical *T. bicolor* has the ray florets pure white.

Border Carnation, Paul Engelheart, is a variety discovered in a cottage garden by the well-known amateur, Mr. Engelheart, and introduced last year. It is a very vigorous variety, with strong, wide leaves, the flowers being of a rich shade of deep crimson, fragrant and plentiful, borne on stout, erect stems, only eight to nine inches high, and requiring no stakes, a merit which will be appreciated by any one who has had to do with garden Carnations, which are mostly of lanky growth, and if unstaked or staked are usually equally unsightly. Among the series of Carnations in my border this neat dwarf variety is certainly the most sightly and satisfactory. It is to be hoped that we may be able to secure other colors with some habit.

Elizabeth, N. J.

J. N. Gerard.

Notes from the Arnold Arboretum.

SOME of the small-fruited Vines are attractive and useful ornamental plants. There are three east-Asiatic species found in gardens in this country, although they are not at all well known, and there is everywhere, judging from the different names under which these plants have been sent to the Arboretum from European gardens, the greatest confusion about their names, which are often interchanged.

The first of the three species to be considered is *Ampelopsis heterophylla*. This is a widely distributed, but not very variable, plant from Manchuria, Mongolia, and through China to Japan. It is a vigorous and hardy climber. The stems attain here a height of ten or twelve feet or more, with ovate or slightly-lobed leaves, or sometimes deeply three or five-lobed with deep, broad sinuses, the bases rounded, cordate or almost truncate. They are smooth above; the under surface of the mid-rib and primary veins covered with stout hairs. The flower-cymes are corymbose, long-stemmed and widely

branched. The fruit is the size of a pea and bright blue when ripe.

There is a Japanese variety with variegated foliage, often found in gardens, under the name of *Vitis Sieboldii*. This is the *V. elegans* of Koch, and the *V. vinifera foliis variegatis* of Neubert. The leaves of this form have deep, broad sinuses. The north China variety with slightly lobed leaves, somewhat cordate at the base or those near the end of the stems, with three or five broad lobes, is *Ampelopsis humulifolia* of Bunge, figured in the *Botanical Magazine*, t. 5, 682. It is the *Vitis Reliiana* and the *V. orientalis* of Hort. Kew; at least plants of this species have been sent to the Arboretum from Kew under these names.

The second species is *Ampelopsis serjaniæfolia*. This is a very distinct and ornamental species, easily recognized by the broad wings on the leaf-stalk between the leaflets. It is a native of north China and Japan, and has been described under half a dozen different names. It has smooth, rather slender branches climbing here eight or ten feet high, palmately five- (or rarely three-) foliolate leaves, with narrow, trilobed and incisely cut leaflets, dark green and lustrous on the upper and somewhat paler on the lower surface. The cymes are dichotomously divided, and the fruit is small, the size and shape of a pea, pale violet-blue with darker blue spots. It is the *Cissus viticifolia* of Siebold and Zuccarini, the *Vitis pentaphylla* of Miquel and the *Ampelopsis napæformis* and *tuberosa* of Carrière.

The third species, *Ampelopsis aconitifolia*, of north China and Mongolia, may be distinguished from all the Vines of eastern Asia by its nankin-colored fruit. It is a slender plant, with three to five-lobed leaves, which are often divided into three to five palmately disposed leaflets. The leaves are cuneate at the base, sharply and unequally dentate, dark green and glabrous on the upper surface; the lower paler and hairy on the mid-rib and primary veins. The cymes are long-stemmed and several times dichotomously branched. The fruit, rather larger than a pea, is nankin-colored.

There is a form in which the leaflets are divided into narrow, acuminate lobes, which is as hardy and even more ornamental than that with broader leaflets. It is the *A. dissecta* of Carrière; and it is this variety upon which, according to Panchon, in the Monographs of DeCandolle (v. 2, 459) the species was first established by Bunge, and which was found by the Abbé David in Mongolia.

Cissus Japonica, a native of Japan, the East Indies and Australia, with immense tuberous roots, and annual stems climbing four or five feet high, has stood uninjured in the open ground during the past winter, and appears to be perfectly hardy. It is rather a botanical curiosity than an ornamental garden-plant.

Two of the small-fruited North American Vines are admirable garden plants also. *Ampelopsis indivisa* is the species most commonly found in gardens. It is a high-climbing, glabrous vine with ample, heart-shaped, coarsely-serrate, rather thin leaves, and small, loose panicles of small flowers; the fruit about the size of a pea. It is a common plant along the banks of streams from Virginia and the Ohio southward, where its graceful branches may be seen draping tall trees and hanging down over the water. It is perfectly hardy here, and perhaps the best plant of its class in this climate.

Ampelopsis bipinnata is a more ornamental species, with twice pinnate or ternate leaves, the leaflets sharply cut-toothed and small obovate fruit. It is a more southern plant than the last and is not, unfortunately, quite hardy here, although in the neighborhood of New York it succeeds admirably. Less vigorous than *A. indivisa*, it is rather inclined to be shrubby in its habit of growth.

Clematis Eriostemon is one of the hardiest and most satisfactory plants of this genus here. It produces long, woody stems destitute of tendrils, sometimes eight or ten feet long. The stem leaves are pinnate, with three pairs of lateral, entire, oval, three-nerved leaflets, and a terminal leaflet often lobed and long petioled. The leaves on the flowering shoots are sessile, simple and entire. The dark-blue flowers are long-peduncled, about three inches across, and appear in succession during two or three months in the greatest profusion, completely covering, sometimes, the plant from a point near the ground to the extremities of the stems. The origin of this charming plant, which was first described under this name by Decaisne in the *Revue Horticole*, 1852, p. 341, with portrait, is entirely unknown. M. Lavallée, who introduced an excellent figure of it in his "Les Clématites à Grande Fleurs," suggests that it is, perhaps, of American origin, but this is hardly possible. It is an old inhabitant of gardens, where it has been cultivated as *C. Hendersoni*, *C. Chandleri* and *C. Poizati*. In

England it has been considered a hybrid between *C. viticella* and *C. integrifolia*. But whatever its origin, it is a far more desirable plant in this climate than any of the more modern and now more fashionable, larger-flowered varieties, which, with few exceptions, have here proved themselves short-lived and very unsatisfactory.

June 27th.

J.

Correspondence.

Forests and Civilization.

To the Editor of GARDEN AND FOREST :

Sir.—I have recently asked several of the thoughtful men of our country for some expression of their interest in forestry subjects, and have just received the following letter from Professor C. E. Norton, of Harvard University :

"Dear Mr. Harrison :—The strange, hideous, barbaric spectacle which the rush to Oklahoma has presented during these last weeks affords the clearest proof that the work in which you are engaged, of endeavoring to rouse the conscience of our people to a sense of the prevalent misuse and waste of the natural resources of the country, is of prime, national importance, not only from the material but also from the moral point of view. Were the proper use of these resources understood there would have been no such scene of savage struggling to gain possession, by fair means or foul, of the fancied advantages which this territory, now for the first time open to settlement, is supposed to offer.

"It is now many years since the late eminent George P. Marsh, in his most interesting and instructive work on 'Man and Nature,' demonstrated the fact of the calamities and desolation which had fallen upon many once fertile regions of the earth through the ignorance and reckless disregard of man, in dealing with the soil, of the laws by which its permanent resources for human support are maintained and replenished. His demonstration fell for the most part upon deaf ears. Never has the waste of what should be the permanent, inexhaustible fund of a nation's prosperity been exhibited on so wide a field as in our own country during the past twenty years. We have been living like spendthrifts, flinging away treasures slowly accumulated during the past without consideration of the rights and interests of future generations or recognition of our responsibilities toward them. We have used the goods of Nature as if we were sole and absolute owners of them. We have behaved like fraudulent trustees. A people can only justify its claim to be called civilized by so using the free gifts which it has received from Nature and its own predecessors as to transmit them undiminished and improved to its successors.

"All good men, all men who love their country and who desire that the democracy of America should set an example of rational, manly, intelligent and moral national life, must desire your success, as the agent of the American Forestry Congress, in the work which you have undertaken.

With the highest regard, sincerely yours,

"Cambridge, Mass.

C. E. NORTON."

I should like, with your permission, to write a series of notes on forest interests and affairs in this country, with allusions to contemporary journalism, literature and life. There is always occasion for vital and discriminating discussion of these subjects, and the need of it increases of late. For many years I have observed the course and methods of action of the people of the United States in their treatment of their forests and woodlands, and have studied the disappearing woods themselves, in nearly every part of our country, with deep interest in the relation of the forests to our national civilization and development. I remember many years ago when I began to talk of this relation, even men of a high degree of general intelligence often asked, "What have forests to do with civilization?" Since the establishment of this journal the idea has been more definitely presented, and such a relation has been generally recognized in the discussion of forestry subjects in these pages, but the idea is still unfamiliar and needs further development.

It is not wonderful that people do not readily receive the notion of such a relation, for the popular ideas of civilization, and of nationality itself, are extremely nebulous, incoherent and inadequate. A nation should be a vital unity—a population organized for intelligent co-operation for the attainment of worthy practical ideals. The sentiment of nationality, or what is called by that name in our country, is still superficial and indefinite, with little vital relation to the present time, and our national life is in great degree inorganic, made up of scattered nuclei, and without common direction. We are wanting in some of the elements which are necessary to the persistence

of national individuality. Our "magnificent vitality," to use the phrase of the centennial orators, lies all abroad, and is, thus far, not able to come to time, or to get down to the serious business which requires our attention. The principal adequate and manly thing which we have done as a nation, the fighting out of the great controversy over slavery, though inevitable, was largely of the nature of an accident, something apart from the natural and essential continuity of our national life and history.

The Civil War has already become, to a great extent, a part of ancient history. Its lessons have little relation to the needs of our time, and the fact that "we put down the Rebellion" does not render it certain that the problems of the present and the future will solve themselves, or that the enemies which now threaten our national prosperity and success will be frightened out of our path by the shouts with which we celebrate past triumphs. We may have a splendid destiny before us, but it will not be the product of our present national temper or character, nor the result of the methods which now prevail in our national house-keeping. Nothing splendid lies along the roads upon which we are now mainly traveling.

As to civilization, it does not appear that those who talk of it most boastfully have thought much about what it is, in what it consists, or how it may be maintained and carried forward. They never have anything definite to say about it. The popular optimism may have a basis in reality, but its prophets have no liking for scientific methods of inquiry. They are either incapable of analysis, or they regard facts with contempt. If our people had the idea of nationality, and a definite perception of what constitutes civilization, they might be brought to see clearly the relation of the nation's forests to its development and welfare.

There is a great deal of talk about forestry in this country, but I cannot find out that we have much of the thing itself. Forestry is an art, and it can be learned only by practicing it, and it can be practiced only where there are forests to be administered or cared for. The art has not been practiced in this country. The only forests in which it could be illustrated and practiced, and thus learned, are neglected, outrageously abused, and as rapidly as possible destroyed, so that we have here no means, material or opportunity for training young men in a real knowledge of forestry. We have some admirably equipped dendrologists, but forestry in the United States is a matter of talk, of Arbor Day oratory and essays at Forestry Congresses. We shall build nothing valuable on a basis of unreality, and to clear the ground of misconception and illusion is usually a necessary beginning for any serious work or real advance.

J. B. Harrison,

Cor. Sec. American Forestry Congress.

Franklin Falls, N. H.

The Choice of a "National Flower."

To the Editor of GARDEN AND FOREST :

Sir.—It has not seemed to me that the question of a "national flower" for the United States, so widely discussed in the press, had a very serious interest either for patriots or for flower-lovers. Of course, if we could choose and bring into general use a floral emblem of the right sort, it would conspicuously enrich the sentimental side of our lives; and, of course, it behooves every patriot as well as every lover of Nature to regard this side. No one questions that a flag is a precious, indeed an indispensable, national possession, or can fail to see that ours is all the more valuable because of the symbolic significance of its stripes and starry field. The utility of such an emblem as the eagle is also plain, for we must have some device to serve in a coat-of-arms and to ornament a multitude of "official" articles. If a flower could be added to the flag and the eagle it would serve more than one end they do not meet, and would be especially valuable as an element to introduce into our decorative art. What a blank would be left in the art of France were the Fleur-de-lis expunged! What a boon would it be to the American decorator had he some such consecrated type ready to his hand!

Nevertheless, the current discussion has seemed without much point, for, discuss as we will, how are we to choose our flower? There is no prince to hand it over to us, already encircled with a halo of significant associations; it seems most improbable that any popular assembly, charged with the settlement of important national affairs, will put the question to a vote, and such an assembly is our only substitute for the personal ruler of old. A flower might have been selected when the flag and the eagle were chosen; and chance may some day give us one, in some great national crisis, when we are thinking least about it. But to choose deliberately by "popular" voting, and then to impose the choice upon a nation so

immense and so widely scattered over different soils and under different skies—this seems, indeed, a hopeless effort.

Being hopeless—or seeming so to me—your readers may wonder why I speak of it at all. And yet I have a reason for speaking, the reason implied when I said at the outset that a national flower would be a valuable possession could we get one of the right sort. By this I mean that, even if it were perfectly easy to choose a national flower and bring it into universal use, it would be of next to no value if it were of the wrong sort; and the fact is important because, of the four flowers thus far “ahead at the polls,” only two have any claims to be considered of the right sort. These four are the Golden-rod, which seems beyond all others to be the favorite; the Mayflower, which comes next; the Sunflower, and the Mountain Laurel.

In the many discussions and exhortations which I have read upon the subject, and in the reports of the preferences of famous individuals, there has been much mention of sentimental associations as dictating this choice or that, and also of facts of distribution and general familiarity. These questions have their importance, of course, but it seems to me that the primary consideration is an artistic one—has regard to the serviceableness of the proposed form as a type or model for artistic variation. Let me try to explain what I mean by taking each of the four favorites in turn.

The Golden-rod, in some of its protean shapes, is very widely distributed throughout the United States, and familiar enough to be beloved by all Americans; and though it grows in other countries it does not grow in Europe (unless as introduced in gardens), except in the higher parts of Switzerland. It has no associations, therefore, which unfit it to be our national emblem; and it is a good flower to wear on the person as a badge—individual, bright, pliable, graceful and lasting.

The Mayflower is likewise a characteristically American plant, with relatives in Asia but none in Europe. As regards sentiment, it has perhaps a higher claim than any of its rivals. Was not the first Pilgrim ship called the “Mayflower,” and does it matter to the short memories of men that the name did not denote our Epigea, but undoubtedly the English Hawthorn? But the Epigea is a poor flower to wear—charmingly pretty when grown or even when massed in a large dish, but ineffective as a little spray—stiff in habit and very perishable; and, while it is very familiar in the eastern States, it is unknown “out West,” and therefore has but a half-claim to adoption as a national flower.

The same lack of universality affects the claims of the Mountain Laurel. From North to South, eastward of Kentucky, it is very familiar, but our occidental regions know it not. Yet it is another true American, seen in Europe only in gardens; and it is a good flower to wear, while its ever-green leaves, with a distinctive character of their own, would be available at all seasons.

The Sunflower, like the Golden-rod, grows everywhere in our country, varying in different localities, but keeping its essential character throughout; and it is nowhere a native of the eastern hemisphere. But cultivation in this case has largely undone the favor which Nature did us in making this flower our own. It is so commonly grown in Europe to-day it can hardly be called a true American. What would the “*æsthetes*” of England say did we exalt the Sunflower to be national emblem? And should we not feel like English *æsthetes* instead of American patriots, did we go about with a Sunflower on our bosoms? Seriously, whenever an American sees or hears of Golden-rod, Kalmia or Trailing Arbutus he thinks of his own country and of nothing else; but the case is very different with the Sunflower, and I think the difference seriously invalidates its claim to be adopted as an emblem of the United States.

Let us look now at the adaptability of these flowers to the designer's purposes. What we want is that it can be used, like the Lilies of France, on everything which man's hands can ornament; from a coin to a button, from a pennant to a carpet for the White House, from the capital of a column in a public building or the pedestal of a hero's statue to the binding of a copy of the census.

Of what account, now, is the popular Golden-rod for such purposes as these? To be rightly used in art a flower must be conventionalized, and to be conventionalized each head or blossom must have individuality and, so to speak, architectonic dignity. The flower of the Golden-rod has no individuality, when we stoop to study it; isolated from its fellows it looks precisely like numerous other flowers of the vast family of the *Compositæ*. And, moreover, we never do isolate it; the Golden-rod as we think of it is not a flower but a panicle of many minute heads, and to separate them would be to ruin

the type, even had the heads each a more special character. The character of Golden-rod comes, in short, not from its flowers but from the way they grow; this loose, irregular way cannot be reproduced in strictly ornamental art; and a single little head used alone would look no more like Golden-rod than like Aster or Fleabane. Then the foliage of Golden-rod, while it varies very much in different species, is never really beautiful or individual or well adapted to use in the arts.

The Mayflower is a little better, yet it is by no means a good flower for the artist. It is not strikingly individual; it is ineffective; it is weak in form and somewhat trivial; it lacks the two indispensable qualities—dignity and special character.

The Sunflower is a cousin of the Golden-rod, and one of its great heads resembles in large the tiny head which we scarcely notice as such in a *Solidago*. But this increase in size and distinctness makes all the difference in the world as regards use in the arts. A Sunflower is a flower meant to be seen alone, and it is so formal, so massive, so stately that it could admirably serve every purpose of the designer. But the same unfortunate fact again confronts us. Modern “*æstheticism*” has made this flower its own, and so frequently reproduced it, with more or less artistic felicity, on a myriad objects of the most trivial sort, that it would seem absurd for the American decorator now to seize upon it, and for the American people to try to read into his reproduction any sign of patriotic meaning. Sunflowers on the base of a hero's monument or around the capital of a post-office column—the artistic effect might be admirable, but the sentimental effect would be entirely different from the one we desire. A generation ago we might have made this flower our emblem and rejoiced in its use. I fear it is spoiled for the purpose to-day.

But something still better is left us in the Kalmia. Here is a plant which neither art nor sentiment has touched as yet, but which seems to have been created for the artist's hand. Its leaves are so like those of the Laurel, which from time immemorial has been an artist's favorite, that its popular name has sprung from likeness; they are fine in outline, solid in aspect, and beautifully grouped, on the stem, needing but a trifle of arrangement to fit them for the weaver's or the carver's use.

Still more beautiful, infinitely more individual, is the flower of the Kalmia in every stage of its growth. Look at the conical bud with its deeply-cut, symmetrical flutings, the admirable contrast between the upper and the lower portions, and the ten strong points where they meet; see how architectonic it is, whether viewed sidewise or foreshortened from the top. Look at the half-expanded blossom, where to these sculptural beauties are added the wide, deep, simple indentations of the lip; and look at the expanded blossom, a beautiful five-pointed star, with ten radiating stamens running each to its deep little cleft; and if anything beyond the artistic excellence of the form is asked, examine the artistic beauty of the color-markings. How easy it would be to conventionalize this blossom, seen from the inside or the outside, and how beautiful it would be, in paint or tissues or carvings, when thus conventionalized. Conventionalizing, indeed, is hardly the right word—Nature has done the artist's work in this case; the flower could be almost literally copied and be systematic and dignified enough. A temple frieze might be made as nobly beautiful with a Kalmia pattern as with the Lotus of the Egyptians or the Honeysuckle of the Greeks, and with far less deviation from actual portraiture. So, too, on woven stuffs it might be as effective, almost, as the *Fleur-de-lis* of France, and again with much less change—for the *Fleur-de-lis* has been changed so greatly that we cannot be quite sure whether it really means an Iris, as is generally thought, or some other related flower. Indeed, I can think of no flower which in its various stages offers so many quite admirable types for artistic treatment as the Mountain Laurel. Turn back now to the Golden-rod and the Mayflower, compare them with the Lotus or the Honeysuckle or the *Fleur-de-lis*—what must the verdict be? It is, or should be, a decisive verdict against them both as proper to be chosen for a national emblem. Why did the Violet of the Napoleons never impress itself upon national sentiment like the Valois Lily, and never enter into national art? Why was the place it should have held in art taken by the Napoleonic bee? Simply because it was not susceptible of artistic treatment. It is pretty, but it has no dignity; it is graceful, but it has no “form” in the artistic sense, no architectonic, sculptural character. This the Kalmia has. If the fact is not so immediately apparent in its case as in the case of the Lotus or the Iris, it is because the blossom is smaller and few people notice characters which are not boldly thrust upon their eyes. But size means less to the artist than “form,” “character,”—and no flower in the world has these in greater perfection than the Mountain Laurel.

If, then, we really want a national flower, and if there is really a way to decide upon it, could not the one deficiency of the Mountain Laurel—the fact that it is not universally distributed throughout our country—be overlooked because of its manifest superiority in other points? The Great West has taken much that pertains to national life from the East. Could it not be persuaded to take a national flower as well?

New York.

M. G. Van Rensselaer.

Squirrels and Conifers.

To the Editor of GARDEN AND FOREST:

Sir.—Several correspondents of GARDEN AND FOREST, whose opinions are certainly entitled to consideration, hold the red squirrel responsible for cutting off and scattering the twigs of the Norway Spruce. The red squirrel does a good many curious things, apart from the heinous offenses he perpetrates upon his larger black and gray cousins.

In the cases cited it may be that owing to the mildness of the past winter the red squirrels were more active than usual, and having exhausted their supply of nuts, turned more particularly to the Spruce cones for food. The squirrel does not dislike a cone when he cannot get his nut. Indeed, the nurseries would be without the *Sequoia gigantea* to-day were it not for the squirrels, who cut the cones off from the Californian big trees, the seeds of which were otherwise unobtainable. Thoreau refers in several instances to the squirrel's manner of plucking and stripping a Pine cone. "He does not prick his fingers, nor pitch his whiskers, nor gnaw the solid cone any more than he needs to. Having sheared off the twigs and needles that may be in his way (for, like a skilful wood-chopper, he first secures room and verge enough), he neatly cuts off the stout stem of the cone with a few strokes of his chisels, and it is his. To be sure, he may let it fall to the ground, and look down at it for a moment curiously, as if it were not his. But he is taking note where it lies, that he may add it to his heap of a hundred more like it, and it is only so much the more his for his seeming carelessness."

This would bear out the theory of several of your correspondents, were it not for three reasons—the torn or mangled, not cut, appearance of the tangled twigs; the many fallen twigs beneath trees where no cones, or hardly any cones, exist, and the scattered twigs in masses where there are no squirrels in the near vicinity. These scattered twigs are repeatedly noticed beneath the Norway Spruce during early spring, and late in April they might have been seen in quantities on my neighbor's lawn beneath his patriarchal Norways. The same state of things is observable in the case of the White Pine. As the red squirrel works by day, he would be seen, and if not seen he would be heard were he the spoiler in these instances. It is to be noticed, moreover, that the trees underneath which the scattered twigs exist most numerous stand most exposed to the wind, and that the side of the tree facing the west is noticeable for the quantity of dried and bruised twigs upon the tree.

If we consider for a moment the fury of the wintry gale, especially when the limbs of the tree are coated with ice and lashed one against the other for hours, the cause of the scattering of the twigs and needles will, in most instances, I think, be apparent as due to high winds, and not to a rodent's tooth.

Rochester, N. Y.

George H. Ellwanger.

[We have received several other letters on this interesting subject; but it may be well to refer the writers to the original article on page 111. It was there stated that squirrels, both gray and red, had been seen to cut off the small twigs of the Norway Spruce in order to get at the terminal and lateral buds (not the cones), the heart of which they dextrously extracted. Examination of the twigs on the ground last winter showed that in cases where the buds appeared sound the heart had been neatly taken out.—Ed.]

To the Editor of GARDEN AND FOREST:

Sir.—Will you kindly inform the readers of your journal what is the proper treatment for the beautiful *Rosa multiflora*, described in the notes from the Arnold Arboretum, on page 309, and especially whether this plant should be cut back to induce free flowering.

Boston, July 1st.

W. W. C.

[*Rosa multiflora* should be planted in rich soil, where it can have plenty of room to spread its graceful, arching branches without being interfered with by other plants. Young, stout shoots produce the best flowers, and their development should be encouraged by cutting off the

flower-clusters as soon as the flowers have faded, and by shortening in the branches at the same time to induce the growth of lateral shoots. Old branches should be removed entirely after they have flowered during two or three years, to make room for more vigorous ones which will spring up from the roots of well-established plants. A plant of this species, generously treated, may be expected to grow six or eight feet high and ten feet through, and to be completely covered with flowers at the blooming period.—Ed.]

To the Editor of GARDEN AND FOREST:

Sir.—I am glad to see GARDEN AND FOREST calling attention to the importance of preserving our national and state parks. The State of Wisconsin, in 1882, set apart some twenty or more townships in what was then Lincoln County as a state park. The scenery is bold and rugged. It is a land of heavy timber and lakes and running water—its natural features finely adapted to the purpose to which it was devoted. But last winter a bill was introduced near the close of the session to allow the Pine-timber to be cut, and to destroy the native beauty of the tract. I am glad to say that the bill failed. It was, however, a fair warning to the friends of forestry and state parks to be on the alert, for similar attacks will, no doubt, be organized year after year.

Evansville, Wis.

B. S. Hoxie.

Recent Plant Portraits.

LÆLIA DIGBYANA MOSSIÆ, *Gardeners' Chronicle*, May 25th; "decidedly one of the most remarkable, and with equal certainty one of the most beautiful of the hybrids raised in the great Veitchian establishment by Mr. Seden." A hybrid between *Cattleya Mossiæ* and *Lælia Digbyana*.

CATTELEYA SKINNERI, *Gardeners' Chronicle*, June 1st; the portrait of a remarkable specimen with 200 expanded flowers.

PSORALEA PINNATA, *Gardeners' Chronicle*, June 1st.

PUCCINIA SCHRÆTERI, *Gardeners' Chronicle*, June 1st; this is the Fungus which is doing much damage among the Narcissus in some English gardens.

"It is sufficient to say that *Puccinia Schræteri* is closely related to *P. malvacearum*, the deadly pest of Hollyhocks; and the life-history of the fungus of Narcissus agrees with that of the Hollyhock. Many species of *Puccinia* have a Uredo, or young condition, but no Uredo is known for either the Narcissus or the Hollyhock fungus. Neither has any æcidium condition been recorded for either; this being so, the readers of the *Gardeners' Chronicle* will understand that the spores of the Narcissus fungus germinate as soon as they are mature upon the host-plant, and produce at once new pustules of spores. The fungi to which the Narcissus fungus belongs produce many generations of spores in one season, and so make great havoc in gardens, as every one acquainted with the history of the Hollyhock disease knows only too well. Diseased plants should, of course, be utterly destroyed, if possible, but no amount of burning or burying will get rid of all the minute spores which are produced in hundreds of thousands upon every affected plant. The new arrival is not confined to one species of Narcissus; it has been recorded on *N. poeticus*. The fungus may be considered a very threatening one, but time only can show whether it will spread in Britain as did its ally, *P. malvacearum*."

ÆSCULUS SINENSIS, *Gardeners' Chronicle*, June 8th; a native of northern China, and a still imperfectly known species. The figure is from a specimen of the flowers produced in the establishment of M. Van Volxem, of Brussels, where it is probable that this tree has flowered for the first time in Europe.

CATTELEYA WALKERIANA, *Gartenflora*, June 1st.

CYPRIPEDIUM NITENS SUPERBUM (*C. villosum* × *C. insigne* Maulei), *Le Moniteur d'Horticulture*, June 10.

CHRYSANTHEMUM ULIGINOSUM, *Gardeners' Chronicle*, June 15; a hardy, decorative, autumn-blooming plant with large, white flowers.

AMORPHOPHALLUS TITANUM, *Gardeners' Chronicle*, June 15; this, the largest known of all the Aroids, has recently flowered for the first time in Europe, in the Victoria House at Kew. It is to be gathered from our English contemporary that Dr. Beccari discovered this wonderful plant in western Sumatra. "The tuber dug up by the doctor measured nearly five feet in circumference, and was so heavy that ten men could scarcely carry it. From this tuber only one leaf is produced; but what a leaf, to cover an area of forty-five feet in circumference."

The leaf-stalk is ten feet high, divided at the top into three branches, each as large as a man's thigh. The flower spadix is six feet long, and, altogether, this must be considered one of the vegetable marvels of the world.

BOUGAINVILLEA GLABRA, *Revue Horticole*, June 16.

Notes.

The first prize for cut blooms of double Lilacs at the Paris Exposition was taken by Messrs. V. Lemoine & Son, with flowers of twenty seedlings named and unnamed, and including the double white variety.

The programme for the Botanico-geographical exhibition which, as we have already announced, will be held in Antwerp during the summer of 1890, may be obtained from Monsieur Charles de Bosschère, Lierrelez-Anvers, Belgium.

According to the *Pacific Rural Press*, California has produced two new Roses of undoubted excellence this year. One, introduced by J. H. Sievers, is known as Rainbow, and the other, yet unnamed, was raised by E. Gill, of Oakland.

Mr. H. H. Rusby, well known as a botanist from his explorations in southern New Mexico, and later in South America, has recently been appointed Professor of Botany and Materia Medica in the New York College of Pharmacy, in this city.

A correspondent of the *Country Gentleman* writes that he once heard Dr. William Darlington, the well-known botanist, express the wish that the Tulip-tree (*Liriodendron tulipifera*) might be selected as our national emblem, both leaf and flower being distinct and beautiful.

A very interesting hybrid Philadelphus, lately bloomed at Nancy. It was produced by crossing *P. microphyllus*, the beautiful dwarf species with deliciously fragrant flowers, which is a native of the mountains of southern Colorado and New Mexico, with *P. coronarius*. The plant has been named after its originator, *Philadelphus hybridus Lemoinei*.

Among the bush Honeysuckles, *Lonicera Ruprechtiana* is now by far the most striking. Its abundant bright scarlet fruit, carried gracefully on arching branches, would make it one of the most desirable of hardy shrubs, even if it were not beautiful in general habit, foliage and flower. Its single fault is that the flowers lack perfume.

Cladrastis Amurensis, the Old World representative of our Yellow-wood, is blooming most abundantly this year, and as the specimens grow older the tree becomes more attractive. The foliage is very clean, the shape of the tree neat, and the spikes of flowers are fragrant and yield abundant nectar, as is proved by the constant hum of the bees, which visit this tree in great numbers.

English horticultural journals describe a splendid display of Tulips lately in bloom in the garden of Lord Arlington, at Crichton House. Twenty-four large beds were filled with about 15,000 bulbs, Crimson King and Yellow Prince being the only varieties used. This is but one sign among many that we have noted of late to prove that there is a growing tendency in England towards more simple and effective arrangement of bedding-plants than those which have hitherto prevailed. In the parks of London the Tulips are said to have made an especially attractive appearance this year, "although individually the flowers have not been so fine as in some seasons. . . . The advantage of having distinct beds of one color over indiscriminate mixtures of several shades is most conspicuous."

Mr. Roosevelt, consul of the United States at Bordeaux, recently reported to our Government concerning the wine production of France during the year 1888. He announces a considerable increase over the amount credited to 1887, and explains that the fact is due to the introduction of American vines as stocks. The vineyards of the south of France were the first to suffer from the ravages of the phylloxera, and their owners were the first to test the value of American plants. A large number of vines on American roots bore for the first time in 1888, and so successfully that the most steadfast doubters were converted; a large demand for seedlings immediately followed, and the nurseries have been already exhausted. Preparations are being made to meet the growing demand as quickly as possible, and, according to Mr. Roosevelt, the future is not very distant when the vintages of former years will again be equalled.

A recent number of the *Illustrirte Gartenzeitung*, of Vienna, quotes from Monsieur Charles Joly, Vice-president of the Horticultural Society of France, a description of three enormous trees

which stand in the south of France. One is a Stone-pine (*Pinus Pinea*), the stem of which is two metres in diameter—which means nearly twenty-two feet in circumference—with a crown of foliage that measures twenty-six metres in diameter. Another is a very old Olive-tree at Villefranche-sur-mer, between Nice and Monaco, which seems to have formed part of an ancient orchard, as it has several neighbors of almost equal size; the diameter of its trunk, at a metre above the ground, is the same as that of the Pine just referred to. And the third is a still larger Olive, which stands in the "*domaine de St. Eulalie*." The circumference of this trunk is no less than eleven metres. Its head was greatly injured by a severe frost in 1820, but since then has developed afresh into a compact, spherical shape.

We have more than once referred to the fact that greater simplicity in the planting of flower-beds was becoming the rule in England, much to the enhancement of the effect of private gardens and public parks. Another instance may be quoted from a recently published description of this year's Tulip-planting in Alexandra Park, Manchester. Here there were twenty-eight large circular beds, each filled with a single variety of Tulips, about 300 plants to a bed. Prosperpine, Dussart, Potter, Crimson King, Rosa Mundi, Queen of the Violets and Chrysolora were the varieties used—seven in all—making four beds of each. The contrast of their colors, which was carefully considered in disposing the different beds with relation to each other, was sufficient to produce a very brilliant effect; and it may be noted that the beds themselves were placed where such formal arrangements are well in keeping—fourteen on either side of a long, straight path which runs from the terrace to the principal drive.

An interesting article recently published by Mr. Percy E. Newberry, in the *Pharmaceutical Record* of this city, upon "The History of Medicine in Ancient Egypt" says that some fifteen vegetable remedies are mentioned in a Papyrus preserved in the Leyden Museum, while the so-called "Berlin Medical Papyrus," which dates from the eighteenth dynasty, mentions more than fifty such remedies, "from herbs and fruits to sawdust and chips of Cypress and Sycamore." Mineral remedies were, of course, also largely used; and while many incantations and conjurations were thought to aid the physician in his work, still the manuscripts reveal no dependence upon "hocuspocus or gibberish." On the contrary, the well-known Egyptologist, George Elvers, writes that the famous Papyrus which bears his name and was published by him "shows that it was possible to write in the sixteenth century, B.C., complex receipts, and that the physicians understood how to administer with care the medicines prescribed." Many such receipts are written on the papyri, and some of them, says Mr. Newberry, might well be used to-day for the indicated purpose. Castor-oil, Senna and Caraway-seeds are among the vegetable remedies that were then employed in much the same way as they are to-day.

The park of Holwood House, which lies about fourteen miles from London, on the road to Uckfield, and was formerly the home of William Pitt, is famous for its magnificent trees of many kinds. But there can be none among them more interesting than a double tree recently described in the *Garden*. It is formed of an Oak and a Yew which were originally planted close to one another and the young stems of which were, perhaps, bound together. A "natural graft" was thus produced; the two trunks united and, though a clear line marks the junction of their different barks, there is now but a single trunk of perfectly normal outline, which at three feet above the ground girths nearly twelve feet. The height of the Oak portion is thirty-five feet, and its branches spread fifty-four feet, while the Yew portion is fifteen feet in height with a spread of thirty-six feet. Up to about five feet above the ground, where the Oak sends out two great branches, the Yew seems to absorb nearly one-third of the diameter of the trunk, although it is impossible, of course, to tell how far inward its wood extends. Each of the main branches of the Oak girths more than four and one-half feet and "as they grow in opposite directions . . . and in bow-shape have an appearance that is as peculiar as it is unusual in tree-growth." The Yew stem almost encircles one of these branches and is completely amalgamated with it, "the barks being level and as if inarched at the point of junction." Such a twin growth would be remarkable in any trees of different species, but is doubly striking when one is a deciduous and the other a coniferous tree, and we can well understand that "when viewed from the public path, which is only eleven yards distant, these combined trees present a most curious and unusual appearance, particularly when the Oak is destitute of leaves, as the co-mingled, deciduous and evergreen branches are then most noticeable."

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The Treatment of Road-sides.

THE planting of trees along all highways is usually insisted upon as a public duty by persons who take an active interest in matters which pertain to rural improvement. The first work undertaken by village improvement societies is most frequently road-side tree-planting. The activity of Arbor Day is apt to expend itself in the same direction, and very often the work is commendable from every point of view. A long, straight, level avenue with a row of Elms, or Sugar Maples, or Tulip-trees on either side set on smooth turf at regular intervals, is always beautiful. No nobler approach to a stately mansion can be conceived of than such an avenue. As an introduction to a suburban park, or the extension of the main street of a country village, especially when it leads to some object of adequate dignity, such an avenue is always satisfying. But in an open, hilly country, road-sides are not always improved when bordered by a formal line of trees. To one standing on an eminence, slender lines of foliage following the winding of various roads across the landscape would rarely be pleasing, and to one traveling on such roads the constant shade and the unvarying repetition of a tree on either side at equal distances would be still more displeasing.

It does not follow from this that the planting of trees along country highways should be discouraged, but it should be remembered that trees can be agreeably disposed in various ways, and that in many cases an occasional group of trees at a cross-road, or a single tree here and there at desirable points by the wayside, will prove more attractive than a monotonous row on either hand in which each tree is precisely fifty feet from its neighbor. It should be remembered, too, that shrubs and vines, and even humbler growths, should have a place on a road-border as well as trees, and there are many road-borders where they are of much more importance than trees. These thoughts have been suggested by a letter which is published in another column of this issue. This letter will enable any one to realize how trifling an outlay of labor and expense is needed to transform the hot, raw gravel-slope of an excavation or embankment into a sweep of

verdure, which becomes purple and fragrant with bloom in its season. An unsightly gully filled in with brush to guard against a more serious wash-out becomes in its turn a bower of beauty under the directing hand of one who thinks it worth his while to render such service to the wayfarer. We have heard of a piece of road on Long Island which is bright with flowers in their season, through the thoughtful care of the gardener of a large estate near by. We know a mile of country road which grows more attractive every year because a little care is taken to introduce the flowers and shrubs and vines which flourish naturally in that region. Marsh Marigolds and Cardinal flowers have been made at home by the outlet of a way-side spring. Houstonia and Bloodroot bloomed this year where they were unknown before. The thickets are fringed with an increasing variety of Ferns, and Club Mosses are now creeping among them. Even in winter the hedges of wild Roses and the berries on the Red Alder show how a road-side can be brightened by a few hours of attention in a year.

It is hardly to be hoped, however, that every land-owner will be persuaded to take such an active and intelligent interest in the treatment of road-sides. The energetic pathmaster would think it beneath his dignity to plant shrubs or sow flower-seeds to help cover over the seams and scars left by man in the track of all his "improvements." But, fortunately, he need put himself to little trouble in all the hill-country east of the Alleghanies, at least, for Nature, if left to her own kind offices, will at once begin to clothe the desert made by man. No artificial planting can be more attractive than the natural thickets which would fringe almost every road in New England and the Middle States, if they were only allowed to grow. In many places, it is true, such growth would be out of place. Smooth turf running from the wheel-way to, or under, the fences inclosing fertile fields is always attractive. In the rougher country, however, the natural border of shrubs and trees and festooning vines is generally worth preserving. The Thorns and Dogwoods and Viburnums, the thickets of Elder and Hazel, the Bitter-sweet and Clematis and Moon-seed climbing over all—the flora of the world has no more beautiful plants than these and a hundred more which spring up of themselves and flourish until some one with a zeal for "trimming up" attacks them with grubbing-hoe and brush-hook. And when the vines are stripped from the fences, and the brush all cut, gathered and burned, the road-sides are thoroughly cleared, it is true, but a desolation of rocks and ashes is all that is left in exchange for the fragrance of flowers, the beauty and coolness of green leaves, and the melody of the birds among them.

It is a comfort to note that road-borders of native shrubs are being used more and more in the best park-work. Nothing can be more effective than the shrubbery on either side of the drive through the Arnold Arboretum, not only as an appropriate cover for hill-sides where Myrica, Sweet Fern and other low-growing shrubs take the place of turf, but for the distinct purpose of fringing the road. These shrubs are proving themselves no less useful or appropriate along the smooth, broad and well-kept wheel-way than they are in remote by-ways among the hills. Indeed, it is difficult to imagine how the hard, stony gutter-line beside the road-bed could be more agreeably broken than it is by the Wild Roses or Red-root that occasionally stray across it, or how any other shrub would take the place of the Sumachs banked above one portion of the drive. Every one of these shrubs would grace a palace garden, and yet when they modestly appear along a rural highway they are mowed down to "improve the appearance" of the country. If there is no reason to look for any general and organized effort to beautify our country road-sides, let us hope at least that overseers of the highway may in time be induced to refrain from expending labor and money to destroy the native shrubs and vines and trees which clothe so many waysides with beauty as with a garment.

These are native to New England

Notes Upon Some North American Trees.—I.

THE last catalogue of the trees of this continent (exclusive of Mexico) was published in New York in 1885, in a work entitled "The Woods of the United States," intended as a guide to Mr. Jesup's collection of woods in the American Museum of Natural History. This was a condensation, with a few unimportant changes, of the more detailed catalogue of our trees which I had published the year before in the ninth volume of the Final Reports of the Tenth Census of the United States. Since this catalogue was written I have had the opportunity of studying, for the first time in the field, many of our trees during different journeys undertaken for the purpose, especially those found in the extreme southern portion of Florida and in the valley of the lower Rio Grande; and to examine in European herbaria, type specimens of many of the old species. A large number of correspondents, moreover, in different parts of the country have continued to favor me with information bearing upon this subject. Questions of nomenclature, too, are now, perhaps, more than ever before occupying the attention of botanical students; and although the subject is perplexing enough in some cases, I cannot any longer delay a discussion of the names which should be applied to our trees, as the first volume of the new "Silva of North America," which has engaged my attention pretty continuously during the last ten years, will not, it is to be hoped, be much longer delayed, the plates for the illustrations for nearly three volumes being already engraved. It is therefore desirable to print now such changes, from the Census Catalogue, as fuller information than was available when it was written appears to make desirable both as a record of facts and for the purpose of calling out criticism, which, as well as any facts about our trees, it is needless for me to say, will be welcomed from all quarters. I shall now take up, therefore, the Catalogue as it was published in the Census Report, and briefly note such changes as it now seems necessary to make in it. The numbers prefixed to the species are those of the Census Catalogue.

4. *MAGNOLIA CORDATA*, Michx. —Michaux's specimens preserved in the *Museum d'Histoire Naturelle*, in Paris, upon which Richard founded this species, have leaves which are not at all cordate, and are clearly that form of *M. acuminata*, with broadly oval, rarely cordate leaves, more or less pubescent on the lower surface, and rather small, yellow flowers, which Dr. Mohr has found in central Alabama and I have collected on the Blue Ridge, in North and South Carolina, and which Michaux, as his own labels, still attached to the Paris specimens, show, considered to be *M. acuminata*.* I have already proposed for this form, and for the plant known in gardens as *M. cordata*, the name of *M. acuminata*, var. *cordata* (*American Journal of Sciences and Arts*, 3 ser. xxxii., 466). No wild form, it must be said, has been found just like the one, of unknown origin long preserved in cultivation, which has small, canary-yellow flowers, broadly oval and, occasionally, slightly cordate dark green leaves. Two specimens of this variety may be seen in the Harvard Botanic Garden, where they were found already well-grown trees by Professor Gray in 1842 when he assumed control of the garden. The plant so often spoken of by Michaux in his journal as *M. cordata* was *M. Fraseri*, Walt.

5. *MAGNOLIA UMBRELLA*. —Linnæus first named this plant *M. Virginiana*, var. *tripetala* (*Species Plantarum*, 536), and in the second edition of the same work *M. tripetala*. Lamark, twenty-eight years later (*Encyclopédie Méthodique*, iii., 644), proposed for it the name *M. Umbrella*, quoting Linnæus' name as a synonym, but giving no reason for discarding it. The Lamarkian name was taken up by De Candolle (*Systema*, i., 452), the sentence "petala oblonga concava 9-12 (nec 3 ut vult nomen Linnæanum)" explaining his reason for so doing. Many botanists, nota-

bly Professor Gray in all his works, have followed Lamark and De Candolle in discarding the Linnæan name, which was based upon the three broad reflexed petaloid sepals of this species, which, as they are not strictly petals, make it, perhaps, inappropriate. But in natural-history nomenclature it is now well nigh universally acknowledged among working naturalists that a name cannot properly be changed because it happens to be inappropriate. The inappropriateness of the name, moreover, in this particular case is certainly not great enough to warrant its disuse; and I should therefore propose to take up for this species the name *Magnolia tripetala*, L.

13. *CLUSIA FLAVA*, L. —This plant has been considered a native of Key West on the strength of a specimen collected by Dr. Blodgett more than fifty years ago. It has now entirely disappeared from the island, and has never been seen on any of the neighboring Keys, so that it may be supposed that Nuttall, who published Dr. Blodgett's discoveries, mistook in the case of this plant, as he did in that of *Terminalia Catappa*, also included in his supplement to Michaux's *Sylva*, a cultivated for an indigenous plant.

17. *TILIA AMERICANA*, var. *PUBESCENS*. —Professor Gray (*Proc. Am. Acad.*, new ser. xxii., 305) has pointed out characters ("smaller and mostly thinner leaves, distinctly pubescent beneath, yet often glabrate in age; floral bract usually rounded at base, except the uppermost; fruit ovoid, usually lightly costate") which seem to separate this plant specifically from *Tilia Americana*. The oldest name connected with it is *T. Caroliniana*, of Miller (*Dictionary* 204), but, as Professor Gray has suggested (*l. c.*), Miller's characters point to *T. Americana*, as do those of Wangenheim and Marshall, who followed him in the use of this name. Aiton's name, *Tilia pubescens*, will, therefore, be most safely retained for this tree.

19. *BYRSONIMA LUCIDA*, HBK. —This plant, as it appears on the Florida Keys, is a low, slender shrub, rarely attaining a height of six feet; and I have now no reason to believe that it ever becomes a tree. I should propose, therefore, to drop it from the North American *Sylva*, unless it is known to become arborescent in the West Indies.

C. S. Sargent.

The Sumachs.

ALL the Sumachs, as the plants of one section of the genus *Rhus*, of eastern North America are popularly called, are plants of great ornamental value, and if they do not now play a more important part in the decoration of American gardens, it is because they are seen so commonly along the borders of the highways or upon rocky slopes, that they are not supposed to be worth a place in the garden or upon the lawn. In Europe they are often planted; indeed, in the countries of central and northern Europe no exotic plant, with the exception, perhaps, of the American Locust (*Robinia Pseudo-Acacia*), and its varieties, is planted so commonly, or is so generally admired, as the Staghorn Sumach. They are all plants of good habit, with bold and handsome pinnate leaves. The flowers, which are small and greenish-white in color, are not, in themselves, showy or conspicuous, but the great terminal panicles in which they are clustered are striking, from their size and are conspicuous objects. The panicles of fruit, which is a small, dry drupe, covered with scarlet hairs, give great beauty to the female plants in the autumn, for the Sumachs are dioecious, or mostly so—that is, they produce, ordinarily, male and female flowers upon different individuals. The foliage of all the species turns to an intense scarlet color during the month of October, when some of the most beautiful effects of American autumn-coloring are produced by the great masses of these plants, often found spreading over the rocky hills of the New England and middle States.

There are three species of Sumach in eastern North America:

The Staghorn Sumach (*Rhus typhina*) is the largest of them in the northern States, and the one most generally cultivated in Europe. It reaches sometimes the size and habit of a small tree, thirty or thirty-five feet high, with a trunk eight or ten inches in diameter at the base. This, like the branches, is generally more or less crooked or contorted; it is covered with a light brown bark, separating sparingly into very thin, flakey scales. The young branches are stout, forked, entirely

*The two specimens in Herb. Michx. of *Magnolia cordata* are labelled in Michaux's handwriting, the first "*Magnolia acuminata* florib. flavis;" the second "*Magnolia lutea*, fol. acuminatis florib. luteis, collines, territoire de Squirrel's Creek."

destitute of spray, generally crooked, and covered with a dense velvety-pubescent—a character which has gained for this plant its popular name, from the supposed resemblance of the branchlets to the young horns of the stag. The leaves are two to three feet long and are composed of from eleven to thirty-one pairs of lanceolate, serrate, sharply pointed, sessile leaflets, dark green on the upper and pale on the lower surface. This species flowers in New England during the third week of June; the fruit begins in August to assume the scarlet color, which it retains throughout the autumn and long after the leaves have fallen.

The Staghorn Sumach is found from New Brunswick to Minnesota; it is very common through the northern States, and extends southward along the Alleghany Mountains to upper Georgia and to central Alabama and Mississippi. It is found growing in nearly all soils, but requires a deep, rich and rather moist loam, in order to develop its full beauty and best size. The wood of the Staghorn Sumach is light, brittle and coarse grained, of a yellow color streaked with green; the bark and leaves are rich in tannin and are somewhat used in dressing leather and, domestically, for dyeing cloth yellow; and the whole plant contains a copious resinous, milky juice. Our illustration upon page 343 will give an idea of the value of the Staghorn Sumach in ornamental planting. It is from a photograph of a broad mass—about eighteen feet high and fifty feet long—of these plants, growing upon the borders of one of the most carefully planted lawns in the United States, where it is by no means, the least attractive object among the plants gathered from all the temperate parts of the world associated with it. The Staghorn Sumach is valuable in ornamental planting when grown in a mass and kept compact by occasional shortening-in of the vigorous upright branches, as in the group which serves as the subject for our illustration. It can be planted, too, with admirable effect, as a single specimen upon the lawn; and from the habit, common to all the Sumachs, of spreading rapidly from underground shoots, it is one of the best plants for clothing rocky banks, railroad-cuts, and other rough places, where it is desirable to hold the soil from washing and to shade the ground. The Staghorn Sumach can be increased from seed; but a supply of young plants, and this is true of all the species, can be obtained more quickly by cutting up pieces of the stout roots into lengths of two or three inches and planting them in rich soil in nursery rows. Vigorous young plants, of a size suitable for permanent planting, can be attained by this method in a year.

Rhus glabra, the Smooth Sumach, is a smaller plant than the Staghorn Sumach, never reaching to the size and habit of a tree, and rarely exceeding a height of ten or twelve feet. It is a broad, spreading, handsome bush with irregular branches, which are smooth and often somewhat glaucous. The leaves are composed of thirteen to thirty-one pairs of lanceolate-oblong, sharply pointed, serrate, sessile leaflets, which are glaucous on the lower surface. The greenish-white flowers are borne in broad, thyrsoid panicles, eight to ten inches long, and are not open until the middle of July, or two or three weeks later than the last species. The fruit resembles that of the Staghorn Sumach. *Rhus glabra* is found from eastern Canada to Washington Territory, extending south to Georgia, Texas and New Mexico. It is a common and generally distributed plant, being commonly seen along the borders of woods and farm inclosures, or covering dry and barren fields and rocky hills, sometimes almost to the exclusion of other plants. As an ornamental plant it is as valuable as the Staghorn Sumach, except that it never attains the size of that plant; and it can be propagated and used in the same way. There is a variety with deeply incised leaflets (var. *laciniata*), discovered many years ago in Chester County, Pennsylvania, which is often seen in gardens.

Rhus copallina, sometimes, at the north, called the Dwarf Sumach, is the last of the three species popularly called Sumach in the United States. The name of Dwarf Sumach is appropriate enough in the northern States, where this species is only found upon dry and, generally, barren soil, and where it grows to a height of only a few feet. In the southern States, however, especially in the neighborhood of streams in the valleys situated about the base of the high mountains of Tennessee and Carolina and along the borders of the rich bottom-lands of southern Arkansas and western Louisiana, it becomes a round-headed tree, sometimes forty feet high, with a tall, straight trunk, ten or twelve inches in diameter at the base, and is the largest of all the North American *Rhus*, with the exception of the south Florida and West Indian *R. Metopium*.

The branches and leaf-stalks of *Rhus copallina* are downy, and the leaves, which are composed of nine to twenty-one

pairs of oblong or ovate-lanceolate, serrate, or of the entire leaflets oblique or unequal at the base, may be readily distinguished from those of the other species by the broad wings which occur on the petiole between the leaflets, and by their lustrous upper surface. It is the latest of the species to flower. They do not appear in New England until the middle of August, and the fruit is ripe a month later.

The panicle of the male or sterile flowers is twelve to eighteen inches long, its stem and branches quite downy; while that of the female flowers is shorter, three to six inches long, with less downy stem and branches. The fruit is somewhat compressed, ovoid, dark, vinous-red, with scattered gray dots when ripe, the clusters not upright as in the other species, but more or less pendulous from the ends of the more slender branches. The leaves, although smaller than in the other species, are beautifully bright and lustrous, and in the autumn turn, not scarlet, but to a deep, rich claret color. Although less often planted than the Staghorn Sumach, this is, perhaps, the most ornamental of the Sumachs, and few shrubs or small trees can be used upon the lawn or in great masses on rocky hill-sides with better effect. The fact that it will thrive and spread rapidly in dry and sterile soil increases its value.

The genus *Rhus*, of which more than a hundred species are now recognized by botanists, is widely distributed through the extra-tropical portion of the northern hemisphere, especially in eastern Asia and in eastern North America. In Europe this genus is confined to the southern and south-east portions of the continent, where four species occur; it is found in the Andean region of South America, in the East Indies, and abundantly in tropical Africa, south of the equator, and in the Cape region. Eight or nine species in addition to the true Sumachs are found within the limits of the United States, over which the genus is widely and very generally distributed. Four of these species—the so-called Poison Ivy and the Poison Dogwood of the East, the Poison Sumach of semi-tropical Florida, and the Poison Oak of the Pacific States—contain a milky juice, which is exceedingly poisonous to most persons touching these plants. S.

A New Zealand Forest Scene.

PERSONS familiar only with the dwarf Ferns of the temperate parts of the earth, have but a faint idea of the magnificence of the arborescent forms of these plants, which are often conspicuous features in the tropics, and which outside of the tropics are found only in some parts of Australia, in Van Dieman's Land and in New Zealand. Tree Ferns are often inhabitants of conservatories, but they must be seen in their native forests, clothing the forest-floor with a gigantic undergrowth, and producing an effect of vegetable richness and grace which no pen can describe, before all the effects of beauty they are capable of displaying can be realized. The illustration upon page 343 of a New Zealand forest scene, with one of the large Dicksonias in the foreground, serves to give an idea of the peculiar vegetation of that region. Tree Ferns are pretty generally distributed through the warmer parts of the tropics of the two worlds. Some of the species attain a height of trunk of more than sixty feet, with a crown of fronds twenty or thirty feet across.

Foreign Correspondence.

London Letter.

THE chief event in the London horticultural world this week was the great summer exhibition of the Royal Botanic Society in their Regent's Park Garden. There is much reason for the popularity of these shows, as they are delightful displays of flowers and fruit in a delightful garden, which I have always looked upon as Robert Marnock's masterpiece in his half a century's work of landscape gardening. It is, in a great measure, due to Marnock's original arrangement of the permanent exhibition ground in these gardens that the shows are so popular. In no other place that I have seen is the possible arrangement of exhibition plants so far removed from primness and formality. The ground surface under the great tent is undulated in such a graceful and natural way that it wears a totally different aspect when bedecked with plants and flowers from the matter-of-fact arrangement of breast-high benches generally seen at flower-shows. The plants look better, too, on grassy mounds than on anything else, so that the whole scene is fresh and natural. This grassy-mound arrangement can obviously only be carried out where the exhibition site is permanent, but in all public gardens where shows are held there should be a fixed spot, and, if laid out in a tasteful way, it might

be made attractive throughout the year. Although the Botanic Society's show-ground is a model in its way it has faults, the chief being the narrowness of the pathways, which should never be less than twenty feet wide, in order to avoid unpleasant crowding. The width of walks is generally governed by the size of the tent, but if this is constructed on the ridge and furrow principle (which is decidedly the best) it costs comparatively little to extend it so as to render the locomotion of large crowds pleasant. There is in this country an ample scope for more picturesque grouping in flower-shows, and since they have ceased to be the attraction for the million that they once were there is the more necessity for novelty in arrangement.

The great gatherings of this Society afford a good indication of the prevalent fashions in floriculture. For years, and until recently, the chief features of the shows were the monster stove and green-house plants trained in perfectly symmetrical shapes, which were, of course, admirable examples of patient skill and good culture. This was the fashion for half a century; the present fashion dictates otherwise. The trained plants seen at London shows to-day are mere apologies for the elephantine specimens that once paid visits to every important exhibition up and down the country. We get, however, more variety in shows now, and the prevalent taste runs in the direction of Orchids and hardy flowers. It does not even pay exhibitors to build up those marvelous mushroom-headed specimens of show-Pelargoniums; for there is no demand for them since the advent of more easily-grown plants like the Begonia, for instance. There is an ever-increasing demand for all classes of showy, hardy plants, the great delight of those who cannot afford, or do not care, for the trouble of green-houses. At this show there was ample material for every class of visitors, and the open-air flowers won, perhaps, the most attention. Of the two great groups of bulbous Irises, the English (*Iris xiphoides*) and the Spanish (*I. xiphium*), with their graceful flowers of an infinite range of hues, the Spanish Irises are the greatest favorites, as they are smaller and their colors are more æsthetic. The ladies seem to admire most the bronzy-hued sorts and those that show odd mixtures of yellows and purples. They have been the chief florists' flower for the past three weeks, and they are seen in every flower-shop done up in all kinds of ways. The quantities of this flower that are poured into Covent Garden from the Channel Islands and the warm counties are prodigious. The Langport Pæonies, Irises and Pyrethrums, about which I wrote you last, were as pure as ever, and I do not remember to have seen such a marvelous array of Roses so early in the season. The new rival to Niphetos, Souvenir de S. A. Prince, was shown splendidly, and won additional honors by being certificated. Two other prominent Roses, which were in perfection of bloom, were Mrs. John Laing and Lady Mary Fitzwilliam, the latter a Rose that will become as popular as La France.

I shall not attempt to go into the details of the multitudinous exhibits, as there was but little novelty about them; indeed, there was a conspicuous absence of absolutely new things, for most of the so-called novelties sent up for certificates had been shown before the Royal Horticultural Society, which is the recognized authority for adjudicating upon novelties. One always sees a large collection, at these shows, of "new plants," because exhibitors know that the judges are less critical than the committee of the other society, though, of course, a certificate granted by the Botanic Society does not carry the same weight as one from the other. As instances of what are recognized here as new plants I need only mention that certificates were granted to *Lilium Hansonii* and *Lilium Martagon album*, both old plants, now having been in cultivation for years. Orchids were a strong and most attractive feature, and a grand display was made by the Duke of Marlborough, who now possesses one of the richest collections of Orchids in England, while the trade-growers were represented by the two veteran firms—Low, of Clapton, and Williams, of Holloway. It is getting late in the season for Orchid bloom, but the exhibitors had evidently "held back" for this show, as some of the specimens which would ordinarily have been past a month ago were in grand condition. The leading Orchids were *Cattleya Mendeli* and *C. Warneri*. Masdevallias, especially *M. Harryana* and its many varieties. *Epidendrum vitellinum majus*, *Odontoglossum vexillarium*, *O. crispum* (*Alexandra*), *Lælia purpurata* and various species of Cypripedium. The leading collections were composed of huge specimens, and consequently represented old varieties, and the first prize group shown by the well-known gardener, Mr. Douglas, was perfection in all points. There were, however, a good many so-called specimens to be seen which were

nothing more than several plants of a sort massed together in large pots. "Made-up plants" are not bona fide specimens, and, as there is no skill required in producing them beyond that of cunningly fitting the pieces together, they should not be allowed to compete for prizes for specimens.

Not the least attractive exhibit was that from the famous Sawbridgeworth fruit-nurseries, consisting of fruit-trees—Peaches, Nectarines, Cherries, Plums—in pots, in the most vigorous health, and bearing fine crops of fruit. This system of pot-culture has for many years been a leading feature of these nurseries. The late Mr. Rivers originated the idea of orchard-house culture, and after showing what good results can be obtained and publishing a book on the subject, his system is practiced throughout the country, especially in small suburban gardens where there is no space for wall trees. Mr. G. F. Wilson, the great Lily amateur at Weybridge, has an orchard-house fixed on the Rivers' principle, in which he grows superb fruit, though the trees are stunted and only from five to six feet high. Most of the trees have not been potted for years. The secret of success lies in administering liberal supplies of manure as top-dressing.

London, June 20th.

W. Goldring.

New or Little Known Plants.

Vitis palmata.

THE figure of *Vitis palmata*,* Vahl, upon page 341, appears to be the first which has been published of this handsome plant. Its history is interesting. It has been cultivated in the Jardin des Plantes at Paris for more than a century, having been introduced, it is supposed, by one of the French missionaries, who were the first European travelers through the valley of the Mississippi. It was first described by Vahl (*Symbolæ Botanicæ*, iii., 42) from the cultivated plants and a few years before the elder Michaux discovered it on the banks of the Mississippi, the Cumberland, Tennessee and other streams during his visit to the Illinois country in 1795. He failed to recognize the plant, which he had no doubt seen growing in Paris, and proposed for it the name of *V. rubra* on account of the bright red color of the young branches. This name however, was not mentioned in Michaux's Flora, in which work the plant was merged into *V. riparia*; and it was not rediscovered until the autumn of 1882, when Mr. H. Eggert found it growing abundantly upon the banks of the Mississippi opposite Alton, and Dr. Englemann was able to establish the identity of Michaux's plant with that of the Paris Garden, and to point out its true specific characters.† Seeds of *Vitis palmata* were sent to the Arnold Arboretum in January, 1883, by Dr. Englemann, and the plants raised from them are perfectly hardy, and now flower and produce fruit every year. They possess no little decorative value, and in a collection of climbing plants grown for ornament this vine should find a place. It flourishes in ordinary garden soil, and is easily multiplied by cuttings or by seed. Our figure is from a specimen in the Arboretum.

C. S. S.

Amorophophallus Titanum.

THE flowering of this gigantic Aroid at Kew, for the first time in Europe, is an event full of interest to botanists and horticulturists. Compared with it, the *Rafflesia*, *Victoria regia* and *Aristolochia Goldiana*, all giants among flowers, are small and almost commonplace. There is no known plant that approaches it in size and magnificence, and, I am sorry

* *Vitis palmata*, Vahl., *Symb.*, iii., 42.—DC. *Prodr.*, i., 637.—Englemann in the *Bushberg Cat.* (1883) 17; *Bot. Gazette*, viii., 254.

† *Vitis riparia*, Michaux., *Flor. Bor. Am.*, ii., 231 in part.

Vitis riparia, var. *palmata*, Planchon in DC. *Monographs*, v., 2, 352.

"*Vitis monosperma*, cette espèce se trouve au long des Rivières et nullement dans l'intérieur des bois; je l'ai vu sur la Rivière Kaskaskia, sur le Mississippi aux environs du fort Massac sur la Rivière Tenasse."—Michaux, *Journal*, p. 124.

† "*Vitis palmata*, Vahl. A vigorous climber with red branches (and often also red petioles), young shoots angular and ribbed, older ones losing the bark in large flakes; diaphragms rather thick; stipules very short, rounded, nearly deciduous; leaves smooth, glabrous (or on the nerves beneath with short, straight hairs), dull and rather dusky green, cordate with broad sinus, mostly deeply three- or sometimes five-lobed, lobes when long widest in the middle, contracted at base and mostly slenderly caudate-acuminate, with few coarse teeth; flowering racemes compound, long peduncled; berries black without any bloom, rather small (four to five lines in diameter); seeds long for the size of the fruit, slightly notched on top, single and then nearly globose or in twos, when they are hemispherical and very flat on the ventral side; beak very short, chalaza narrow, elongated, groove without any visible raphe."—Englemann in *Bot. Gazette*, viii., 254.

Fig. 118.—*Vitis palmata*.—See page 340.

1. Flowering Branch, natural size. 2. Flower Bud. 3. Male Flower, deprived of petals. 4. Female Flower, deprived of petals.
5. Cluster of Fruit, natural size. 6. Seed. 7. Side view of seed.

to be compelled to add, in the power and disagreeableness of its foetid odor. The discovery of this Aroid, in Sumatra, was made by Dr. O. Beccari, a well-known botanist and traveler, whose explorations in New Guinea, Borneo and Sumatra have

done so much to enrich botanical and horticultural collections. To him we are indebted for a knowledge of the wonderful Myrmecophilous plants, two of which, *Hydnophytum* and *Myrmecodia*, are in cultivation at Kew. He also sent home

living plants of *Bulbophyllum Beccari*, whose enormous leaves and massive inflorescence are unequaled by any other Orchid. This plant also flowered at Kew in 1881, and it is noteworthy that the odor of the flowers was almost as powerful and repellent as that of the *Amorphophallus*. In the account forwarded by Dr. Beccari to the *Gardeners' Chronicle* of his discovery of the Aroid in 1878, he stated that he found it growing side by side with a *Rafflesia* (a model of this wonderful parasite is in the Kew Museum), and that the tuber when dug up was five feet in circumference, and so heavy that two men could scarcely carry it. The solitary leaf was composed of a stalk as thick as a man's thigh, and ten feet high, whilst the blade was many times divided, spreading umbrella-like, with a circumference of forty-five feet. This is a little larger than the leaf borne by the Kew plant last year. The dimensions of the tuber, however, when measured in March of this year, were equal to those of the specimen described by Beccari, and it weighed exactly fifty-seven pounds. From this we entertained the hope that a flower would be developed at Kew this year, and the hope has been realized to the fullest extent. Less than a month ago the bud was sufficiently developed to enable us to see that it was a flower-bud, not a leaf-bud; at that time it was cone-shaped and about a foot high. From this it grew in height at the rate of about three inches a day, till it attained a height of nearly seven feet. The spadix is now five feet long, nearly a foot wide, club-shaped, with irregular depressions, and colored pale greenish-yellow. It stands erect in the middle of the huge bell-shaped spathe, which is three feet deep, three feet eight inches across the mouth, the margin wavy and deeply-toothed, with numerous parallel ridges on the outside. Its color is pale green, mottled at the base, almost white on the upper part, whilst inside it is a deep vinous purple with a sheen of bluish color. The whole is elevated on a stalk fifteen inches high and six inches in diameter. It is impossible to convey in words any correct idea of the stateliness and massive grandeur of this huge inflorescence. The expansion of the spathe took place to-day (21st June), and at once the house where the plant stands was filled with an odor exactly like that of putrid fish. Flies of all kinds were attracted by the smell, and buzzed about the spadix in great numbers. We cannot guess how long the flowers will remain fresh, but already crowds of people are attracted to the house by the reports in the papers concerning this plant.

Kew obtained a seedling of this *Amorphophallus* from the Florence Botanic Gardens in 1879, and this has been grown in a moist tropical house until its leaf faded, which usually occurred late in Autumn. The tuber was then removed from the soil, well washed, and at once placed in a pot filled with moist silver sand. Whilst at rest it was kept in a stove temperature. As soon as the bud showed signs of pushing the tuber was replanted in strong, well-manured soil, and kept perpetually moist. During the last four years the plant has been grown over the tank containing the *Victoria regia*, its pot standing an inch or two in the water. The gigantic leaf with its noble proportions has been annually a feature of this house, so that even apart from its enormous flowers, this plant is worth growing for its leaf alone.

There have flowered at Kew this year, in addition to this titanic Aroid, the following giants of the same order, viz.: *Amorphophallus campanulatus*, *A. virosus* and *Godwinia gigas*. These all have very large inflorescences, tall and handsome foliage, large tubers, and an unpleasant odor. The last is certainly a drawback, but it is more than counterbalanced by the wonderful proportions and extraordinary character of the flowers themselves.

Kew.

W. Watson.

Cultural Department.

Summer Pruning.

PRUNING is one of the most important points of garden practice. When judiciously pruned, a shrub or tree can be held at almost any size or changed to almost any form; and, besides this, a tree or shrub can be made much more productive of fruit and flowers. On the other hand, improper pruning will not only weaken the vigor of a plant, but may destroy all its beauty of outline, and at the same time hinder the production of flowers and of fruit. The shearing of a tree or shrub into some formal shape, as of a cone or hemisphere, may have a proper place in some styles of gardening; but, in general, it may be said that the clipping of trees or shrubs into any set form is radically wrong. I have seen many good collections of shrubs ruined because each one was cut into a shape to resemble all the rest. In this way all individuality is lost, whereas the object of pruning should be to develop what-

ever beauty each plant possesses on the lines of its natural growth. It is utterly impossible to secure any fine effects in large shrubberies where each individual is trimmed after the same pattern. Evidently the true way is to encourage each one to make the best of its natural graces, and then to arrange this infinite variety of form into a harmonious picture.

If we prune for the purpose of increasing the flowers of a shrub or tree, we must prune different species and varieties at different seasons of the year; but surplus wood and suckers can always be thinned out during the summer season, and wounds which are cut clean in midsummer will heal more quickly than those made in frosty weather. Maples, Birches, Yellow-woods and many other trees bleed copiously when their branches are cut in the spring, but they heal over more quickly if pruned while in full leaf. Again, shrubs which bloom on wood made the previous year, of which the early *Spiræas*, *Forsythias*, *Honeysuckles*, *Viburnums*, *Syringas*, *Philadelphus* and *Deutzias* are examples, should receive their chief pruning soon after the flowers have fallen. This will encourage a growth of young wood with flower-buds for the following year. Of course, when these shrubs are cut back in early spring before flowering, the flower-buds are sacrificed. On the other hand, shrubs like *Hydrangea paniculata*, *Desmodium penduliflorum*, *Hibiscus Syriacus* and others, which flower on the new growth, bloom more abundantly when cut back severely in early spring. But even in this case the surplus wood should be thinned out during the summer.

With anything like an extensive collection of shrubs constant attention must be given to pruning during the whole growing season, and this is especially true where coarse-growing shrubs and those of delicate habit are planted together. If this is neglected the less robust plants will soon be smothered out by their vigorous neighbors. Many shrubs are pruned too much. If a healthy young plant is carefully pruned at the outset, allowed plenty of room, with all the cross branches cut away to admit light and air, and all the old flowering wood shortened in after bloom and the over-strong shoots stopped, at midsummer, it will not only retain all its natural beauty, but this beauty will be increased, and it will be full of flowers the next year. After the branches of large shrubs have been thinned out, stronger shoots should be pinched back with the thumb and finger, for this will hasten the growth of flowering-buds. Many trees and shrubs can be made to produce flowers and fruit at a smaller size than if they were left to themselves or pruned only in the winter or spring. This summer pinching also helps to ripen up the wood, and leaves it in good condition to withstand the cold. I have known trees which were tender, when left to grow naturally, to endure our winters fairly well when the wood had been properly stopped by pinching it in summer. This is especially true in wet seasons, when the branches often continue to grow until the frost kills them. Apples, Peaches, Plums, Filberts and many other trees can be made to bear when quite small if the new growth is stopped once or twice in the summer. I now have Peach-trees five or six feet high which are loaded with fruit, the result of pinching back in summer. While trees are growing vigorously the flower-buds do not form well, but by this summer pinching the flow of the sap is checked and the buds are developed. Many plants also ripen their fruit better when the strong shoots above the fruit have been stopped. Young trees can be easily trained with very little use of the knife when they are taken in time, the surplus buds rubbed off from the lateral branches and the branches properly pinched back. In short, summer pruning is useful and indispensable for the removal of superfluous branches in the middle of the tree or shrub, and for the shortening-in of all over-vigorous branches and such as interfere with the native symmetry of the tree; and by thinning out the weak and misplaced branches additional nourishment is supplied to those that remain.

Arnold Arboretum.

Jackson Dawson.

The Vitality of Seeds.

MOST books on horticulture contain tables showing the number of years that the seeds of garden plants remain "good"—that is, retain their germinating strength substantially unimpaired. These tables, compiled by different writers, do not quite agree; yet they are not widely discrepant. Of late, our agricultural experiment stations have been engaged in testing the vitality of seeds sent out by dealers; and these reports show a considerable amount of difference. It is, unquestionably, a wide-spread practice among seedsmen to mix old stock with new; and in some conspicuous cases this has been shown, by the station experiments, to have been carried



Forest Vegetation in New Zealand.—See page 339.

very far, so that nearly or quite half of some stocks had entirely lost their power to grow.

In the case of those seeds which hold their vitality substantially unimpaired through a considerable number of years, this mixing of the remainders of one year with the fresh stock of the next is unobjectionable. To do otherwise would be foolishly wasteful, and, if insisted on by buyers would unnecessarily enhance the price. But to sell dead seeds, or seeds the vitality of which is weakened by keeping, is a dastardly wrong. On this point there can be no mistake. I believe that any one who will make a study of seeds, with a glass of a moderate magnifying power, will, in many cases, be able thus to judge very closely of their quality. But every gardener should procure his stock of seeds early enough to be able to test them in good time, although, fortunately, there is now a

large and increasing number of seedsmen in this country who never wilfully send out inferior seeds.

In regard to the keeping of home-grown seeds, so that their vitality shall be as well maintained as nature will allow, there are some necessary points to be observed. The first is, that they shall be well ripened. This is a nice point, and one not always easy to secure—in fact, impossible, except by making successive cuttings. That they should be well and promptly dried, cleaned and secured from attacks of vermin is obvious; but the duration of their continued vitality is very much affected by the after care. They should be kept dry. This is more important than the question of light, temperature or ventilation. My own experience of now many years has not convinced me of any positive disadvantage from exposure to the air or to low degrees of temperature. In fact, many seeds retain their vitality better in open barrels and boxes, or in bags, than in tight packages. Warm this valuable chiefly as a security against dampness. Many times I have found seeds good that had repeatedly endured a cold of 40° below zero; but dampness will very quickly destroy them. Light bleaches or darkens them; the color of seeds is rarely maintained unchanged for any considerable time.

Newport, Vt.

T. H. Hoskins.

Orchid Notes.

Cattleya granulosa.—Several nice strong plants of this striking species are now producing their flowers here with great freedom. One gets so accustomed to look upon all *Cattleyas* as being represented by the numerous gorgeous-flowered forms of the labiate section that it is quite a relief to meet with such a contrast to them as that presented by the species now under consideration.

C. granulosa belongs to a very distinct section of the genus typified by *C. guttata*. It has been cultivated in English gardens now for nearly fifty years, having been introduced, it is believed, from Guatemala in 1840 by Hartweg, who at that time was collecting in tropical America for the Horticultural Society of London. Notwithstanding the fact that it has been under culture so many years, it is a neglected Orchid in many collections, although well-grown plants when in flower present a type of beauty difficult to match, and one which should entitle this species to more respect.

The plants are characterized by their slender, terete and jointed stems, nearly of the same thickness throughout, except at the base, where they are slightly narrower, and clothed



A Group of Staghorn Sumachs on the Border of a Lawn.—See page 338.

with silvery membranous sheaths. At their apex are two oblong-lanceolate, deep-green leaves, from between which arises a stoutish peduncle bearing from three to eight flowers, each about four inches across. The sepals are oblong acute, the two lateral ones being falcate; the petals are nearly similar, but broader and wavy on the margins of the upper half. Both sepals and petals are of a shining coppery-green color, handsomely spotted near the edges with crimson-purple. The two lateral lobes of the lip meet over the top of the column; they are creamy-white outside and lined inside with rows of crimson-purple dots, which become very thick on the recurved tips; the middle lobe, which expands into a crisped emarginate limb in front, has the surface traversed by irregular granulated lines of deep crimson-purple, radiating obliquely from the central purple lines which run from the base. It is from these granulations, or papule, as they are now called, that the plant received its specific name from Dr. Lindley.

About two months ago there was another very handsome *Cattleya* in flower, namely, *C. Schofieldiana*, which, from a botanical point of view, must certainly be looked upon as a magnificent variety of *C. granulosa*, although it is much superior in every way to that species as far as the grandeur of its flowers are concerned. In character of stem, leaves and growth *C. Schofieldiana* is similar. The flowers, however, are half as large again as those of *C. granulosa*, and are of a rich tawny yellow, suffused with a coppery tinge, and thickly covered with large crimson spots. The large lip is very beautiful, the surface of the middle lobe being covered all over with deep crimson-purple raised dots, as in *C. granulosa*. *C. Schofieldiana*, which is a native of Brazil, flowered for the first time in England in the autumn of 1882 with Mr. G. W. Law-Schofield, of Rawtenstall, near Manchester, in compliment to whom it was named by the late Professor Reichenbach.

Both of these plants thrive well in pots, which must be well drained. They should stand well above the rims in a compost of rough fibrous peat, which may have a little charcoal added, so as to render it not only more porous, but also to prevent it from becoming sour. Owing to the slender nature of the stems care must be taken not to let the plants get too dry during the resting season, otherwise they are liable to shrivel—a misfortune which could not be easily rectified. During the time of growth an abundance of water may be given judiciously, and as much light as possible, so long as there is no danger of their being scorched by the heat of the sun. This is necessary to enable the plants to ripen their growths, without the proper development of which it would, of course, be impossible to expect good flowers.

St. Albans, June 7th, 1889.

John Weathers.

Phalænopsis Culture.—The best-grown collection of these plants in England is that of Mr. Parlington, of Cheshunt, whose gardener, Mr. Searing, has met with the most surprising success in the cultivation of these oft-times "miffy" plants. I saw them last week. Imagine *P. grandiflora*, *P. amabilis* and *P. Schilleriana* with from eight to eleven leaves each, and some of the leaves measuring sixteen inches long by four and a half inches wide. No spot, no bad health in any shape. The spikes bear as many as sixty flowers each. The house in which these plants are grown is a lean-to, with an aspect full south, and it is twelve feet high at the back by four feet high in front. Mr. Searing allows the sun to shine upon his plants in early morning, and again in the afternoon. He ventilates very carefully, but never keeps the house shut up close. A dressing of salt is given to the gravel in the house, both on the stages and in the path. This is done several times in the year, and Mr. Searing attributes much of his success to this. It is difficult to imagine how salt thus applied can have any effect on the health of the plants, as salt does not evaporate. Still, the proof of the pudding is in the eating, and there may be something in this salt dressing after all. I am told that collectors always find the strongest and healthiest *Phalænopsis* within reach of an atmosphere affected by the sea, and we know that the genus is generally confined to small islands. There does not appear to be anything but the salt in Mr. Searing's treatment that would account for his wonderful success. His plants are in teak baskets, well-drained, with a little sphagnum about the roots. The strongest plants are placed over pots half-filled with charcoal, and into these the roots have grown most vigorously. In winter only sufficient water is given to keep the moss alive, and in summer the plants are kept fairly moist at the roots. Mr. Searing does not disturb his plants at the roots, but simply removes the dead moss in spring and replaces it with living. Mr. Herman Wendland, whose knowledge of Orchids, and especially of Orchid collections, is exceptional, was filled with astonishment when he saw these plants.

Kew, England.

W.

Notes on Wild Flowers.

Habenaria orbiculata, one of the Rein Orchis family and now in flower, is an interesting plant. The leaves (a pair of them) are nearly round, lying flat on the ground, and are often ten inches broad. They are dark, shiny green in color, and from between them comes the flowering stem, ten to twenty inches high, with its loose raceme of almost white flowers. Its natural home is in the shade of Spruce and Hemlock. It can be grown without much trouble in moist, well-drained soil in the shade if leaf-mould is placed about its roots. It is a desirable plant for its curious leaves as well as for its interesting flowers.

Habenaria dilatata, also in flower, is a valuable plant for artificial bogs, but it can be grown in ordinary soil in a moist, shaded place. It grows from one to two and a half feet high, with a dense spike of pearly-white flowers, six inches to a foot in length, which are deliciously fragrant. Another species of this genus, almost identical in its general appearance with *H. dilatata*, except that the flowers are greenish-white and not fragrant, is *H. hyperborea*. The two species grow together, and it is difficult to distinguish them when not in flower.

The Hare-bell (*Campanula rotundifolia*) is quite interesting, now that the little blue, bell-shaped flowers are open. The natural location for it is in rocky soil, and it is a valuable plant for the rockery. It will, however, thrive in any ordinary soil. The plant grows about a foot high, often higher, with an abundance of fine, grass-like leaves along its stems.

Two desirable plants now in bloom are the Tickseed (*Coreopsis lanceolata*) and the Golden Ragwort (*Senecio aureus*). The former grows about two feet high with large, bright yellow flowers often two inches broad, on long stems, several from each plant. The plant remains a long time in bloom and is easy of culture. The flowers of the Golden Ragwort are smaller, but in dense heads or umbels, of a bright yellow and very pretty. It is a variable plant according to its location. The most showy form is found in low, wet meadows, along the borders of swamps. It takes easily to cultivation, and may be grown in moist upland soil.

One of our most desirable bog plants is the Side-saddle Flower, or Pitcher Plant (*Sarracenia purpurea*). Its pitcher-shaped leaves, when grown in the sun, are of a rich purplish color, three to six inches long, usually full or partly filled with water, and the single purple flower is nodding on a stem a foot or more high. The plant requires wet soil, and seems to prefer peat or muck. We have grown it in wet clay-loam, but the leaves seem to be sickly and the flowers dwarfed. Another pretty bog plant, but one which we never have tried to grow, is *Pyrola rotundifolia*, var. *uliginosa*, one of the Shinleaf family. Its spike of reddish-purple flowers is very showy—the most showy of any of this genus we have seen. It is found in cold bogs, and, probably, would not thrive except on a boggy soil.

Charlotte, Vt.

F. H. Horsford.

Narcissus for Borders.—Among spring-flowering plants *Narcissus* take a foremost place. The many species and varieties now in commerce are perplexing, to say the least, to the general cultivator, and it has occurred to me to note a few of those that may be relied on to succeed and increase under ordinary garden treatment. The first to bloom here is always Golden Spur. This is a bright yellow variety, and in my opinion superior to Emperor. Golden Spur is fully expanded a week before any other kind, and increases rapidly. Next in order of flowering is *N. princeps*. This is a form of *N. Pseudonarcissus*, and is well named. Sir Watkin, the largest of all with us, produces noble flowers and foliage, and doubles the number of its bulbs every year. *N. bicolor Horsfieldii* is the best known of the bicolor section, and should be grown in every collection, the bright yellow of the corona being a beautiful contrast to the paler yellow divisions of the limb. Of *N. poeticus* and its varieties, we can strongly recommend the variety *Ornatus*, which flowers two weeks earlier than the type, while *N. poeticus plenus* flowers two weeks later. The type and these two varieties give a supply of flowers lasting over a month. Orange Phoenix is, perhaps, the best of the double varieties, combining, as it does, two shades of yellow in a charming manner. Of all the varieties of *N. incomparabilis*, none, perhaps, excepting Sir Watkin, are superior to the type. The best time to plant *Narcissus* is as soon after the foliage dies down as possible, and before the bulbs commence to make new roots in fall—that is, in September. Home-grown bulbs are, we find, preferable to the imported ones, which need a season or two to get established. Choice kinds of *Narcissus* should be lifted about every three years; the soil enriched, and the bulbs replanted, for this gives them

an opportunity to fully develop, and insures plenty of good flowers. We plant six inches deep, cover the bulbs with two inches of soil, then give a sprinkling of manure and fill in the soil. If the manure is brought in immediate contact with the bulbs they are liable to rot. By adopting the above plan we find the rains provide the young roots with the full benefit of the manure used. This remark applies also to most of the Lilies, for which many people are averse to use manure; we find, however, that the main feeders of the Lilies are the roots produced between the surface of the soil and the top of the bulb.

Passaic, N. J.

E. O. Orpet.

Orchard Notes.—During July many fruit-trees can be budded. A strong bud, if it takes well, is as good as a graft. Just as the longitudinal growth stops is about the time to bud, although the operation can be successfully performed at any time before the sap ceases to flow.

Sometimes the work of looking for borers about the base of fruit-trees is forgotten. The first inspection should have been made earlier than this, and a later one should follow. A keen-pointed knife and a piece of stiff wire will now dislodge the grubs. Cherries budded on Mahaleb stock are failing, largely on account of the borer at the root. Purchasers should procure trees worked on the Mazzard.

Clapp's Favorite is a valued early Pear for family use, but is not greatly prized for market, on account of its lack of keeping qualities. But the fact that its large, beautiful fruit can be gathered in this latitude by the 10th of August makes it desirable.

Germantown, Pa.

Joseph Meehan.

Recent Publications.

The Home Acre. By Edward P. Roe. New York: Dodd, Mead & Co. 1889.

Mr. Roe's "Success with Small Fruits" has long been familiar to thousands of readers, and the present little volume will be found another store-house of useful information, so pleasingly conveyed that it will doubtless instruct and profit many whom more strictly scientific treatises would repel. It is a series of papers, collected from the periodicals where they were issued before Mr. Roe's death, dealing with the problems which confront the owners of suburban places. "The area of land purchased in such places," says Mr. Roe, "will depend largely on the desires and purse of the buyer; but about one acre seems to satisfy the majority of people. This amount is not so great that the business man is burdened with care, nor is its limit so small that he is cramped and thwarted by line fences. If he can give to his bit of Eden but little thought and money he will find that an acre can be so laid out as to entail comparatively small expense in either the one or the other; if he has the time and taste to make the land his playground as well as that of his children, scope is afforded for an almost infinite variety of pleasing labors and interesting experiments." The taking title of the book thus expresses its exact purpose, as giving counsel not to the professional horticulturist but to the amateur with modest funds but a genuine love for out-door work and beauty. Yet it is essentially practical in scope, dealing not at all with the culture of flowers, but, in its successive chapters, with Tree-Planting, Fruit-Trees and Grass, the Garden (as a useful rather than an ornamental spot), the Vineyard and Orchard, the Raspberry, the Currant, Strawberries, and the Kitchen Garden. The advice given with regard to the selection and planting of trees is sound in substance and clearly conveyed. Good counsel of a general sort relates to the preference that should be given to native over foreign species—a preference, of course, which need not mean narrow exclusiveness, only, when the Norway Spruce is mentioned, we should have been glad had its unsuitability to the climate of our Eastern and Middle States been expressly set forth. Speaking of Grape-culture, Mr. Roe insistently recommends that, where birds are destructive, songsters should not be shot, but that the bunches should be protected by mosquito-netting bags, as is the constant custom in Germany, or by cheap paper-bags with the lower corners cut off to admit of the easy passage of moisture. And, he adds, "clusters ripen better, last longer on the vine and acquire a more exquisite bloom and flavor in this retirement than if exposed to light as well as to birds and wasps. Not the fruit but the foliage of the Grape-vine needs the sun." With regard to keeping grapes after they are cut, Mr. Roe says that few of the early sorts will last long, but that some of the later ones can be preserved a considerable time in boxes stored where the temperature is cool, even and dry, and that "some of the wine-grapes . . . will keep under these conditions almost like winter-apples. One October day I took

a stone pot of the largest size and put in first a layer of Isabella grapes, then a double thickness of straw paper, then alternate layers of grapes and paper until the pot was full. A cloth was next pasted over the stone cover, so as to make the pot water-tight. The pot was then buried on a dry knoll below the reach of frost and dug up again on New Year's Day. The grapes looked and tasted as if they had just been picked from the vine."

Correspondence.

Forests and Civilization.

To the Editor of GARDEN AND FOREST:

Sir,—We might have had some real forestry here in the State of New York if we had been sufficiently advanced in the art of living; if we had had the interest in the public welfare and the perception of our obligation to coming generations, which are necessary to the development and persistence of civilization. The entire Adirondack Wilderness should have been held permanently in the possession of the state. Then a real school of forestry could have been established somewhere in the woods, and young men could have been trained in the practice of this art, and they could have been employed in the care of the forests and woodlands of other portions of the country. The whole tract of 8,000 square miles was originally heavily wooded. The timber could have been cut off as the trees matured, and, of course, should have been so cut off. Nothing could be more absurd than the notion that trees should never be utilized or removed. Whenever a tree has come to its best it should be cut down, and its wood applied to some useful purpose, so as to obtain its value, and in order to provide for a succession of generations of trees, and thus for the permanent life of the forest.

If the Adirondack forests had been thus intelligently managed and administered they would now have been for a long time yielding an increasing revenue to the people of the state. The whole population would have been greatly benefited by the reduction of taxation. Every man and woman in the state would have been richer to-day—would have had more of the means of subsistence and of comfort and happiness than at present. Every child in the state would have been born to a better inheritance, and into more favorable conditions than now. The forests would have been better now than ever before, and they would have gone on increasing in value to the people of the state, with the increasing density of population, and on account of the exhaustion of the timber-supply in regions fit for agriculture.

The Adirondack region is not fit for agriculture. No part of it is suitable for any other than forest-conditions, and these should have been maintained forever. It is indeed impossible to disturb these conditions very extensively, or to remove the forests permanently, without destroying the region itself and annihilating everything that makes it of any value. I doubt if an instance of more obvious and complete adaptation of a region to a special and particular use can be found in the whole world. Nature made this region for the permanent and everlasting growth of forests, and this sole and exclusive adaptation to a most important function should have been recognized.

As I said years ago,* if the Adirondack forests could be saved by legislation, one of the best possible measures would be "An Act for the Discouragement of Agriculture in the North Woods." The lumber-business is not by any means the only destructive agency at work here. Tens of thousands of acres, entirely unfit for any use but forest-growth, have been stripped of trees, and by cultivation and pasturage have been rendered incapable of reproducing the only crop for which the land ever had any adaptation. It is strange—if anything in human folly is strange—to see so many people persist in the effort to "farm" where the soil is so meagre, and the country so high and cold, that no profitable return for their labors is possible. The thin film of soil disappears after a few years, leaving only the bare, inert sand or gravel, and as most of the "farming land" here is rolling or hilly, the slopes soon begin to break down and wash away. Great gullies are formed, which grow wider and deeper every year, till vast waterless tracts of shifting sand, or of clay and gravel, varied only by rock-ledges and boulders, stretch before the unhappy traveler where once grew noble forests fed by perennial springs.

I have carefully studied the lives and work of farmers in nearly every part of our country—from the Atlantic to the Pacific coast, and from Canada to Mexico—and I have found nowhere else conditions so forlorn and forbidding as here in northern New York. The local histories of the regions adjoining the Wilderness abound in stories of the hardships of

* In the New York Tribune.

the early settlers of those counties, especially of those endured by the women of those times. The hardships continue with little mitigation, but as few people are interested in contemporary history, there is no record or observation of these miseries.

The region was meant to be let alone. It has no natural fitness for agriculture. It is pitiful to see the scanty growth of vegetation which the farmer's toil produces here cut off by frosts in both spring and autumn, and, in many places, even in the middle of summer, while in the southern States of this country there are millions of acres of fertile soil lying untilled beneath most genial skies. The effort to farm these inhospitable lands has also been the source of a large proportion of the fires which have destroyed so much of the remaining forest. Land is cleared by being burned over, and in a dry time the fire extends from the fallow to the woods, despite the best efforts to keep it within bounds, and it is a common saying in the woods that such a conflagration is often a convenient accident for the farmer, as he plants corn the next spring in the burned woods without any clearing whatever, and raises a crop in the ashes. A great deal of the "farming land" here has been brought into cultivation in this way. It is all, from beginning to end, a most wasteful and suicidal process, and the inevitable end, the ruin and disappearance of the soil itself, is speedily reached. Man has no power to create a new world. He has not yet learned how to take care of the one which he inherits, but his ability to wreck and exhaust it is very great. The accumulation of the soil of the planet, out of which must come everything that supports human life, civilization and happiness, has been the slow, patient process of vast and unimaginable periods of time, and it has been chiefly the work of vegetation. While the forests stand on these mountains, the soil out of which they spring grows perpetually richer, and it would continue to do so forever if man had yet become a rational being. Each year's leafage as it grows and falls wins and deposits for us a little more of the precious material out of which all things human are fashioned, lifts another slight increment from the dark province where all is inert and lifeless, up into the light, and starts it on its shining way to the realm where it shall take its part in the play of consciousness. The stones are thus changed to bread. But since man began his work in these regions he has blotted out, over great areas, the results of millions of years of Nature's patient toil, and has brought back and re-established here the hard and forbidding conditions under which she began her processes of vegetable growth, and it will require great cycles of time again to redeem and recover these vast tracts of scorched and desolate stone.

Moirs, New York, May, 1889.

J. B. Harrison.

Roadside Adornment.

To the Editor of GARDEN AND FOREST:

Sir.—A striking feature may be added to roadside adornment by sowing the seeds of wild flowers where grass does not readily take root, there being many plants that thrive where it does not. For instance, if a road is cut through a knoll of sand and gravel, as frequently occurs, the rugged surfaces give little encouragement to grass, while the Lupin finds them altogether congenial. Beside giving a mass of purple bloom in May, the pretty foliage of this plant covers the ground throughout the summer. No other sowing than the first is needed, as Nature has provided for the dissemination of the seed by the bursting of the pods.

The owner of a sandy way has obtained very satisfactory results by gathering seeds from the great variety of flowers bordering the railroad track (that bounds his farm on one side) and scattering them broadcast beside the highway. Among these Lupin predominates, but *Lithospermum hirtum*, Vetch, Wild Pea of several varieties, Cone-flower, Butterfly-weed, Painted Cup (*Castilleja coccinea*), Golden-rods in great variety, and the persistent little Harebell, all follow along in their season. A troublesome wash-out along this roadway that was filled with brush and other unsightly material, to prevent farther encroachments of the water, has, by skilful planting, been changed into a place of beauty.

Basket Willows screen it from the road on the lower side, and higher up along the slopes are set Purple Lilac, Red Cedar, Bladder Nut, Scarlet Maple, Whitewood and Osage Orange; Sassafras springing up of itself.

Any surplus of the flower-garden was transferred there. Yards of crimson Boursault and yellow Roses trail over the brush and flower in their season, and in the vicinity low Scotch and native Roses flourish. The Lemon Lily and Iris add, too, their brightness to the scene; and all these trees and plants thrive without care or attention.

This spot is a favorite nesting-place for birds, and I am in-

clined to think the Roses owe their freedom from the pests that infest the gardens to the presence of these active neighbors.

Kliuger Lake, Mich.

Dorcas E. Collins.

The Newtown Pippin.

To the Editor of GARDEN AND FOREST:

Sir.—Referring to the note of Mr. J. J. Thomas in your issue of May 26th I would state that the Newtown Pippin—by which he means, I suppose, the Newtown Pippin of his "Fruit Culturist" and the Green Newtown Pippin of Downing's Treatise—is one of the most obscure Apples in California, while the Yellow Newtown is generally considered our best winter Apple. In several hundred reports from Apple-growers, which I have secured as a basis for tabulation of varieties in "California Fruits, and How to Grow Them," which I now have in press, the Green Newtown Pippin was approved by a single grower in a single county, while the Yellow Newtown is reported favorably from every county from which I secured reports, and nearly all counties have been heard from. The data presented in this work of the popularity of different varieties here are interesting for comparison with the tables of the American Horticultural and other societies representing eastern experience.

College of Agriculture, Berkeley, Cal.

E. J. Wickson.

The American Beech.

To the Editor of GARDEN AND FOREST:

Sir.—I have never seen a more noble or beautiful tree than an American Beech growing on the Luce Farm, in the town of Riverhead, and within a quarter of a mile of Long Island Sound.

Soon after the Revolutionary War the entire head was cut from this tree to make a brush-harrow. Not discouraged by this rude treatment it threw out seven branches, equidistant, in various directions, forming a beautiful and symmetrical head. Its trunk, two feet from the ground, is ten feet in circumference; its height to the branches, eight feet; the circumference of four of the larger branches is respectively, six, six, five and a half and five feet, and they extend from thirty-six to thirty-eight on either side, giving the head a diameter of seventy-four feet. The ends of the branches nearly touch the ground and turn up with a graceful curve. The outline of the top is regular and massive and beneath the branches is a beautiful camping-ground, where a party of one hundred or more would be perfectly protected against sun or shower.

Floral Park, N. Y.

C. L. Allen.

To the Editor of GARDEN AND FOREST:

Sir.—I have often heard complaints that the Crown Imperial does not flower well, and perhaps the method that has given me fine blooms for the last fifteen years may interest some of your readers.

When the stem-leaves fade I cut the stalk to within six inches of the ground, and when convenient (some time in July) dig up all the bulbs with the earth about them, and put in its place rich mould from a frame or old hot-bed. I plant the bulbs again immediately in a layer of this mould, covering with the same, and treading it down firmly. In December I cover the bed with some litter, and good flowers are sure to come in spring. The place where these Crown Imperials grow is well open to the sun in early spring, but later in the year is heavily shaded by a spreading Ash tree.

Cambridge, Mass.

J. M.

Dosoris.

To the Editor of GARDEN AND FOREST:

Sir.—It would be difficult to find a more desirable situation for country homes than the north shore of Long Island, with its frequent bays cutting deeply in between well-wooded hills, behind which fertile farm-lands roll away in endless variety of surface. Every bluff is breezy with coolness from the Sound, and on either hand is a diversity of pleasing prospect across green fields or glittering waters. Along this shore, close to the mainland and hardly twenty miles from the City Hall in a right line, lies the Island of Dosoris, a portion of an old estate which has borne that name for nearly two hundred years. The original title was derived from the Matinecock tribe of Indians, and in 1668, under a patent granted by Sir Richard Nicolls, the first English Governor of the province, it passed into private hands, and in 1693 "it was owned," says the record, "by John Taylor, who died seized thereof, leaving his surviving daughter and heir-at-law, Abigail, who subsequently intermarried with the Reverend Benjamin Woolsey, and the title was therefore, by deed of lease and release, conveyed to him, and the trust from that circumstance acquired

the name of Dosoris—*dos uxoris*." Some sixteen years ago the island was bought by Mr. Charles A. Dana, who at once began the systematic planting which has made it one of the most interesting gardens in the country. The entire island, about forty-five acres in extent, is now one garden, and is maintained throughout as a garden, the pasture and forage lands being on the neighboring mainland.

Mr. Dana's collection of trees and shrubs and herbaceous plants has grown year by year, until it rivals in richness the most complete private collections of the world, and yet the island is much more than an arboretum or a plant museum, for the planting has been disposed with reference to some fine old trees which already stood about the house, and to the belt of forest which already fringed the island, so as to bring out and emphasize the natural beauties of the place. The house, with broad, hospitable, vine-shaded piazzas, stands on high ground, and from one side the prospect is over a stretch of perfect lawn, with glimpses of the open waters of the Sound between the trees, to give life and light to the picture. On the other side the most attractive view is down a long slope and through a vista of rich foliage towards the bridge which unites the island to the mainland. A sea-wall is built all around the island, and it is draped and festooned with Matrimony Vine, our native Bitter-sweet, a Japanese species of the same genus (*Celastrus articulatus*) and *Periploca Græca*, which are planted on the top, and relieved by an upright growth behind them of *Eleagnus*, *Tamarix* and some species of *Prunus*. On the banks, exposed to the lashing of storms, are set such sturdy trees as Locust and Red Cedar, while the Waxberry and Beach Plum have proved perfect shrubs for such a position, extending down to high-water mark, and hiding the dry sand and gravel of the bank with a mantle of luxuriant leafage. Within this trim circumference, in every shrub-border and group of trees and flower-bed, the universal health and vigor of the vegetation bear witness to the skill and intelligence with which the garden is cultivated and cared for, and over all is the charm of perfect neatness and order that is absolute.

To give a list of the garden treasures of Dosoris would be to make a catalogue of the trees and shrubs of ornamental value that flourish in this climate, but some idea of the richness of Mr. Dana's collection can be gathered from such statistics as these: Of Oaks there are 29 species and varieties; of Hickories, 7; of Walnuts, 6; of Maples, 39; of Magnolias, 15; of Pyrus, 13; of *Prunus*, 20; of Lindens, 11; of Aralias, 7; of Cornels, 12; of *Euonymus*, 12; of Rhus, 8; of *Spiræas*, 33; of *Viburnums*, 20; of *Berberis*, 12; while 2,700 plants of *Azalea* indicate the abundant way in which many species and varieties are used. The figures relating to conifers are still more remarkable when the slender success which usually attends their cultivation in this region is considered. Of Pines there are 38 kinds; of Spruces, 21; of Firs, 23; of *Chamaecyparis*, 17; of Junipers, 16; of Thujas, 20; of Hemlocks, 10; and so on. Mr. Dana considers one secret of his success with conifers to be the unsparing use of the knife. He makes repeated extirpation of the leader to cause a full and vigorous growth of the lower branches and certainly some of the specimens which have been habitually pinched back are objects of singular beauty. This is notably true of some Nordmann Firs, a Cilician Fir and a Cephalonian Fir, which have been subjected to this treatment for a long series of years.

Besides the general assortment in the fruit garden there are 400 dwarf, espalier and cordon trained Pear-trees, with Apple, Plum, Cherry and other fruit trees trained in the same way. Figs, German Medlars, Filberts, with other rare fruits and nuts, are cultivated, and this year an unusually heavy crop of Madeira Nuts will be produced. Japanese, Spanish and American Chestnuts and Chinquapins are also grown. In the two acres of vineyard sixty varieties of Grapes are found including many of Rogers Hybrids, which are the most favored here. Between the rows of grapes and in the young orchard as well as in an independent garden are seven acres where every sort of vegetable is grown and all new varieties are tested as soon as they are sent out, many of them, indeed, being sent here before they are put on the market. In connection with the garden is a Mushroom cellar, eighty feet long, a structure built tunnel-fashion, where fresh Mushrooms can be gathered from October until May. The green-houses are arranged in compartments for Roses, for tropical plants, for winter-flowering stock, and a second range consists of a propagating house, a cool house for plants like *Calceolarias* and *Pelargoniums*, a Fern house, and a vegetable house while some 250 sashes are used for frames and hot beds.

It was my good fortune to be one of a small party who visited these well-appointed grounds last week upon the invita-

tion of Mr. Dana, whose hospitable habit it is to give a day among his trees now and then to guests who take an interest in them. To go through this collection, or as much of it as it is possible to see in a day, under the guidance of its owner and of Mr. Wm. Falconer, for many years head-gardener of the place, is something like a liberal horticultural education, but apart from very general facts, like those given above, it is difficult to make a selection of topics that might prove interesting to your readers. As an item of seasonable interest it may be worth recording that among trees in flower, on the 11th of July, I noted the *Kœlreuteria*, our eastern *Catalpa* (the western species was out of bloom) *Catalpa Kœmpferi* and many of the Lindens. Of shrubs in bloom the most striking to me was *Stuartia pentagyna*, with its large, pure white blossoms. The Japanese *Stuartia Pseudo-Camellia*, whose flowering caused some sensation in England last year, has bloomed here for several years, but had gone out of flower. Next were three species of *Hypericum*—*H. Kalmianum*, *H. prolificum* and *H. aureum*, which last would be a perfect shrub if the old flowers, withered and brown, did not remain so long amid bright golden blossoms in their prime. *Hydrangea paniculata*, also in flower, seems to me more graceful than its more widely-known variety, *Grandiflora*. Other shrubs in bloom were *Spiræas* in variety, dwarf Horse-chestnut, *Lespedeza bicolor*, *Ligustrum Iboti*, *Buddleia recurvifolia* and *B. Lindleyana*, *Grewia parviflora*, *Symphoricarpos occidentalis*, Trumpet Vine, and the Chinese *Wistaria*, which was showing its second crop of flowers. Among the gayest of other plants in bloom were Cannas, Montbretias, Perennial Phloxes, Clematises of several species and varieties, Silphiums, Rudbeckias, Statice, Hollyhocks, and all seasonable sorts of hardy perennials with annuals in countless varieties, since every novelty in this line is grown and tested. In the flower-garden the annual and perennial Poppies, Larkspurs, Canterbury Bells, Sweet Williams, Foxgloves, Stocks and other early bloomers were being cleared off and replaced with *Gaillardias*, *Coreopsis*, *Mignonette*, *Gladiolus*, *Zinnias*, *Marigolds* and other plants, which, as a second crop, will make a bright display of flowers before and during autumn.

Of conifers, besides the specimens named above, which seemed conspicuously beautiful, I noted a glaucous form of the Atlas Cedar; a *Sequoia gigantea*, probably the finest on this side of the continent; a Japanese Hemlock of wonderful grace; a remarkable specimen of *Pseudolarix*; a Numidian Fir, which seems to me one of the noblest of its class; a Douglas Spruce, not quite as large as some specimens I have seen, but unexcelled in form and in the soft texture and color of its foliage. *Eleagnus longipes*, a fruiting branch of which you figured in GARDEN AND FOREST last year, was loaded with fruit which was relished by all. There is little doubt that by careful selection this relative of our Buffalo-berry could be made to produce a valuable dessert or culinary fruit. Not far away from the *Eleagnus* stands a most effective bed of grasses, with an immense mass of *Arundo donax* in the centre, eighteen feet high, varieties of *Eulalia* and *Briza maxima*, ranked about it according to their various stature, and the whole bordered with *Stipa pinnata* and *Pennisetum longistylum*. Noteworthy groups of shrubbery were made up of several different species of the same genus as of *Spiræa* and *Viburnum*, and one mass of *Rosa rugosa* alone, twenty-five feet square, must have been an imposing spectacle when in bloom. The Rose season was over, but the pink, ever-blooming Bourbon Rose, Mrs. Degraw, was loaded with flowers, and it was pronounced by both Mr. Dana and Mr. Falconer the best garden Rose in the entire collection. The bewildering profusion of vines I thought noteworthy. Woody and herbaceous, tender and hardy, they were clambering and twining, wherever there was a support to cling to and a handful of soil for root-room.

"You must use a good deal of fertilizing matter to feed all these plants so well," said one of our party to Mr. Dana.

"One year I bought 5,000 loads of stable-manure," was the reply; "but my ordinary annual supply is about 1,500 loads, brought here from New York by schooner."

Besides this, quantities of sea-thatch, forest-leaves, lawn-cuttings and the like are collected for mulch, which is more largely and systematically used here than in any other garden which I have visited. The theoretical value of mulching, both in summer and winter, is admitted by all, but it is demonstrated here in actual practice, for the principle which controls every operation here seems to be that whatever is worth planting is not only worth planting in the best manner possible, but it deserves the very best after care that can possibly be given to it.

New York, July 15th.

S.

Notes.

Syringa Pekinensis flowered this year in the Arnold Arboretum probably for the first time in cultivation.

The flower of the giant *Amorphophallus*, described in another column of this issue, remained open but a single day, when the expanded spathe again closed about the spadix.

In regard to the hardiness of *Heuchera sanguinea*, Mr. A. H. Fewkes, of Newton Highlands, Massachusetts, reports that it passed the winter safely in his border. It made stout plants in rather light soil, flowering freely. It received the usual covering of leaves given to other plants in the same border.

Market-gardeners in England sometimes add to their profits by cultivating hardy flowers among their vegetables. For example, in a Cornish market-garden recently described in the *Gardeners' Chronicle*, a growing demand for Wallflowers had induced the owner to plant four acres of them, on ground the first duty of which was to produce Potatoes. As soon as the Potato crop is up the young Wallflower plants are inserted, "much in the same way as Broccoli and Mangels were planted a few years ago."

Kœlreuterias are blooming most abundantly this year and it is noticeable that on some trees the flowers are of a much brighter yellow than they are on others. There is a marked difference, too, in the time of flowering in different individuals—some being ten days earlier than others. Any well grown Kœlreuteria is a striking object when in full flower and these trees have an especial interest from the fact that they are covered with showy flowers after the great majority of trees and shrubs are past their bloom.

The Prairie Rose (*R. setigera*) is slowly finding its way into American gardens and few persons see its corymbs of large, deep rose-colored flowers without feeling that it is superior to the double flowered climbing roses, like Queen of the Prairies, which have originated from it. It is the only American Rose with climbing stems and is one of our most beautiful climbing plants. Its foliage is handsome and less liable than that of the garden hybrids to attacks from insects and its beautiful flowers appear in great abundance after the general Rose season is past.

In a private letter, Mr. F. L. Temple, of Shady Hill nurseries, now in Europe, states that the most interesting flowers he saw in England were the Pyrethrums, and he was surprised to find that plants so little known and grown at home were, next to the Rose, the most popular ones in English gardens in June. The best double varieties are as good as the finest China Asters in autumn, and they are admirable for cutting. Among the named single varieties, Melton and Mrs. Bateman Brown were noted as the best, while Captain Nares, Mont Blanc, Flora, Haage & Schmidt and M. Barrall were among the finest double sorts.

Mr. Andrew S. Fuller finds that the green Cabbage-worm is discouraged by the following treatment: Two quarts of coal tar are put into an open vessel which is set in the bottom of a barrel and the barrel is filled with water. In forty-eight hours the water is impregnated with the odor of the tar although the tar is not dissolved in it. The water is then sprinkled abundantly on the Cabbages and the odor penetrates every portion of the head, killing or driving away the worms. As the water evaporates no stain nor odor remains on the cabbage. The same quantity of coal tar can be made to impregnate several successive barrels of water.

The great Rose Shows of England this year have differed altogether in quality from the exhibitions generally held when collections of Hybrid Perpetuals and of the Tea-scented varieties were only to be found. For the late exhibitions, collections were invited of Moss and Provence Roses, of hybrid Chinas, of Bourbons, of Noisettes, of Single Roses "of decorative value," of climbing Roses, of Polyantha Roses and other classes. The season there has been favorable for the production of these flowers so that the display of bloom has been remarkable, while the public interest in all matters relating to Roses and Rose-culture seems to be more profound than it ever was before.

According to the *Pacific Rural Press* the cool, moist climate and filled in, sandy soil of San Francisco are peculiarly adapted to the best development of the Fuchsia, which has grown in popularity since the day it was introduced until plants are found thriving in every unlikely nook and corner. On some residence streets there is scarcely a yard or strip of shaded ground which does not boast of beautiful specimens. Doorways and windows are shaded, stone walls and board fences covered and foundations hidden—in fact, some yards are entirely filled, so that the Fuchsia plays an important part in the

city's decoration and there are many single specimens there that would do honor to any part of the world.

In response to a request by the Board of Park Commissioners of the City of Omaha, Mr. H. W. S. Cleveland has prepared a report upon a system of parks adapted to that city. Mr. Cleveland gives some sound advice as to the desirability of broad, tree-planted avenues or park-ways and of systems of small parks for American cities. It is his counsel, also, that land be secured outside the present business part of the city for a park large enough to furnish the relief of seclusion from city sights and sounds and the refreshment of rural scenery. He considers that for this purpose 500 acres is the smallest area that would be required in one body, and that an equal area will in time be needed for another park in some other direction from the business centre of the city.

A new disease of the Irish Potato has been discovered by Professor J. Lamson Scribner at the Experiment Station at Knoxville, Tennessee. The disease first appears in numerous small pimples, each surrounded by a slight depression. In advanced stages the pimples and their depressed borders occupy the entire surface of the tubers, which become much shrunken. The skin is broken over the point of the pimples, giving them a grayish color. The Potatoes gradually become reduced in size, dried out of shape, and finally are very dry and hard. The cause of the disease was shown by microscopic examination to be thread-worms or nematodes, which were present in great numbers, the largest of them being about one-fiftieth of an inch in length. Nothing is known of the history of this parasitic Potato-eel, so that no remedial treatment can be suggested. Many of these parasitic nematodes pass a period of their existence in the ground, so that it is probable that they were introduced into the University farm from infected seed—for an infected tuber would be certain to carry the worms to the new crop, thus perpetuating the disease.

One of the most interesting of the old homes of America is Dungeness on Cumberland Island which lies off the coast of Georgia just north of the Florida boundary-line. The southern portion of the island, together with the estate of Mulberry Grove on the mainland, was presented by the state of Georgia to General Nathaniel Green as a recognition of his services in the Revolutionary War. He resided at Mulberry Grove, but, says a recent writer in the *Evening Post*, he planned a country-house on the island, "laid out the garden which afterwards became so famous for its tropical fruits and flowers, . . . and cut through the forest of Live-oaks those grand avenues which now form the wonder and delight of Dungeness." After he died in 1786, the house itself was built by his widow who subsequently married Phineas Miller, of Connecticut, and it became her permanent home. Its foundations rested upon an immense shell mound, a relic of Indian habitation, which was levelled to form a terraced base nearly an acre in extent, and it was of great size and dignity, containing some forty rooms. "A wide lawn lay before the house with its shades of Palm and Live-oak. On the south was an Eden-like retreat—the famous Dungeness garden. It comprised twelve acres enclosed by a massive wall of Coquina and was entirely devoted to tropical fruits and flowers. The garden fell by terraces to the creek. On the terrace nearest the house was a luxuriant growth of Crape-myrtle, and Sago Palms. Below it was a broad terrace divided by an avenue of Olives. A thick-set hedge of Mock-orange separated this from the lower garden, which was devoted to flowers and in which was a similar avenue of Olives. The garden was more particularly famed for its Roses though all varieties of flowers were cultivated. East of the garden was an Olive-grove of 800 trees brought from Italy, which attained a flourishing and profitable growth. Beyond, in the broad fields, 400 negroes toiled to raise the Sea Island Cotton and Sugar-cane that yielded the revenues of the estate. If the guests wished to ride there were the long dim avenues of the forest and the eighteen-mile-long beach. If they wished to sail, bright waters that seem especially provided for the yachtsman surrounded them; to hunt, they found an abundance of bear, deer, wild turkeys and water-fowl in the forest which even now covers much of the island." Dungeness was burned during the Civil War in a Christmas frolic of the negroes who were then in undisputed possession. It lay ruined and deserted for years, but was bought a few years ago, with half the island, by Mr. Thomas Carnegie of Pittsburgh who erected a modern villa on the old site, reclaimed the lawns and gardens from their wildness, and eventually added the northern half of Cumberland to his estate. The lawns in this climate are always green, and Orange-trees, Palmettos and a host of other sub-tropical plants group with the Live-oaks in splendid confusion. But the Live-oaks themselves are the great feature of Dungeness.

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What is a Sycamore?

IN an article called "Popular Errors," not long ago printed in a St. Louis newspaper, and thence copied into an eastern journal, the following paragraph appears:

"Another error in the application of names is noticeable in the vegetable world. This is with regard to the so-called Sycamore. The true Sycamore (*Acer Pseudo-platanus*) grows only in England, or, at most, in the British Isles. Our tree—*Plantanus occidentalis*—should be called Buttonwood. The true Sycamore is as worthless as Buckeye or Horse Chestnut."

It would be hard to find more errors combined in a single paragraph than appear in this one, which was intended to set wrong things exactly right, even if the mistake of printing *Plantanus*, instead of *Platanus*, be credited to the printer rather than the author.

Mistakes and confusions are, however, the very essence of popular plant-naming, and it may therefore be worth while to explain what is the right use of the name Sycamore, and to trace the steps by which it has come to be applied to three entirely different trees—*Ficus sycomorus*, *Acer Pseudo-platanus* and *Platanus occidentalis*.

Not the second, but the first of these, is the "true Sycamore." It is a tree of the Fig Family, very common in Palestine, Egypt and Arabia, where it grows to a great height, extends its branches over a wide area, and is much prized for the shade it affords. Its Figs are sweet and delicate, although it is not the species commonly cultivated for fruit. Its wood is light, but very durable, and was largely employed in ancient times. The mummy-cases of the Egyptians, and those wonderful sculptures in the round which have been found in the tombs of their earliest dynasties, were made of it. The name Sycamore is a combination of the two Greek words, *Sykon*, a Fig, and *Moron*, a Black Mulberry, and emphasizes the fact that the leaves of this Fig-tree resemble those of a Mulberry. This, then, is the Sycomorus of the Romans, the Sykomoros of the Greeks, the Sycamore of the Bible, the "true Sycamore" for all time. The most famous specimen now existing is perhaps that one not far from Cairo, which is

believed to be more than two thousand years old, and is pointed out to travelers as the tree under which the Virgin and Child reposed during the flight into Egypt.

Acer Pseudo-platanus is a species of Maple. Although commonly called in England simply the Sycamore, it should be called the Sycamore Maple, the qualifying word merely explaining the likeness of its leaves to those of the true Sycamore. The statement that it grows only in the British Isles is far enough from the truth; for, while it is a native of the continent of Europe, and is found growing wild in many places there, especially in Germany, Austria, Switzerland and Italy, the first mention of it as growing on British soil is in Turner's "Herbal," printed in 1551, and all subsequent writers either deny or question the fact that it is indigenous to that soil. Nor is it a "worthless" tree, for its wood is much used in the delicate work of the makers of musical instruments, as well as for many other purposes. Pliny makes especial mention of three species of Maple among many which he believed to exist. One of these is undoubtedly the Sycamore Maple, and it seems to be the Maple mentioned by Virgil, as he speaks of the stature and strength of the tree and the durability of its wood. The confusion of its identity with that of the true Sycamore must have begun very long ago, for Evelyn, in the seventeenth century, mentions the fact that religious persons had then long been accustomed to plant the Sycamore Maple near their homes in the mistaken belief that it was the Sycamore into which Zacharias climbed to see the Saviour pass. For the same reason, its significance in old treatises on the language of flowers is "Curiosity." This tree has been much planted of late years in America, but is never called the Sycamore—always the Sycamore Maple.

Platanus occidentalis is the principal American representative of *Platanus orientalis*—the Plane tree of modern Europe and of ancient writers. In Europe the name Sycamore is never given to a Plane tree, but in America it seems to have been thus applied from early times, for the younger Michaux, writing early in the century, cites it as an accepted name, others being Buttonwood, Cotton-tree and Water Beech. According to him Plane trees were called Sycamores only in the Western States; but now-a-days, at all events, they are so called in many eastern districts. The fact appears to be that the English who had miscalled a Maple because of its striking, if superficial, resemblance to the true Sycamore, similarly miscalled the *Platanus occidentalis*, when they emigrated to America, because of its resemblance to the Maple they had left at home. The right name for the western as for the eastern *Platanus*, is the Plane tree; but Buttonwood is a perfectly legitimate, and, indeed, excellent name, as it has not been applied to any other kind of tree and is picturesquely descriptive of the fruit of the Plane. Water Beech is, of course, a patent misnomer, and Cotton-tree is not appropriate, and leads to confusion with Cottonwood, a species of Poplar.

Classic writers constantly refer to the Plane tree, and it was one of the most highly-prized trees of the more temperate parts of the Orient. On a Plane tree in Phrygia Marsyas was hung to be flayed by Apollo. Under a grove of giant Planes on an island off the Lacædemonian coast the youth of Sparta met for athletic exercises, and Pausanias mentions a Plane in Arcadia which was then said to be 1,300 years old and to have been planted by Menelaus. But the most famous Plane tree of antiquity was, perhaps, the one in Lycia, which so delighted Xerxes by its size and beauty that he caused it to be encircled with a collar of gold and delayed a whole day beneath its shade—a fact to which contemporary critics are said to have largely attributed the defeat of his expedition. The so-called "Seven Brothers" are seven huge and magnificent Planes which stand on the shores of the Bosphorus, as they stood when, in 1096, Godfrey de Bouillon and his Crusaders encamped in their vicinity, and are estimated to be at least 1,500 years old. The most famous Plane of our western world, if we may associate renowns so dis-

similar in duration, is the one which stood and perhaps still stands on an island in the Ohio River near the mouth of the Muskingum, which was measured by Washington in his early days and again by Michaux twenty years later, when its circumference was found to have but slightly increased and to be forty feet, four inches at five feet from the ground. It is a pigmy, however, in comparison with one of the Seven Brothers, which, it is stated measures 150 feet.

In Scotland, we are told, the Sycamore Maple is frequently called the Plane tree, and thus the cycle of confusion is complete.

The name we have been discussing is sometimes spelled Sycamore and sometimes Sycomore. Both spellings are permissible, but, although the use of the *o* seems more logical, in view of the derivation from *Sykon*, the *a* is preferred by the best modern English authorities. Most of them do not associate differences in spelling with different significations, but we have found it stated in one horticultural dictionary that the *o* should be used in writing of the true Sycamore, and the *a* in writing of the Sycamore Maple. In modern foreign tongues the *o* is universally employed, and in colloquial French we find the same mistake as in colloquial English—*Sycomore* being constantly used in the stead of *Erable faux-platan*—Sycamore Maple.

How to Mask the Foundations of a Country House.—I.

NOTHING is more essential to the beauty of a country-place than that the foundations of the house should be properly connected with the ground from which they spring. The house should look as though it belonged where it stood and could not be moved to another spot without detriment; and all the devices of the gardener at a distance from its walls will not give it this appearance unless the walls themselves seem integrally united to the soil.

The first step towards the production of this effect must be taken by the architect. Not very many years ago a broken, irregular site was considered, in this country, undesirable for building on, and, when it could not be avoided, was often levelled that the foundations might be made as mechanically symmetrical as possible. But of late our architects have realized the folly of neglecting the chance to unite a house well with its site and at the same time to secure individuality and, possibly, great picturesqueness, and have seen that it is still more foolish to spend time and money in destroying such a chance when it cannot be evaded.

When the slopes of an irregular site are gentle and devoid of stones a beautiful result can be achieved by respecting their undulations, laying more or fewer courses of masonry according as they fall or rise, and bringing the grass up to the walls in an uneven, billowy, yet not too broken line. No better example of such treatment can be found than in the Public Library at Quincy, Massachusetts, a work of Richardson's which has been familiarized by repeated illustrations. When the site is rocky and when local stone can be used, rough-faced, for the foundations, as charming a result of a more strikingly picturesque kind can be achieved, as we see in Richardson's Public Library at North Easton—where the rock-like turret seems almost to have grown naturally from the rocky hillside—and in many cottages along the north shore of Massachusetts Bay, built by Mr. Emerson and others. To have levelled such sites as these would have injured the house as greatly as the grounds about it. Now the two are in harmony and each helps the effect of the other; while as the formation of such sites is never twice alike, each home has that most desirable of qualities—individuality.

But even in cases where Nature has given the architect a good chance to blend his work with hers something more is needed to make the union seem perfect; and this is doubly the case when the site is flat and the house must stand like a box upon a floor. Some simple arrangement of terraces may then be used with advantage if there is a difference of level between the spot where the house stands and the adjacent street or pleasure-grounds. But always something more is necessary—always the planter must be called in to help the architect whether Nature has helped him much or little.

Nature has helped him most, of course, when the site is very broken and rocky. Then the planting of a few vines against the walls may often suffice to bring them into a close enough

union with Mother Earth. It is a pity, however, that when vines are relied upon to do this service, a single kind should so often be chosen for repeated planting. A little thought in the selection of different kinds which harmonize, yet contrast, would produce a far more beautiful effect. It is well on a city house to let Wistaria or Japanese Ivy alone clothe the walls. Here there is no question of uniting site and walls, and we do not want variety or picturesqueness in a street facade even though it be a very wide one. A symmetrical architectonic effect should be preserved, and for this purpose a Wistaria trained on two or three wires stretched to the roof or a close covering of Japanese Ivy is better than would be an intermingling of two or more different kinds of foliage. But on a country house, especially of the irregular, picturesque kind we most often build, the presence of a single sort of vine produces an undesirable monotony. In some parts it will look best to have a vine which clings very closely to the walls; in others a more massed and freer growth will be preferable; and contrasts of color, density and habit in the clothing foliage will add immensely to the general effect.

But when the vines are once planted they should not be allowed to grow at their own sweet will. A house is not like a ruin or a cliff or a blasted tree where the wilder and more erratic the growth of the creeper the more charming and appropriate is the effect. It is (or should be) a work of art to which all its immediate surroundings are subordinate; and as its prime end is to give its owners comfortable shelter, it should always present—no matter how great its picturesqueness—a neat, orderly, well-tended aspect. Its vines, therefore, should be intelligently pruned and trained—not allowed to run ragged yet not forced into unattractive, unnatural stiffness. They should be pruned, but the fact that they have been pruned should not be apparent. Nor should they ever be allowed to cover a house entirely or to so great a degree that its architectural character is concealed—unless, indeed, this character be such that it deserves a shroud. To build a solid lower story of stone and then allow it to be entirely hidden, even during half the year, by a dense growth of foliage, is surely a mistake. Not only is the beauty of the stone-work concealed, but the effect of the upper stories, based, apparently, upon a substructure of fluttering leaves, is unsatisfactory to the eye. Vines enough may be grown to beautify the walls in the highest possible degree and unite them well with the ground and yet spaces be reserved, below as well as above, where the constructed surface shall appear—spaces which will indicate the character of the walls as a whole and thus prevent the eye from questioning the stability of any part. It is a good plan, also, to train some vines so that they spread over portions of the ground and thus make the transition between the soil and the wall seem still more natural. A mass of Honeysuckle, for instance, running out over rock or grass for a little distance is a very beautiful object, and its bloom will seem even more profuse in this than in an upright position.

The Art of Gardening—An Historical Sketch.—VII. Persia (continued).

IT is noteworthy that even princely Persians did not confine themselves to enjoying parks and gardens but shared in their creation. Strabo says that after the active exercises of the day were over young Persian noblemen were taught to plant trees as well as to forge armor and weave hunting-nets. When the Spartan Lysander visited the "paradise" of Cyrus the Younger at Sardis, he said: "I look with astonishment on all these trees on account of their beauty, but am still more astonished at the art of him who measured out the ground and arranged them for you." Cyrus, on hearing this, "was delighted," and said: "It was I, let me tell you, Lysander, that measured out the ground and arranged all the trees myself; and there are some of them that I planted with my own hands. Whenever I am in health I never dine until I have put myself into a perspiration by pursuing some military or agricultural occupation, or by contending for superiority in some exercise of a similar nature." Lysander may well have been surprised; despite the active temperament of the Greeks they left manual toil to their slaves, and to hear agricultural coupled with military exercises, as similar in dignity and interest, must indeed have been a novel sensation.

What now were the gardens of these Persians who created them on so extensive a scale and valued them so highly? In speaking of the parks of Bazarra, where Alexander hunted lions, Quintus Curtius says:† "A spacious wood in which

*Xenophon, *The Economist*.

†Life of Alexander.

numerous unfailing springs give cheerfulness to the scenery is selected, encompassed with a high wall, and interspersed with towers for the reception of the hunters"; and some writers have believed that this brief account describes the character of Persian *paradeisoi* in general—that they were merely portions of ground which Nature herself had made beautiful, carefully protected from hurtful alterations. But Plutarch is careful to relate that the park in which Artaxerxes permitted his soldiers to despoil for firewood stood "in the midst of a region naked, and without trees"; and if these special words imply, perhaps, nothing more than a natural oasis in a wilderness, there are others which more definitely indicate the arts of cultivation and arrangement. Plutarch says of the park which Tissaphernes named for Alcibiades—a true *paradeisos*, not a mere garden—that it contained "salubrious streams and meadows," but also "pavilions and places of retirement royally and exquisitely adorned"; and wherever in ancient times there were buildings that could be thus described, the adjacent landscape must likewise have been "royally and exquisitely adorned"—not left in the wild graces of nature. It is only in modern days that men have failed to perceive that the essence of beauty is harmony; that the essence of harmony is the likeness in fundamental character of one thing to another; that architectural beauty and the untouched beauty of nature, though equal in value, are dissimilar in character; and that each must be accommodated to the other if a satisfying general effect is to be the result. No Egyptian, Assyrian, Persian or Greek would have allowed the virgin forest or the untended champaign to come up close to the walls of temple or palace. In the park at Celænæ where Cyrus the Younger reviewed 13,000 troops, there were of course vast open spaces; yet through the middle of it, says Xenophon, ran the river Mæander. "Its springs issue from the palace itself, and it runs also through the city of Celænæ." A park which lay between palace and city, and a river which ran from beneath the palace itself, certainly imply some degree of formal, architectural treatment.

Several passages which I have already quoted show that trees were extensively planted by the Persians. Nor was it only in situations where they could not possibly have grown by themselves, as in city streets and squares, for the parks which Cyrus the Younger formed during his journeys were "stocked with everything good and valuable that the soil will produce;" and the scene where Lysander expressed his astonishment at Cyrus's personal prowess in tree-planting was the famous *paradeisos* at Sardis. This last-named incident, I may say in conclusion, gives us decisive proof that in such great parks a portion of the planting, at least, was done in a strictly formal way. Lysander admired not only the beauty of the trees, but "how regularly they were planted, how straight the rows of them were and how elegantly all the rows formed angles with one another."*

At "Shushan the Palace," as described in the book of Esther Ahasuerus held his great feast in the "court of the garden," which was hung about with embroidered draperies. The Persians used columns profusely, although the Assyrians and Babylonians did not. Ahasuerus has been identified with Xerxes, and in the splendid palace of this king at Persepolis may still be seen a wide, unwalld space with various groups of stately columns, sometimes called the "summer throne-room," which may well have been planted like a garden and used for feasts and audiences. Or, if "Shushan the Palace" means Susa, here also may be traced the remains of a similar court-yard.

In short, we may conclude that in Persia the art of gardening meant a combination or alternation of formal with natural-seeming arrangements. Symmetrical court-yards, regular plantations and stone-walled canals gave harmony to the neighborhood of buildings and formed adjuncts to such magnificent terraces and external stairs as we see at Persepolis, while more distant parts of the domain were left in their natural state or merely beautified without losing their character; and cultivation was everywhere carefully practiced. Are not these facts? And must we not deeply regret that we know so

little about the parks of the Persians? One can hardly imagine a more interesting relic of antiquity than a plan of a *paradeisos* could it be recovered—preferably, perhaps, the plan which would show us how Cyrus arranged his pleasure-ground at Celænæ so that he could hunt wild beasts within its limits yet review a great army in safety, and so that it formed a harmonious setting for the palace with a river flowing from its base.

When Pliny wrote in his "Natural History" that "the first Plane-trees that were spoken of in terms of admiration were those which adorned the walks of the Academy at Athens," he had in mind only Greece and Italy. He must have been familiar with Herodotus' story of the giant Plane that so delighted Xerxes near the borders of the Hellespont, when he was marching towards Greece, that he lingered for an entire day beneath its shade—imperiling his expedition by the act—decorated it with a golden circlet and left an officer of rank to serve as its guardian. In explaining the different varieties of Palms, Pliny says: "The most famous of all are those which, for the sake of distinction, have received the name of 'royal' Palms because they were preserved solely by the kings of Persia. These used to grow nowhere but at Babylon, and there only in the garden of Bagoas, the eunuch; . . . this garden was always carefully retained within the precincts of the royal court." Anecdotes like this help us to divine the almost passionate love that the Persians had for trees; and so many plants now familiar in European lands have come from Persia that we may fancy its gardens rich with a variety of beautiful blossoms as well as with those odorous shrubs the cultivation of which was rendered necessary by a profuse employment of perfumes and unguents.

New York.

M. G. Van Rensselaer.

Notes Upon Some North American Trees.—II.

21. *PORLIERA ANGUSTIFOLIA*, Gray.—This is a common plant on the dry plains of the lower Rio Grande valley, where I have observed it in Texas and Mexico. It is everywhere a low, upright shrub, with thickened stems, which are rarely six feet high. It cannot in any sense be considered a tree, and must be dropped from the Silva.

22. *XANTHOXYLUM AMERICANUM*, Miller.—Although this plant may be grown in gardens into a small tree with the aid of skillful pruning, it does not appear to become naturally a tree anywhere, and it should be dropped from the Silva.

23. *XANTHOXYLUM CARIBEUM*, Lam.—The proper name of this south Florida tree, which was first described by Nuttall (*Sylva* iii, t. 85) as *X. Floridanum*, is still in doubt. It has been referred to the West Indian *X. Caribeum*, which is said to be prickly, while the Florida plant is quite unarmed. It differs, also, in some minor characters from the description of Lamark's plant. Professor Gray doubtfully proposed to call the Florida tree *X. Caribeum* var. *Floridanum* (*Proc. Am. Acad.*, new ser. xxiii. 225), but it will be necessary to examine authentic specimens of the different West Indian species before this question of nomenclature is settled.

XANTHOXYLUM EMARGINATUM, Sw.—This handsome plant was collected by the late Dr. Garber in 1877 on Virginia Key, in Bay Biscayne, Florida. It has not been seen elsewhere in Florida, where it is probably exceedingly rare. It was not found by Mr. A. H. Curtiss, who has carefully explored the flora of the Florida Keys, and I failed to detect it anywhere on the shores of Bay Biscayne, to which I have made three separate journeys. Professor T. C. Porter, who has placed, most obligingly, his specimens in my hands, informs me that Mr. Garber left no notes upon this plant, which both Macfayden and Grisebach speak of as a tree or shrub. It may, perhaps, properly therefore find a place in the North American Silva. More information of its habit of growth, and of the size which it attains is, however, desirable. I am quite ignorant of the character of the bark of this plant, of the nature of the wood which it produces, and of the situations and soil in which it is found. Professor Porter calls my attention to the fact that some of the leaflets on the Florida specimens are obtusely pointed, the others emarginate as described by Swartz and by Grisebach, who gives (*Fl. Brit. West Indies*, 137), under *Tobinia emarginata*, the full synonymy of this species. A specimen

* "A person of high spirit and honor, naturally a king though fatally prevented by the harmless accident of post-geniture, not only a lord of gardens but a manual planter thereof, disposing his trees like his armies in regular ordination. . . all stories do look upon Cyrus as the splendid and regular planter." These words occur in "The Garden of Cyrus," a curious and interesting treatise by the famous seventeenth century writer, Sir Thomas Browne. The essay, however, like many of its time, is but loosely connected with its title. Accepting Cicero's statement that the regular rows and angles which Lysander admired in the plantations of Cyrus meant an arrangement in "quincunxes"—in a succession of patterns like that on a five-spot of cards—Sir Thomas passes into a rambling dissertation, finding, as Coleridge said, "quincunxes in heaven above, quincunxes in earth below, quincunxes in the mind of man, quincunxes in tones, in optic nerves, in roots of trees, in leaves, in everything."

collected on the Island of New Providence by William Cooper in 1859, is preserved in the Herbarium of Columbia College. This plant is apparently widely distributed through the West Indies.

HELIETTA PARVIFOLIA, Benth.—Dr. V. Harvard detected this plant growing very abundantly as a shrub on the bluffs of the lower Rio Grande, on the Texas side of the river (*Proc. U. S. Nat. Mus.*, viii. i., 515); and I found it near Seralvo, south of the river, where it is a slender tree, twenty or twenty-five feet high, so that it should find a place in our *Silva* in *Rutaceæ*, immediately after *Xanthoxylum*.

KÆBERLINIA SPINOSA, Zucc.—This plant, which is widely distributed from the valley of the lower Rio Grande to San Luis Potosi and to Chihuahua, must be included among the North American trees. It is often shrubby in its habit of growth, especially in Texas, but sometimes becomes truly arborescent, with a straight, erect trunk, six or eight feet long, and a round, compact head. Its place in the Catalogue is in *Simarubæ*, immediately before *Simaruba*.

30. *AMYRIS SYLVATICA*, Jacq.—I follow Professor Gray (*l. c.*) in referring our south Florida tree to *A. maritima* of Jacquin. The exposition of the confused synonymy of this plant will be found in the paper cited.

32. *XIMENIA AMERICANA*, L.—I have never seen this plant growing as a tree. It is common on all the south Florida Keys as a spreading shrub, sometimes with stout, nearly prostrate stems ten or twelve feet long, and eight or ten inches in diameter at the ground. I propose, therefore, to omit it from the *Silva*.

ILEX MONTICOLA, Gray.—This species was not included in the Census Catalogue. It is a widely-distributed plant through the Appalachian Mountains from New York to Alabama, generally as a low shrub, but I have seen it on the slopes of the Blue Ridge, both in North and South Carolina, especially near Highlands in Macon County of the former state, growing as a tree thirty or forty feet high, with a clean, straight trunk ten or twelve inches in diameter. It should find a place in the *Silva* immediately following *Ilex decidua*, Nutt. (No. 36).

38. *CLIFTONIA LIGUSTRINA*, Spreng.—Mr. Watson has pointed out (*Bulletin Torrey Botanical Club*, xiv., 167) that the oldest name for this plant is *Cliftonia nitida*, Gærtn, fil. (*Fruct.* iii., 247, t. 225, f. 5).

40. *MYGINDA PALLENS*, Smith.—This, it now appears, is a shrubby species, and should therefore be dropped from the North American *Silva* and replaced by *Myginda integrifolia*, Lam, as I have pointed out in the *Botanical Gazette* (xi., 313). This last is the *M. latifolia* of Chapman's "Flora of the Southern States," and was early confounded with *M. pallens* in American herbaria. *M. integrifolia* is truly arborescent upon Key West, where it is abundant and reaches a height of twenty or twenty-five feet, with a straight, slender trunk, often six inches in diameter. The fruit is two-celled, although sometimes one-celled by abortion. *C. S. Sargent.*

Platanus occidentalis.

OUR western Plane (*Platanus occidentalis*) is the largest deciduous tree of the American forests. It rises sometimes from the deep, alluvial soil deposited over the margins of streams in the valley of the Mississippi, to a height of a hundred and forty feet by actual measurement, with a tall, straight shaft, fourteen or fifteen feet in diameter. One of these large trunks appears in our illustration upon page 354. Such trees were common many years ago, in the valley of the lower Ohio and in those of its tributaries. Now they are rarely seen. The disturbances of natural conditions which always follow man into the wilderness are bringing to the forests in all our western country their inevitable consequences. When the surroundings of an old tree, which may have grown undisturbed through centuries, and which left undisturbed might have continued to grow through other centuries, are once invaded by man, its subsequent history

is generally short. The picture of another old Plane-tree and its characteristic surroundings, on page 355, shows what the fate of these forest giants is likely to be. An old tree which has grown always among other trees, and has been supported by its fellows, when suddenly deprived of this support, must soon die. Either the first severe gale will blow over the tall, badly-balanced trunk with all its weight of branches at the summit, or it will die gradually as the tree in the second picture is dying from the sudden exposure to the full sunlight of the trunk and branches, which were developed in the shade of other trees. The danger from wind is increased in the case of the Plane-tree, by the fact that these very large specimens, like the individual which appears in our illustration on page 354, are entirely hollow for a long distance above the ground. It is probable that these very large Plane-trees will disappear entirely, and that at the end of another century, and perhaps much sooner, such great trees as excited the wonder and fired the imagination of the early travelers on the Ohio, the Cumberland and the Illinois will be entirely unknown. The specimens which are now large will have died naturally, or prematurely through the interference of man, and younger trees must, in the future, be sacrificed to the demand for the wood which this tree yields, and which has lately become esteemed and is already largely used for many purposes.

Our two illustrations are made from photographs taken by Mr. Robert Ridgway in the valley of the White River, in southern Indiana—a region once famed for the beauty and varied character of its forests and for the great size attained by its individual trees.

Foreign Correspondence.

London Letter.

AT the last meeting of the committee of the Royal Horticultural Society, new Roses were the leading features of the exhibition, Mr. William Paul having a dozen or more novelties. Only two of them, however, were commented upon—Pink Rover and Duchess of Albany. The first is a climbing Bourbon, with flowers of the size and form of the old *Souvenir de Malmaison* and with the habit of *Gloire de Dijon*, vigorous and of a decided climbing habit. The delicate pink of the large, full bloom is very pleasing, but as the committee are very cautious in certificating new Roses before their true character is known, Pink Rover must be seen again and again. The Duchess of Albany is simply a sport from *La France*, differing from it only in color, being several shades darker, and some rosarians do not think this a desirable variation, as one charm of *La France* is its delicate pink hue. For all that the Duchess has its admirers. The best of the other novelties from William Paul included *Magenta Queen*, a bright magenta flower of good form and substance; *Hero of Waltham*, similar to but lighter than *Beauty of Waltham*; *Spenser*, in the way of *Baroness Rothschild*, but with more substance in the flower; *Salamander*, a good, deep crimson, and *Marchioness of Lorne*, a very free bloomer, said to be a capital garden Rose. There was also a lovely little Moss Rose called *Waltham Pet*, with white flowers and pink centres, a suitable companion for *Little Gem*. *Sappho*, the fine Tea Rose certificated some time ago was shown well, the singular nankeen-yellow tint being fully developed in the open air. *Medea*, a new Tea in the way of *Madame Caroline Kuster*, may be heard of later on as a good addition to the pale yellow group.

The chief among the other exhibits shown at this meeting were hardy flowers, as on the last occasion, the *Pæonies*, *Pyrethrums* and *Delphiniums* from Kelway, of Langport, and the *Lilies* from Ware & Barr being remarkable. Orchids are dropping off now conspicuously, and yesterday there were only half a dozen shown, the most noteworthy of these being two new hybrids from Messrs. Veitch, raised by their indefatigable foreman, Mr. Seden. One of these was *Zygocolax leopardinum*, raised between *Colax jugosus* and *Zygopetalum maxillare*. It is, therefore, a bigeneric hybrid, assuming that the *Colax* is a true genus. The hybrid resembles the *Zygopetalum*, both in habit of growth, in size and form of flower, but differs in color. The lip is of a very deep plum-purple, the sepals olive-green copiously spotted with cinnamon-brown. Though interesting to Orchid fanciers, it possesses no special merit to the general cultivator. The other hybrid was *Masdevallia Ellisiana*, a cross between *M. Harryana*

and *M. ignea*. It reminds one of *M. amabilis*, but has quite the form of flower of *M. ignea*. The color is intermediate. If it proves a winter bloomer, as *M. ignea* is, it will be a good addition to cool Orchids. There were two varieties of *Cattleya* shown, both having the lateral sepals feathered with deep purple on a pale mauve ground. One was called *C. Mendelii Hallé*, which had in addition a very brilliant labellum, and *C. Gaskelliana Sunray*, which differed from the ordinary forms only by the feathering. The very remarkable *Dendrobium Stratiotes*, from the South Pacific, was shown in flower, and, as it has seldom been seen, it created some interest. Like *D. taurinum*, to which group it belongs, it has peculiarly shaped flowers produced on short spikes from the last year's growths. It has narrow, whitish sepals, and the two petals are pinkish and stand erect, and, being twisted, remind one of the horns of an ibex. The labellum is beautifully adorned with rich purple reticulations on a pure white ground. It is among the most beautiful and distinct of all *Dendrobiums*.

Lilies of all kinds are just now in perfection, and among the great number shown were not a few new or uncommon varieties. The white form of *L. Martagon* was shown in grand condition by Mr. Ware, with stems a yard high, carrying conical spikes of pure white blossoms. Though an old sort, this is still rare, and, as it is so beautiful, it is the desire of all hardy plant-lovers to possess it. Another form of *L. Martagon* which I do not remember to have seen before was *Punctatum*, which has whitish flowers spotted with crimson, but it is not nearly so effective as the white or the blackish-crimson variety, *Dalmaticum*. Several American Lilies were shown, and of *L. pardalinum* there were some interesting forms. A hybrid between *L. pardalinum* and *L. parvum*, and named *L. pumilum*, was sent up as a new plant, but as it has not the noble beauty of the one or the pretty form of flower of the other, it was not considered worthy of an award. Of *L. parvum* there was a beautiful variety with scarlet flowers like those of *Fritillaria recurva*. It was named *L. alpinum*, but was evidently only a form of *L. parvum*. Of the lovely *L. Parryi* from the Rocky Mountains there were some fine specimens from the open border, some bearing four to five flowers on a stem. The rich canary-yellow of the fragrant blossoms renders it already a much-talked-of plant, and it is likely to prove a hardy and vigorous grower. There was a greatly admired group of *L. auratum* and other Lilies intermixed with dwarf plants of Japanese Maples. The elegant foliage of the Maples quite disguised the rigid stems of the Lilies, and with their different shades of green produced a charming effect. A very noble and handsome Indian Lily was shown by Messrs. Low, of Clapton, and the committee were unanimous in awarding a first-class certificate to it. It was named *Lilium Wallechi*, var. *superbum*, it being finer in all respects than the typical form. The plant shown had a stem about six feet high, clothed from top to bottom with long, narrow leaves, and surmounted by two flowers about nine inches in length, trumpet-shaped and of ivory whiteness. It is, unfortunately, not hardy, but will prove a superb plant for the green-house. This is the second Indian Lily Messrs. Low have introduced recently, the other being *L. Nepalense*.

Messrs. Veitch showed a fine gathering of flowering branches of some choice, hardy shrubs, including the very elegant *Zenobia speciosa* and its variety *pulverulenta*, both first-rate American peat shrubs. The variety is most popular because the glaucousness of the leaves go so well with the pearl-white flowers which look like magnified Lily-of-the-Valley flowers. *Styrax Japonica*, which is quite hardy as a standard here, was again shown in abundant bloom. Its flowers are an inch across, pure white with yellow stamens, reminding one of the old green-house climber, *Solanum jasminoides*. *Leptospermum baccatum*, similar to, if not identical with, *L. scoparium*, is also hardy at Coombe wood, though a native of Australia. It is scarcely showy enough in flower to recommend it to general cultivation, though the specialist in trees and shrubs will be delighted with it. W. Goldring.

"Having disposed the masses of trees, shrubs, etc., with reference to the general effect of the whole scene, we come now to the finishing touches of decoration—flowers.

"From the general love of flowers and their increasing varieties, we frequently see the breadth and repose of the lawn sacrificed to them. In a flower-garden, properly so-called, they hold undivided sway, and are at liberty to cover the whole surface and to assume every variety of form that fancy may dictate; but when flowers are admitted to the dress ground we have been considering, they must be amenable to the laws of composition, otherwise they injure the scenery they are intended to adorn."

W. S. Gilpin, 1832.

Cultural Department.

California Lilies.

EIGHT distinct species of Lilies are native to California, besides varieties. They are *Lilium Columbianum*, *L. Humboldtii*, *L. pardalinum*, *L. parvum*, *L. Parryi*, *L. maritimum*, *L. Washingtonianum* and *L. rubescens*. No other country in the world is so rich in these floral beauties, except Japan. Their range is from the sea-coast of Mendocino County to the edge of perpetual snow in the Sierras. Old Shasta's sides are the home of several species.

I have found *L. Humboldtii* in the rich alluvium of the upper Sacramento Valley, and *L. Parryi*, one of the most beautiful, is a native of the high mountains of San Bernardino and San Diego Counties.

As a collector I have taken many thousands of the bulbs of six of these species from their native homes, and have grown all but *L. Parryi*. In the soil in which they flourish and the manner of root-growth they vary greatly. Briefly it may be said that *L. maritimum*, *L. pardalinum*, *L. parvum* and *L. Parryi* are bog lilies with running or rhizomatous roots; that *L. Humboldtii* and *L. Columbianum* are native to rich, clayey soils, and that *L. Washingtonianum* and *L. rubescens* rot easily in cold or wet soils, that they are true bulbs, and that they thrive in well-drained soil of leaf-mould mixed with disintegrated sandstone or gravel.

L. pardalinum, often called Tiger Lily, by the country people, is the most easily grown of all. It has an erect stem with many long, lanceolate, pale green leaves, in whorls. The flower is large and showy; the petals, bright crimson at tips, orange dotted or blotched with black at centre, and recurved to the stem. There are few more brilliant sights than a well bloomed plant of this Lily. The root is hardy and little subject to rot. It prefers a rich sandy mould, but adapts itself to varying conditions. In a shaded pond I saw fine specimens on the mould on old logs, the fibrous root running down into the water. They were six to seven feet high with the finest of blossoms. In the rich mould below mountain springs, or in the alluvium on the banks of small streams, they grow to perfection. I have seen them doing well in sandy soil which in mid-summer was as dry as a brick. In cultivation I have seen the best results from planting in a sunken barrel filled with sand well mixed with leaf-mould or bog soil. It should be kept moist, not wet, and is better in the shade. The bulbs should be planted about four inches deep. Under such conditions strong plants grow five to seven feet high, with an abundance of bloom. Once planted, the roots should be undisturbed. They spread rapidly increasing in geometrical ratio. The bulb of this year throws out two growing roots this fall, each of these throws out two next fall, etc. When the clump gets too thick, the soil can be taken off and the smaller roots removed without disturbing the ones to be left. I have seen clumps of four or five hundred in the wild state, the produce of one bulb. Both leaf and flower of *L. pardalinum* have wide variations, and three or four varieties are named, but it is hard to lay down a dividing line, as the varieties run into each other.

L. Californicum is a variety with narrow leaves, and a brilliant flower; the tips of the petals a rich crimson and the dots small. Var. *puberulum* has paler flowers and broad leaves. The English florists have found a clear yellow form which they call *L. Warei*, but I have never been able to secure a specimen.

L. maritimum is one of the rarest in cultivation; this is for a double reason. The bulb is difficult to handle, being particularly liable to decay when disturbed. Then, too, its range of growth is limited. It grows in and around peat bogs, on the coast of Mendocino County—rarely farther north or south. It is seldom seen farther than two miles from the ocean. The surface of these bogs is dotted with clumps of Ferns and Azaleas. Around the bogs is a waste of gray, ashy-looking sand, densely covered with Heath, Cypress and Pines. On the edges of the bogs, the Lily is a dwarf, often blooming at three or four inches. In the bogs it roots itself in the tufts, and becomes a lovely plant, five feet high with ten or fifteen fine blossoms. The leaves are dark glossy green, and the blossom crimson. At Ukiah I have grown it easily in a reclaimed swamp in the shade. The soil is of vegetable matter and always moist. In the same situation *L. parvum*, *L. pardalinum*, *L. Columbianum* and *L. Humboldtii*, as well as the Japanese *L. auratum* make a vigorous growth, and, what is not usual for the latter, strong bulbs. At Ukiah there is little fog, and there are days in the summer when the thermometer will register more than one hundred degrees.

Lilium Parryi is similar to *L. pardalinum* in leaf and bulb, but the bloom is lemon-yellow and very fragrant. Of its



Platanus occidentalis.—See page 352.

cultivation I cannot speak, but believe it easy of culture under the same conditions as *L. pardalinum*.

L. Columbianum is *L. Humboldtii* in miniature. The bulb is small and compact. The stalk is two feet or so high, and the flowers true lily-shaped, the petals recurved. In color it is a light orange-yellow dotted with dark spots. This Lily has for its native home the plains of the Columbia River. It is easy to grow in cultivation only needing a well drained loam and ordinary moisture.

L. Humboldtii's bulb is often a pound in weight and very compact. The stalk is strong and stiff. The leaves are arranged in circles or whorls and are many in number. Eight or ten blossoms to the stalk are not unusual. These are of a reddish orange with round dark spots. Ordinarily this Lily will grow to a height of three or four feet. The finest specimen it has been my fortune to meet grew in the debris by the side of a Sierra stream. It was over eight feet high and had an enormous bulb. This Lily increases by seed only, in its native state, and where the natural conditions happen to be exactly suitable it is found in great numbers. I took over eight thousand good bulbs from one place some years ago. It was on a hillside in volcanic soil, where years ago the gold miners had cut the timber. I had spent the previous week in hard travel-

ing to find five hundred. I once found fine bulbs of *L. Humboldtii* in an Oak-grove near Chico. They were doing splendidly in the black adobe of that section. In cultivation, this Lily will thrive in clay loam or sandy loam. In hot sections it does better planted in the shade. It needs to be planted six inches to a foot deep, and will give the grower value received. High up in the Sierras above the pine-timber on those grand slopes covered with a mixed growth of Wild Cherry, Manzanita and Ceanothus, *L. Washingtonianum* finds its most congenial home. The soil is loose, decomposed granite and mould. The snow lies very deep in the winter and is late in melting. It keeps the bulbs moist in their early growth, and when it is gone they make a very rapid growth, often blooming six or eight weeks after the snow has melted. The stalk grows up from three to five feet, densely leaved in whorls, and with from five to twenty-five flowers, pure white and with a most delicious fragrance. I have seen places fairly white with this Lily and the air heavy with perfume. The bulb is large. I have bloomed it at Ukiah, but find it rather harder to bloom than any of the other native Lilies. I believe, however, that it is grown quite successfully in England. It should be given a loose soil and abundant moisture during the growing season.

Lilium rubescens is like *L. Washingtonianum* in every particular excepting that the flower blooms out pure white blotched with purple, and gradually gets darker till it is of rich ruby color, hence its name. Similar as the two Lilies are in habit, their native home is very different. *L. Washingtonianum* is a Lily of the high Sierras, *L. rubescens* of the Coast Range. It is found in the Red-woods close to the coast, on shaded hillsides in sandstone gravel, and on high ridges in the chapparal. The finest I have ever seen in numbers were on a chapparal ridge in a soil of gravel mixed with mould, the ordinary chapparal soil. The bulb grows deep and has abundant moisture in winter and spring, but in the summer such places get very dry. A friend of mine grows and blooms them readily in half barrels filled with sand and mould and placed in the shade. The first essentials with them is perfect drainage and a loose, porous soil. Of all our California Lilies it is the most beautiful, and of all Lilies it is the most deliciously fragrant. A flower will per-

fume the leaves of a book for months, and a well grown plant is the admiration of all beholders.—*Carl Purdy in California Florist*.

Orchid Notes.

Motions of Orchid Flowers.—Of all the numerous Orchids exhibited at the recent show of the Royal Horticultural Society, held in the Temple Gardens, in London, none proved such a centre of attraction as the remarkable little *Bulbophyllum barbigerrum*, exhibited by the President, Sir Trevor Lawrence. It was, indeed, difficult to get near the plant at all, such a crowd of visitors was there, all eager to obtain a sight of the curious little plant, whose beautifully fringed labellums were continually in motion. Curiosity, perhaps, prompted many people to see it; indeed, it was this that first drew my own attention. Whatever could it be which held together that cluster of people over whose shoulders others were trying to peep? "Why, it's alive," said one, and, on getting a little closer, the cause of the commotion became apparent. There was a curious little plant in a basket of some six inches in diameter, bearing a short, drooping raceme of reddish-purple flowers, each of which had a smallish lip margined with numerous long hairs, the whole nearly an inch long, perhaps,

and these were continually popping up and down in the most remarkable fashion. "The delightful little athlete," the *Gardener's Chronicle* calls it.

Being somewhat curious to know the cause of these singular movements, and being fully aware of the delicate hinge by which the lip, in this genus, is attached to the column, I carefully watched it for some seconds, and soon concluded that currents of air were the cause of disturbance; a conclusion abundantly confirmed by a gentle puff of the breath, which caused an unusual amount of commotion. So the exercise of the little "athlete" is of quite a passive nature, after all.

It appears to be some curious provision for securing fertilization of the flowers, the movements of the labellum probably serving to attract the attention of curious insects.

The singular little *Masdevallia muscosa* is, perhaps, still more remarkable. It appears from an account which has recently been published, that the lip of this plant is sensitive, and has a movement as definite as that of the remarkable *Dionaea muscipula*, or "Venus' Fly-trap." The habit of the plant is almost that of the well-known *M. Harryana*, but smaller, the flowers standing some six inches high; light yellow in color, the tube of the sepals short, the lip long and protruding, and much narrowed behind. When the flower opens the lip hangs pendulous underneath, but when an insect alights on the lip, and touches a small cushion-like disc, situated some distance from the apex, the lip suddenly shuts up tight against the column, moving through an angle of 80° or 90° in two seconds. The *Masdevallia* is not as bloodthirsty as the *Dionea*, for the insect is not tightly boxed in, nor does the plant forthwith proceed to devour and digest its victim. There is a way of escape between the two petals and the face of the column, but the insect can scarcely fail to carry away the pollen-masses in making its exit, and there can be little doubt that on visiting a second flower it comes in contact with the stigma, and thus fertilization is effected.

This is not all. The plant regularly goes to sleep at night—that is to say, it closes up tight—but positively refuses to sleep in the daytime; for two hours in a dark cellar are reported to have made no impression on it. The slightest touch with a hair on the sensitive cushion causes the lip to close suddenly, but after a short time it gradually opens again. Another remarkable point about the plant is that the peduncles are completely covered with greenish-yellow moss-like bristles, which have been well compared to those of a Moss Rose. There is no climbing up some other way. Ants have been observed to make the attempt, but eventually had to give it up in disgust. It is supposed that this is the particular use of these bristles, to keep away robber-insects. Those who would pay their respects must come in a legitimate way, and alight on the flower itself. Quite a little chapter of romance; but one would suspect that the insect goes away with rather mixed feelings after its first visit. *Calypso*.

London.

The genus *Brassia* derives its name from Mr. William Brass, who, towards the end of the eighteenth century, was sent as a botanical collector to Cape Coast and the surrounding districts by Sir Joseph Banks. There are several species known, but owing to the dingy color of the flowers of most of them, there are only a few which present sufficient beauty to entitle them to the consideration of the cultivator. Both *B. maculata* and *B. verrucosa* are now freely flowering here. The former is the oldest representative of the genus, of which it is the type, having been first made known to cultivation in 1806, when it was discovered in Jamaica. It has dark green, ovoid, compressed pseudo-bulbs, surmounted by a pair of spreading strap-shaped leaves. From nine to twelve flowers are borne on erect, arching spikes, about two feet long, which spring from the base of the pseudo-bulbs. The yellowish-green sepals are linear-lanceolate acute, and channelled on the front surface, the lower portion of which has several dark, dull purple blotches; the incurved petals are similar in shape and color to the sepals, but are only about half as long, and the dull purple blotches

are not so dense, having the ground color showing through in minute spots. The cordate acute lip is large and conspicuous; it is recurved at the apex, and the creamy-yellow surface is sprinkled over with purple-brown spots, while at the base there are two short orange-yellow ridges or crests. The specific name of *Maculata* was suggested to R. Brown, who first described this plant in "Hortus Kewensis," by the spots or blotches on the flowers, but it might be here mentioned that the flowers of all the species are more or less spotted in a similar manner.

B. verrucosa resembles the preceding species in habit, but has thicker pseudo-bulbs, somewhat furrowed and ridged, and narrower leaves. The sepals are about five inches long, pale yellowish-green, with a few dark reddish-brown spots at the base; the petals are only about two inches in length, of the same color, but more thickly covered with spots. The anterior half of the pandurate-cuspidate lip is pure white, abruptly changing to greenish-yellow on the lower half, which is studded with conspicuous green warts—a characteristic from which the plant received the specific name given by Dr. Lindley. This species flowered for the first time in England in April, 1840, in the nurseries of Messrs. Rollison, at Tooting, who had received plants of it from Mexico. Since that time, however, it has also been collected in Guatemala.

I might mention here that a few weeks ago at a London sale I noticed a fine specimen of this species which bore seven erect, arching spikes about two and a half feet long, each having from fourteen to eighteen flowers, which collectively presented a most striking appearance.

The culture of *Brassias* presents no particular difficulty. They will succeed either in well-drained pots or baskets,



Platanus occidentalis.—A Characteristic Western Scene.—See page 352.

although the former seem to be more generally used. A compost of rough, fibrous peat suits them best, and during the summer months, when the plants are making their growths, they should be watered frequently and thoroughly. During the winter months very little water is required to keep the pseudo-bulbs plump and fresh, but care should be taken not to withhold it until the plants begin to shrivel. The winter temperature during the day should be about 65° or 70° Fahr., sinking five or six degrees lower at night. In summer the night temperature should not be allowed to sink below 65° Fahr., while in the day it may rise from 70° to 80° Fahr.

St. Albans.

John Weathers.

Odontoglossum Alexandra.—Only of late years has the finest form of this beautiful Orchid been introduced. Among the early importations the majority of the plants consisted of the variety with very narrow, thin-petaled flowers. These are now rapidly giving place to the broad, round-petaled type, which, during the past seven years, has been imported in considerable numbers. Mr. Frederick L. Ames, of North Easton, Massachusetts, has some very remarkable specimens in luxuriant health, with broad, deep-green foliage and stout well-formed pseudo-bulbs, from the base of which I recently observed no fewer than 200 spikes carrying massive blossoms well shaped and, in many instances, beautifully marked, spotted and fringed. In this wonderful display I noted the scarce *O. Wilckeanum*, carrying dozens of its striking yellow and brown flowers, *O. luteopurpureum*, *O. Pescatorei*, bearing on many-branched stems a profusion of lovely white blossoms, and several handsome plants of *O. vexillarium*, with six to eight richly-colored flowers on a spike. A fine specimen of *Oncidium macranthum*, with a spike measuring seven feet in length, was carrying many of its enormous olive-brown and bright yellow flowers, and specimens of the bright scarlet *Masdevallia Harryana*, helped to make this a paradise of Orchid flowers. The plants here noted occupied a structure facing north, the back wall being covered with moss and ferns, which are kept continually moist, maintaining at all times an atmosphere full of humidity, which is one of the necessities of successful cultivation. *O. Alexandra* is of easy culture and grows freely during the spring months, but during July, August and September great care must be taken to provide cool quarters, or the intense heat of this season will prove detrimental. Where extensively grown, north houses have proved the best for this Orchid, being cool, airy and light. While growing they delight in abundance of air and water, and when the flowering season is past they should be re-potted in a mixture of peat, sphagnum and decayed leaves, in equal proportions. Of all *Odontoglossums* grown few equal this for purity and durability of blossom, and when grown, as it is here, it must prove valuable as a florist's flower.

Summit, N. J.

A. Dimmock.

Planting Roses for Winter Bloom.

THIS operation is an important part of the work in many establishments at this season, and demands the exercise of great care and judgment. Careless planting is doubtless responsible for many failures that are attributed to other causes. The benches or beds having been prepared for planting by being refilled with good soil, in which has been mixed a proper proportion of good manure, some air-slaked lime should be added if the soil is inclined to be clayey; and if the soil is very dry when brought into the houses it will be found better to give it a good watering the day before beginning to plant, so that it will be moist enough to work nicely. The plants to be set out should be well watered a few hours before they are turned out of the pots, this being very necessary, from the fact that when the old ball of earth is dry at the time of planting, it will be found almost impossible to get it wet afterward without making the entire bed sodden, and a poor start, followed by a weak and unsatisfactory growth, soon shows the effect of this error. This point of having the plants moist at the time of transplanting is one of especial importance, and is essential to the welfare of the future crop of flowers.

It will also be advisable to leave the plants in their pots until they are actually needed for planting, as the tender young roots are easily injured if exposed to the direct rays of the sun for even a short space of time. In planting, the soil should be pressed firmly around the plant without breaking the ball, after which a good watering should be given so as to settle the soil. If the weather should prove very hot and dry at this time a light shading on the glass will be beneficial to the young plants, but it should be removed as soon as the Roses become established in their new quarters. For several days

after planting it is well to keep the house a little closer in regard to ventilation, gradually increasing the amount of air admitted as the plants take hold of the new soil, but always bearing in mind the fact that Roses are not stove-plants, and will not flourish if kept too hot.

As a preventive measure it is best to give the plants a dusting with sulphur after planting, as the germs of mildew are frequently present at this season, and awaiting a favorable opportunity to attach themselves to the young growth of the Roses, and this will at once check and disfigure it. It should be remembered that young Roses recently planted are not in a condition to assimilate large quantities of manure, and it will therefore be found best to defer heavy mulching or other application of strong fertilizers until the plants have become better established.

Holmesburg, Pa.

W. H. Taplin.

Notes on Wild Flowers.

Actæa spicata, var. *rubra* (Red Baneberry), is one of the early spring flowers. The chief beauty, however, of the plant is in the ample spike of cherry-red berries, which are now ripe. The foliage is also a handsome dark green. The plant will thrive in moist soil in either sun or shade.

Phlox pilosa is nearly past flower. It is one of the best of the hardy Phloxes, and remains a long time in flower. It is a slender plant, nearly a foot high, with large heads of rose-pink flowers. It takes readily to cultivation, and will thrive in any ordinary soil.

Asclepias incarnata (Swamp Milk-weed) is just beginning to bloom. It is a desirable plant for cultivation, and may be found in many of the wholesale lists of European nurserymen. It grows nearly three feet high, usually bearing several heads of rose-purple flowers. The plant is easily grown in ordinary soil.

Bloomeria aurea, a plant belonging to the Lily family from southern California, is now in flower. It grows nearly a foot high, bearing at the top a dense umbel of pretty yellow flowers half an inch or more in diameter. These flowers do not all open together, and the plant is a long time in flowering. We have had the best success with this plant when set in autumn and covered with leaves to protect it from frost.

Rudbeckia hirta (Cone-flower), although too common in many of our meadows, is a more showy plant when in flower than the rarer *R. laciniata*. The plant is generally about two feet high. The flowers are darkish yellow with a dark purple centre, and are often nearly three inches wide. It will thrive in any ordinary soil, and, when stimulated by cultivation is very fine.

Calochortus albus, var. *paniculatus* (Butterfly Tulip), is one of the finest of this genus. The plant grows from six to eight inches high, bearing several showy white flowers nearly an inch wide. Another pretty species is *C. pulchellus*, with numerous bright yellow flowers a little more than half an inch wide. The flowers of both remain fresh several days. They are both Californian plants and need to be protected from frost. We have had better success in wintering them in the ground and protecting with a covering of leaves than in the cellar. They like a warm, well-drained, loamy soil.

Brodiaea laxa and *B. ixoides* are both natives of California. The former is a slender plant hardly a foot high, bearing a loose umbel of large, showy blue flowers, which remain fresh several days. The latter has smaller flowers, yellow with a darker stripe, several on a plant. Its height is about the same as the first. Both need protection from frost, or should be wintered in dry soil in the cellar.

Charlotte, Vt., July 2.

F. H. Horsford.

Two Good Hardy Plants.—A recent issue of the *Gardeners' Chronicle* contains excellent figures of two fine hardy plants, *Chrysanthemum maximum* and *C. lacustre*. There has been much confusion about the names of these plants since their first introduction. We received from a well-known English firm *C. lacustre* as *C. maximum*, but were subsequently informed that the so-called *C. maximum* was the true *C. latifolium*, the former being a totally distinct plant, and so it has proved. Now, it appears that the name *C. latifolium* is not correct and must be replaced by *C. lacustre*. It is to be hoped that the two species are properly defined at last, since both are showy and desirable border plants. The true *C. maximum* is of somewhat spreading habit, the flower-stems attaining a height of eighteen inches. The flowers are two inches in diameter, with yellow discs and white ray petals of good substance and very suitable for cutting. *C. lacustre* is much taller when treated liberally, having erect shoots three or four feet high surmounted with flowers similar to those of *C. maximum* but

much larger, with the edges of the petals recurved. This plant is a native of Portugal, but has lived out here during the past two winters without protection. *C. maximum* is a native of the Pyrenees and near the Stelvio Pass, so that we may reasonably expect it to prove hardy in our eastern States, since Stelvio Pass is 9,100 feet above the sea and the highest carriage route in Europe. Now, that the Marguerites are so much used for floral decoration, both the above plants should find favor with growers, as both are eminently suitable for cutting purposes.

Symphandra Hoffmanni is the name of a new and very beautiful Campanulaceous plant, which was figured and described last year as flowering at Kew for the first time, and is now flowering freely in the grounds here, and proves to be a valuable plant for the border. It grows about two feet high and is much branched, forming a compact plant, which has for some weeks been covered over with a profusion of large pure white cylindrical bells, reminding one forcibly of *Campanula nobilis*. Other species of this genus are biennial and *S. Hoffmanni* may also prove so, although it offers, at present, no indications of that character. But even if it is, seeds are produced in abundance and these germinate readily. Our plants were raised last year and planted in rich, moist soil, and there they wintered safely without any further care, and they are now covered with flowers and buds that promise to maintain a succession of bloom until frost.

Passaic, N. J.

O.

Roses in Open Ground.—So far this has been a very peculiar season for these plants. Most of the Hybrid Perpetuals did well at blooming time, but they do not appear to be making much growth since, and all kinds of destructive larvæ are preying upon them. Of the newer varieties the best, so far in this locality, has been Mrs. John Laing. Though not of a very hardy constitution, its pale-pink color, fine form and delightful fragrance make it a very desirable variety, and it is a splendid autumn bloomer. Earl of Dufferin is a grand Rose of a deep bright crimson, very fragrant and of a good constitution. Lady Helen Stewart is another first-class Rose, with a good, vigorous constitution. Ulrich Brunner, though not particularly new, nor yet generally planted is pleasing in shape and color. Queen of Queens has again proved one of the best bedding Roses, of a pale shaded-pink color and very attractive in every way. To my mind, however, the best Rose of this class introduced to this country this year is Gloire de Margottin. It is the clearest bright red yet introduced, very fragrant, a strong grower and a Rose that pleases every one who sees it. Last of all is that grand Rose, Madame Gabriel Luizet. With its satin-pink color and unsurpassed fragrance it has few equals, and it should be in every garden no matter how small. If it were my fate to be deprived of every Rose but one for growing in the open air, I should choose this one above all others. It is still producing some good flowers, and will continue to do so all summer at intervals. The monthly or everblooming Roses are not growing very well in this section, except where extra good, strong plants were put out early.

Summit, N. J.

John N. May.

The Vegetable Garden.—It is not too late to plant Lettuce, Spinach, Turnip, Corn Salad, Kale and many other vegetables, but to secure double crops the soil must be full of plant-food from frequent applications of fertilizers in former years. Cucumbers, Melons, Lettuce, Egg-plant, Spinach, Onion and many other crops demand hearty and constant food for their best growth. This can be illustrated more plainly when the crops are maturing than at any other time, for this truth is then brought home with convincing power if the crops do not promise a good reward for the labor given to them. If, on a close inspection, a growing crop seems less vigorous than it should, there are reasons for the failure. The soil may have been too compact, too dry or too wet; but lack of fertility is, four times out of five, the cause of backwardness. And the remedy should be applied at once, in the form of some high-grade commercial fertilizer, especially prepared for garden crops. This application is valuable now in any backward garden. Scatter it along near the growing plants, and hoe or dig it into the soil with as little injury to the roots as possible. If not too long deferred, this treatment will effect a striking change in color and vigor of growth.

Hampden Co., Mass.

W. H. Bull.

Fine Flavor in Fruit.—As the period for the ripening of large fruits is approaching, it may be well to remind inexperienced cultivators of the importance of high culture for the development of the finest quality. Some years ago, two St. Ghislain Pear-trees bore fruit so unlike that they would not be

recognized as the same variety. There was almost no similarity in flavor. One tree, bearing poor fruit, stood in a thick grass sod; the other, with excellent Pears, was kept well cultivated. Early Pears, as well as early Peaches, on crowded trees, which ripen first on the tree, are much inferior in flavor to those which come later. The first are grown so thickly on the branches that they cannot sufficiently mature; those which ripen later, after the early portion of the crop has been removed, have plenty of space to develop their fine quality. Hence the great advantage of early thinning. Take the Summer Doyenné Pear, for instance. Those which are first ripe on densely crowded limbs are about half the size of those which ripen last, and strikingly inferior to them in quality. So with early Peaches—the last scattered ones on the tree are commonly observed to be greatly superior in flavor to the first which ripen. These facts teach the importance of good cultivation and of thinning the fruit on crowded trees, both of which operations will always repay the grower in large, beautiful and excellent fruit, instead of small, knotty and flavorless specimens.—*Country Gentleman*.

Periodical Literature.

THE most interesting articles in the June number of the Kew Bulletin of *Miscellaneous Information* are the following:

Jamaica Cogwood.—This has long been known as one of the most valuable woods produced in the forests of Jamaica, and in the flourishing days of Jamaica sugar-planting it was everywhere in demand for framing mills and for the cogs of machinery. It is durable in water, and tough, hard and heavy. But although this wood has been used for centuries, and the trees which produced it almost exterminated, it is only now that their true name and botanical affinities have been made out. It was long supposed to be a Laurel and then a Ceanothus, but at last sufficient material has been obtained to enable Professor Oliver to make out that the Cogwood-tree is a *Zizyphus* (*Z. Chloroxylon*), a genus not represented before in the Jamaica flora.

Cocoanut Coir from Lagos.—Large nurseries of young Cocoanut plants have been established by the Colonial Government of Lagos, and seedlings are distributed at very low rates, with the view of making the cultivation of this plant in the colony as general as possible. Samples of the fibre recently sent, experimentally, to London, owing, perhaps, to defective methods of preparation and shipment, have not been very well spoken of by experts.

A Wheat Pest in Cyprus.—A report upon a species of *Tinea*, an insect destructive to wheat crops in Cyprus.

Patchouli.—An abstract of an article entitled the "Cultivation and Curing of Patchouli and its Adulterations," from the *Journal of the Agricultural and Horticultural Society of India*, a portion of which we reproduce here:

The plant yielding the perfume known as Patchouli is usually stated to be indigenous to the Malayan Peninsula, but there appears to be no evidence that it has been met with in the jungle, except in places where it could be clearly traced to some old cultivation.

It is grown and much esteemed by the aboriginal tribes of Perak and Pallang, and is met with at an altitude of nearly 5,000 feet amongst the Sakais of the mountains, far away from any Malayan villages.

The leaves are made into garlands and worn round the waist by the women, and bunches of them are often stuck into their bamboo ear-rings. They are also mixed with other leaves and flowers and formed into ornamental bunches, which are hung up and used in some sort of demon worship or propitiation.

Patchouli is a very shy flowerer, so much so that by the natives it is said never to flower, and a dealer, who has grown and bought it for the last thirty years, has never seen or heard of such a thing as a flower or fruit. Mr. N. Cantley, in "Notes on Economic Plants," says: "Plants raised from seed are reported to grow well but to have no scent, but retain it when produced from cuttings. I have not been able to verify these statements, but it is well known that plants do sometimes play tricks of this kind—Sandal-wood frequently." If this report was obtained from native sources it, probably, only represents another way of saying that the plant hardly ever bears seed.

The cultivation of Patchouli is carried on almost exclusively by the Chinese in the Straits Settlements. They do not grow it on a large scale, but a man will plant a patch of perhaps half an acre or an acre at a time. The land is trenched and thrown up into long beds either four feet or eighteen inches wide. The former of these will take two rows of plants, and

the latter only one. The plants are put two feet apart along the rows. The planting is done in the wet season, and the cuttings, which are about a foot long, require careful shading with leaves until rooted, or they will get withered and die, the plant being a delicate one, and very susceptible to the heat of the sun.

The first cutting of the crop is made in about six months after planting, by which time the Patchouli will have reached a height of two to three feet, and two other cuttings are made from the same plants at intervals of about six months. At the end of this time the old roots are dug up, the land re-trenched and fresh cuttings planted.

No reliable information as to the yield per acre nor the cost of cultivation is accessible, but it must be rather high, as the land has to be thrown up into beds, manured and carefully weeded and the cuttings shaded, and, if dry weather sets in before they are rooted, they have to be watered until established. The plant seems to flourish best under slight shade, but, probably, the production of oil is less in that grown under shade than in that grown out in the sun, though the yield of leaf would be greater. It is often planted on new land between Coffee, Nutmegs and other permanent crops, and is said to pay all the expenses of clearing and planting, leaving the permanent crop as clear profit.

The plants are cut down near the ground when they have reached a sufficient size, one stalk only being left to each bush. The Patchouli is then laid out in the sun to dry in the daytime, and put under cover at night and on the approach of rain. When thoroughly dry it is done up into bales, and sold either to dealers in the leaves or to the distillers. In this state it fetches about six dollars a hundred pounds.

The dealers cut it up and separate a great quantity of the larger stalks, and, according to its freedom from these, it is classed as first, second or third quality. The best consists of leaves only, and is valued at \$20 to \$24 a hundred; but, owing to the labor involved, this quality hardly pays to prepare. The second quality is composed of leaves and young shoots with little of the heavier stalk, and ranges in price from \$13 to \$15 a hundred. The third quality contains less leaf and more stalk, and fetches about \$10 a hundred.

The best quality of all would be produced by picking from the plants the leaves and tops of the young shoots, and drying these in the shade, but it is doubtful if it would pay. Prepared in this way thirty-six pounds of green leaves produce ten pounds of dried Patchouli.

Large quantities of the leaves of a plant known by the Malayan name of Ruku are often mixed with Patchouli. The botanical name of this plant is *Ocimum Basilicum*, L., var. *filosum*. A Chinaman recently bought the whole of the Ruku growing wild in a Coconut plantation in Province Wellesley, and twenty-eight tons of the dried herb were collected and taken to Penang to be used for the adulteration of the more valuable Patchouli. European dealers prefer to buy the plant just as it is cut, when it is easy to see if it is adulterated or not, but if the leaves are bought it is very hard to detect the imposition. The leaves of another plant are also often mixed with Patchouli. This plant (*Urena lobata*) is called *Perpulut* by the Malays, and is to be had in any quantity for the trouble of collecting it.

The dried Patchouli is put into a large copper cylinder fitted with a perforated false bottom and mounted on trunnions. Through one of these steam enters from a boiler and is conducted by a tube beneath the false bottom. The remaining trunnion is also hollow, and the steam under a ten-pound pressure, after passing through the leaves, passes out by it and into a worm immersed in a tube of water in the ordinary way.

One hundred pounds of the dried Patchouli, just as it is cut, yields from eighteen to twenty-two ounces of essential oil, and a sample free from the heavier stalks yields about double that amount. By an ordinary still not more than one-half of the oil can be extracted. The green leaves yield little or no oil, and therefore it is necessary that they be dried before being subjected to the process of distillation. The oil is of two varieties, the one being sage green, and the other the color of medium-colored sherry.

Sometimes the one color is in greater demand than the other, but the prices are the same for both. At present the price in Penang is about fifty cents per ounce. Both kinds of oil when fresh are limpid and quite fluid at ordinary temperatures, but at 40° F. they become rather thicker, but remain bright and clear. The golden-brown oil has a specific gravity of 9580 at 85° F., and the green oil a specific gravity of 9578 at the same temperature.

Oil has been kept for ten years in a bottle with a loose stopper, when it becomes of a dark brown color and of a syrupy

consistency. The scent of this old oil, however, is little inferior to fresh, though not quite so powerful. This bears out the statement in Ure's Dictionary of Arts, that "the essential oil of Patchouli is one of the least volatile of any known, hence it is one of the most persistent of perfumes from plants."

Mr. N. Cantley, Superintendent of the Botanical Gardens, Singapore, says: "Plants of Patchouli have been in demand for experimental planting, and a good number have been supplied. Pickled leaves are now selling at \$12 per hundred. The plants grow freely with but little care, and should figure among colonial products." This statement, although correct as far as it goes, gives a mistaken idea of the circumstances of the case. The production now is quite equal to the demand, which seems to be very limited, consequently the market is soon glutted, particularly with the oil. Unless, therefore, the use of the leaves and oil could be very materially increased, there seems to be no prospect of profitably cultivating it on a large scale.

Correspondence.

Forests and Civilization.—III. The North Woods.

To the Editor of GARDEN AND FOREST:

Sir.—It now seems probable that a great World's Fair, or International Exposition, will be held in the City of New York in 1892. If this is done a complete and well-arranged exhibition of the wood-products of this country should be one of the chief features, and the fair should be used as an occasion and means for stimulating public interest in forestry, tree-culture, landscape art, the management of parks and public grounds and related subjects. There should be an elementary department for the benefit of the good people who like to see trees smothering each other to death, and who think it is a crime to cut a tree down under any circumstances. As some savage races like harsh noises better than music, so some persons appear to feel as much pleasure in an ugly tree as in a beautiful one.

Such an exhibition of forest-products, as a part of an International Exhibition which will be visited by intelligent and thoughtful men from all civilized lands, can be made highly interesting and serviceable, and the friends of forestry in this country should at once begin to consider plans to secure its completeness and success. Some preparatory action looking to this end will probably be taken by the American Forestry Congress during its session at Philadelphia in October of this year.

One of the most important and useful features or adjuncts that could be connected with such an exposition would be an exhibition of the Adirondack region itself, as an actual, concrete illustration of our treatment of one of the most remarkable forests in the whole world. There should be arrangements for excursions, for visitors to the Fair, through different parts of this mountain region, and especially across the great tracts that have been destroyed by fire. It would be an interesting lesson to intelligent European visitors. They might write for their own journals descriptions of what they see, which if republished here would be valuable as criticisms from independent sources; and some of our own people who think that no very serious injury has been wrought here might bring their theories regarding the value of forests, as natural storage reservoirs for water, into a little closer relation with facts if they would take the trouble to come and look at the country.

When in Washington last winter I met a number of gentlemen connected with one of the departments of the Government, who asked me if the impression which is produced by the report of the New York Forestry Commission for 1885, regarding the denudation of Adirondack hills, is not an exaggeration of the facts. This is the report of Messrs. Sargent, James, Shepard and Poucher. It was based upon a more careful and thorough examination of the condition of the entire Adirondack region than had ever been made before, and all its representations are of the most moderate character. Most of them are far within the limits of the truth. The photographs, of course, exhibit faithfully the scenes which they represent. Nobody can question that fact, but the Washington people thought there were probably but a few places like those which are shown in these pictures, and that those were tracts of small extent, so that the aggregate denudation is really, they supposed, of but slight importance.

The truth is that the tracts represented by these photographs are so extensive as to constitute an important proportion of the whole Adirondack region. There are hundreds of such places as that which is shown in the picture called "An Adirondack Farm," facing page 5 of the Report. The soil was never fit

for cultivation. Now it is exhausted and ruined, and the inhabitants are starved and dwarfed in body and mind. The pictures of the Indian River country, and of the Hudson River above North Creek, exhibit accurately the desolation of regions of appalling extent. The one showing the appearance of the denuded hills of the Hudson watershed, following page 14, represents precisely as it was at that time the condition of broad hill-tops and slopes which were once covered with glorious forests. I looked at these hills a few days ago. Their appearance has not changed perceptibly in five years. The pictures are still accurate. I wish that these pictures, or photographs of similar places, could be reproduced in GARDEN AND FOREST. Making allowance for geological differences they would show what will yet be seen in Pennsylvania and other mountain forest-regions of our country, unless a great and almost impossible change is speedily wrought in the character and habits of the people of our country.

Years ago I wrote from here: "Last week I rode through the 'Schroon Country' with a man who has probably done as much as any one to desolate this whole region. From Minerva, past Pottersville, Schroon Lake, Schroon River (Roots Hotel), and on along the Elizabethtown road past Dead-water to the new road that leads through the forest to Smith Beedy's, we traveled all day long through a blighted and hopeless land. As league after league of utter desolation unrolled before and around us, we became more and more silent. At last my companion exclaimed: 'This whole country's gone to the devil, hasn't it?' I asked what was, more than anything else, the reason or cause of it. After long thought he replied: 'It all comes to this—it was because there was nobody to think about it, or to do anything about it. We were all busy, and all somewhat to blame, perhaps. But it was a large matter, and needed the co-operation of many men, and there was no opening, no place to begin a new order of things here. I could do nothing alone, and my neighbor could do nothing alone, and there was nobody to set us to work together on a plan to have things better; nobody to represent the common object. Why did not you come along to talk to us about it years and years ago?'"

During the last two days I have passed over the same ground. The aspect of the country is the same, except that the gullies in some places are deeper and wider, and where there is clay or sand the erosion increases. Where there is life there is change, but these dead regions, hills of bare rock, and valleys of desolate sand are little changed from year to year. Extensive tracts here will be much the same a century from now.

I hope all the visitors to the great World's Fair in 1892, who are interested in forestry subjects, will come and see the "Schroon Country," taking the route I have indicated. Minerva is reached by stage or buck-board from North Creek, which is at present the northern terminus of the Adirondack Railroad. If the people of the State of New York would visit these regions they might, possibly, come to feel a more intelligent and vital interest in their own possessions in the North Woods, and in the great river which has its sources here, and which is so necessary to the prosperity of the cities at its mouth. At present everything indicates that when the Adirondack region is completely ruined, if not before, the people of the State will at last awaken to a sense of its value, and will then, perhaps, take steps to obtain possession of it. It will cost vastly more then than it would now, and its value will be fatally impaired for centuries to come.

Elizabethtown, N. Y.

J. B. Harrison,
Cor. Sec. American Forestry Congress.

The Adornment of Gardens.

To the Editor of GARDEN AND FOREST:

Sir.—Kemp, in his "How to Lay Out a Garden," a little volume brimful of excellent suggestions, says: "Gardening and architecture, like all the fine arts, have much in common—and that department of architecture which belongs more exclusively to the garden has especially a great affinity with gardening in its broader principles. In fact, there is much more relation between the two than is usually admitted, or than the ordinary products of practitioners in either art would at all justify us in believing."

I confess to a great admiration for those stiff, formal, geometrical gardens so prevalent in England during the eighteenth century, and whose disappearance was in great measure due to the writings of Addison, Pope and Walpole, and to the hands of Bridgman and "Capability" Brown. There was a direct, harmonious connection with the architecture of the day—they were stately and full of dignity, like the grand lords and ladies that walked in them. William Howitt thus pleasantly

discourses in his "Rural Life of England": "It has been the fashion to cry down all gardens as ugly and tasteless which are not shaped by our modern notions . . . yet the old French and Dutch gardens, as the appendages of a quaint, old house, are, in my opinion, beautiful. They are like many other things, not so much beautiful in themselves as beautiful by association—as memorials of certain characters and ages. If the taste of the present generation had been that of all past ages, what could there have been in the gardens of our past kings, nobles and historical characters to mark them as strongly and emphatically as they are now marked?"

In a modified way, these old gardens were those of our fathers in New England. They served to awaken associations with the past, and with very distant shores, which were still dear to them.

And they yet have their place. In the small public squares of cities and of the larger towns, in contracted suburban bits of ground where variety and irregularity are out of question, and in connection with the pretentious square or rectangular colonial house of the present taste—all that goes to make up the mathematical garden—would, if judiciously carried out, be extremely pleasing—for its novelty, if for no higher reason.

The proper and appropriate adornment of the architectural garden could not be mistaken. Its rectilinear gravel walks with its edgings of Box-wood, its statues, fountains, vases, formal trees and quaint topiary-work were, each and all in keeping with the symmetrical laying-out and with the adjoining buildings. Such, however, is not the case with the style of the present day. Incongruity is too often displayed. As examples, we may cite the disposal of fruit-trees among those of a strictly ornamental character; the cultivation of vegetables in the flower borders; the representation, in the surface of a lawn, of some inanimate object by means of variegated plants; the use of ornaments in a style different from the architecture of the house—not only immediately about but attached to the building.

This applies especially to rustic work. Not that I would by any means decry the æsthetic use of any object or material, however humble, but it must be in harmony with all that surrounds it. And this leads me to speak briefly of the material used in the construction of the suburban dwelling, a matter of the more importance if it has any pretensions to architectural beauty. Wood has long held its ascendancy among us for this purpose, chiefly on account of its cheapness, and in a measure for sanitary reasons. It must, however, soon yield to stone or brick, as the tastes of the people improve. To a man of correct taste and judgment the idea of the want of solidity in the wooden house is unpleasant, especially, if as is generally the case, the appurtenances of the garden and adjoining grounds, such as terrace walls and steps, balustrades, pedestals, vases, etc., are made of the same material. Downing, who did much to improve the public sentiment in all that relates to such matters forty years ago, says: "In point of taste a house built of wood strikes us the least agreeably, as our pleasure in beholding a beautiful form is marred by the idea of the frailness of the material composing that form. . . . The strength with which it strikes a European accustomed to solidity and permanence in a dwelling, is the best proof of the truth of our remark."

Chestnut Hill, Mass.

D. D. Slade.

The Cranberry Gall Fungus.

To the Editor of GARDEN AND FOREST:

Sir.—Some of the Cranberry bogs of New Jersey are infested with a disease which is known as the Gall Fungus, or by some called "red rust." In appearance to the naked eye it consists of a small, deep red, gall-like structure extending from the surface of the infested plant. The galls may appear upon any young-growing part, and in a badly attacked branch they are in large numbers upon the stem, leaves, flowers and finally the fruit. In extreme cases the whole surface of the diseased bog is reddened and the plants are stunted or killed and the crop is a failure. This fungus, when considered microscopically, is quite different from the rusts of the grain-fields, the smut of Corn, Oats and the like, the mildew of the Lettuce and the various moulds which attack many kinds of plants. For the present purpose, however, it may be only said that it belongs in the great group of fungi which contains thousands of strange and minute forms of plants, ranging in size from the puff-balls and toad-stools down to those so minute that a high magnifier is needed to make them appear of the real size of such fungi as bread mould and Grape mildew. The gall fungus of the Cranberry is one of the simplest forms of those peculiar parasitic plants.

In the inspection of the infested bogs it has been found that

at least five other kinds of plants are attacked by the same fungus. These plants are closely related to the Cranberry—belonging to the same family of plants and associated with the affected Cranberry plants. Some of these plants grow only upon the borders of the bog, and it was evident that the disease was confined to these plants located close to the bog. For example, the narrow-leaved *Kalmia* (here called Calf-kill) was badly attacked only when close by the bog. The same was true of *Azalias*, of *Cassandra* and certain species of *Huckleberries*. It seems quite probable that the infection in the form of spores reached these border plants during the time of high water.

There are many important points to be determined concerning the life history of this destructive pest, including the time and method of the dissemination of the spores. It will be necessary to learn, if possible, the present exact limits of the trouble and all the species of plants that are susceptible to the disease. It is hoped that all readers of GARDEN AND FOREST who are Cranberry growers will inspect their bogs and report if they find the disease present. If there still remains any doubt, the best way will be to send some suspected specimens to a competent mycologist. As soon as the disease is circumscribed, means may be taken for the eradication of the pest.

N. J. Exp. Station, July 17th, 1889.

Byron D. Halsted.

Notes.

Mr. W. F. Massey has been appointed professor of horticulture, arboriculture and botany in the college of agriculture and the mechanic arts recently organized at Raleigh, North Carolina.

Professor Hartig suggests that the superior durability of wood, cut in the winter, may be largely due to the fact that it has time to dry on the outside before the atmospheric influences are favorable to the development of fungi. The spores of these are always about and in the summer at once attack freshly-cut wood, while in the winter they are dormant.

The grain plant-louse, *Aphis avenæ*, has seriously damaged the wheat crop from Ohio westward through Indiana, and as far north as Grand Rapids, Michigan. An invasion so serious has not happened for some years. There is little danger of a renewal of the attack next year, for the parasitic enemies of this pest multiply as rapidly as the Aphides themselves, and keep them in check.

Some exquisitely naturalistic reproductions of various Orchids are displayed by the Messrs. Tiffany & Co. at the Paris Exposition, wherein the most delicate tints and textures are imitated in gold, enamel and precious stones. *Odontoglossum Harryanum*, *O. zygotetrum*, *Cattleya bicolor*, *Vanda Sanderiana* and *Phalanopsis Schilleriana* are among the flowers most successfully used as models.

From a private letter we learn that the Black Rot and Mildew are so prevalent in Vineland and other parts of southern New Jersey that the Grape crop will be nearly ruined except where the vines have been treated with the Bordeaux Mixture. But it is hard to use this precaution and keep the leaves and berries fortified against the fungus when it rains seven days and nights in succession. Colonel Pearson writes that so far the Iron-clad Grape has escaped, while even weeds and forest-trees all about it are rotting and mildewing.

It is the practice in many English gardens to grow the Rose-Acacia (*Robinia hispida*) as a wall-tree. It is treated in this way because when grafted on a standard, as is usual, it is easily injured by high winds. But the additional warmth of the wall helps to ripen the wood and make strong buds, so that the racemes seem longer and the color more rich. A correspondent writes of a tree grown this way for several years, nailed to a sunny wall, and the result is that it blooms for a full month, and is then one of the most striking features of a famous garden.

The Hollyhock fungus (*Puccinia Malvacearum*) seems to have spread rapidly this year, for reports of it come to us from widely separated localities. This fungus was carried from Chili to France in 1872 and soon spread all over Europe. Three years ago it was introduced into the United States from Europe at Beverly, Massachusetts. Next year it appeared in the Boston Public Garden, and although the plants were pulled up and destroyed at the suggestion of Professor Farlow its progress was not arrested by these precautions, and it will probably spread all over the country.

The production of raisins in California has grown steadily year by year until it reached the amount of 1,250,000 boxes last year. Careful and systematic experiments have been made

in cultivating, curing and packing the fruit, and several growers have visited Spain to investigate the methods practiced there. The result of this energy and study was seen in last year's pack which proved superior to that of any previous year in quality and attractiveness of appearance. California raisins are sweeter than those of Spain and they will keep more than twelve months, while the Spanish raisins will not last longer than six months without extra sugaring. There is likely to be some European demand for this year's crop of California raisins while Australia and other countries on the Pacific Ocean offer a hopeful market. At all events there is at present little danger that the industry will be overworked, for last year's enormous pack went at once into consumption at good prices and the market is already bare and hungry.

To several inquiries about the best nozzle for spraying plants where insecticides and fungicides are to be applied in this way, it may be answered that the Cyclone nozzle, perfected and recommended by Professor C. V. Riley, throws a spray as fine as a thin mist, but does not throw it far. For shrubs or small trees, the tops of which can be reached with a light bamboo pole, nothing can be better. It will completely and evenly wet the foliage without applying so much as to cause a drip. The finely-divided spray adheres easily, and the poison is economically and effectively applied. Another apparatus is called the Nixon nozzle. It is patented and is made and sold at Dayton, Ohio. Various sizes are made, the smallest throwing a spray as fine as the Cyclone's, and throwing it with much greater force. These nozzles can also be adjusted to throw a solid stream to a considerable height, the size and force of the stream varying with the size of the nozzle. Any good force-pump can be used with the nozzle. The nozzle company make machines adapted to all kinds of spraying.

The *Libraire Paul Klincksieck*, 15 Rue de Sèvres, Paris, is to publish in two volumes, accompanied with an atlas of 300 lithograph plates, an account of the plants of Yun-nan, based upon the collection of the Abbé Delavay, by M. A. Franchet, of the Paris Museum. Yun-nan is a vast province in the south-eastern part of the Chinese Empire, surrounded by Eastern Tibet, the Himalayas, Assam, Burmah and Tonquin. The plants of this vast region are now first known through the labors of a priest of the foreign missions of France, M. Delavay, who has been stationed during the last four years at Tapin-tze, near Lake Tali, and whose plants have been studied by M. Franchet. In the territory explored by Delavay he has gathered 3,200 species of plants, 1,200 of these being new to science. Plants of real ornamental value abound in Yun-nan. Among M. Delavay's discoveries are some forty species of Primrose, and as many new Rhododendrons; Evergreen Oaks, *Leguminosæ*, *Rosaceæ* and Orchids are numerous, and probably there is no part of the world from which so many valuable additions to garden plants can now be expected. The *Planta Delavayana* will be published in twenty parts (four or five a year). The price of subscription is 200 francs.

It is well known that plants of *Dictamnus Fraxinella* at the close of a dry, sunny day are surrounded by a gas which is inflammable and will ignite with a sudden flash of flame when a lighted match is applied to it. M. H. Correvon gives in *The Garden* the results of some investigations lately made with regard to this phenomenon. Certain plants, and very notably the *Rutaceæ* and *Labiata*, secrete various products, such as essential oils, resins, gums, balsams, etc. Secretory organs which are buried in the substance of the parenchyma elaborate these products, while hairs of various forms and textures conduct them to the surface and there excrete them. The secretory organs are termed internal glands, and the excretory hairs are known as external glands. These latter glands are surrounded at the base by a part of the epidermis, which the hair has pushed up in issuing forth to make its appearance on the surface of the stem, and in the *Fraxinella* this raised part of the epidermis covers a gland which is very richly provided with resin and essential oil. When this gland was examined with a microscope on a hot day it was empty, its contents having been drawn out by the heat through the cells of the epidermis or through the hair that terminates the gland. It must be understood that the surrounding air has to be pretty strongly impregnated with the gas of the volatilized resin in order to take fire when a lighted match is applied to it. This experiment has also been carried out in France by placing a pot-plant of *Fraxinella* in bloom under a bell-glass and leaving it there for some time, when the air in the bell-glass was found to be so highly charged with the resinous gas that it ignited the moment a lighted match was applied to it, and it may be added, without doing the slightest injury to the plant.

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Country Foot-Paths.

WRITERS on health have long lamented that Americans, and especially American women, take little exercise on foot. As compared with the English and the Germans, our distaste for pedestrian exercise is very marked, and it is a familiar fact that even men and women who walk a great deal in town, content themselves in summer with sitting out-of-doors, boating and driving; or, if young and active, turn to tennis or some other sport, but walk comparatively little. Yet we are not a lazy, apathetic race, but a nervous, energetic, even restless race; and we are not, like the French, so wholly devoted to social pleasures that we are comparatively indifferent to the charms of Nature. Nor does our climate afford a sufficient explanation of our distaste for walking. It is true that we have many summer days when the sun is very hot and the temperature very high. But we have many others, even in the middle of summer, and long successions of them in spring and autumn, when Nature seems to have done her very best to tempt men out-of-doors—when, under the right conditions, walking would be pure pleasure.

The real trouble is, perhaps, that we cannot always walk in the country under the right conditions, and the fact that we cannot is doubly unfortunate. It would be better for our health as a people if the love of exercise were more general; and it would be better for our intellectual and spiritual development if the love of Nature were more general. We do not associate these two statements in a casual or careless way. The love of walking and the love of Nature are more intimately connected than most persons realize. Only he who goes abroad on foot can really learn to know the beauties of Nature, because only he lives, for the time being, with those beauties, passing among them, not beside them, and seeing the smaller ones as well as the greater, the more intimate and secret as well as those which are freely displayed. To contemplate a beautiful prospect from a veranda or to traverse a charming country in a carriage means much to him who has eyes to see; but to spend an hour in the woods or to follow on foot the course of a winding river means vastly more. And while a beautiful outlook from one's home or

the chance to drive and ride at will are luxuries of the rich, the foot-path is free to the poorest.

But just here is the trouble—just here we find the reason why we cannot walk under the right conditions. Broadly speaking, there are no rural foot-paths in America. There is the high-road which takes us where it wills, not where we will, and never, of course, into the heart of Nature's loveliness, and, which, moreover, is too often hot and dusty. There are the fields and meadows that walls and fences encircle even when the crops are gone and upon these we must not tread. And there are the woods with a few paths, perhaps, but often trackless, briery and tangled; and, even when they offer easy passage, often secluded from approach by cultivated fields, brooks or marshes. Of course the born lover of Nature, blessed with sturdy thews and sinews, makes light of such impediments to his pleasure, and might possibly say that he preferred the wildwood flavor of an American country walk to the tamer enjoyment offered by an English lane or a German forest-path. But such vigorous enthusiasts form but a small minority among the multitudes who live all the year round in country neighborhoods, or go forth summer after summer in search of health and recreation; and among these multitudes are thousands who might grow to be lovers of Nature too, if only the path were made a little smoother for them. It is not, in the majority of cases, a matter of mere taste or convenience. Even a strong woman is seriously hampered by her clothing in a cross-country walk, and to a delicate woman the effort involved would be impossible. To climb fences or take down heavy rails, to ford brooks, to clamber up rough hill-sides and over rugged fields and under matted forest branches, and, if it has rained of late, to get soaking wet in the process, is a prospect uninviting to the average city-bred man, even, and necessarily deterrent to the average city-bred woman. Both are thrown back perforce on the high-road with its very limited offers of pleasure; and the days are indeed many in an American summer when the high-road is as forbidding, in its own way, as is the trackless forest.

In England, on the other hand, one may walk through a county without troubling the high-road. The winding by-road with its bowery sides is everywhere at our service, and everywhere, too, we find the foot-path, crossing private grounds, perhaps, as sanctioned by some ancient right-of-way; edging the little river and passing it by the bridge which is always to be found where needed; bordering the farmer's fields, leading from one hospitable gate or turn-stile to another, and finding its way to every attractive point of view. Of course the physical conditions of the two countries are very unlike—England has been cultivated for so many centuries that scarce an acre appears which the hand of man has not put to some sort of service, while even in the most thickly-settled parts of our older States there are many tracts which are still almost in their primitive condition. Horses, too, are cheap with us and dear in England, so the English rustic is obliged to walk where his American cousin may ride if he will. But to explain why we have not so many foot-paths as the English is not to confess ourselves satisfied with the want of them. Nor is there any reason why we should not have them in far greater numbers. It costs a good deal to make a road but very little to make a foot-path, for, of course, we need merely a narrow path which a well-shod and sensibly-dressed person can traverse with a moderate degree of comfort—not a gravel-walk fit for slippers and muslin gowns. Often a couple of planks across a brook, a few loads of earth dumped in a marshy spot, two or three stones set, as steps, against a wall or fence, and a little cutting away of tree-branches and undergrowth, would open up a delightful tract of country which now is almost impossible of approach. Nor do we think that the farmer's or landed proprietor's interests would suffer by such trifling civilities paid to possible pedestrians. More persons would cross his property, but those who did

cross would do it less damage. The path might keep even boys' feet from straying into less desirable directions, while those for whose especial benefit it was formed would, of course, be limited by its bounds. If even the rudest, simplest paths were thus generally formed in our rural neighborhoods their influence would at once be felt in the village itself as well as in the summer colony. Ask any farmer's daughter why she does not walk more and she will answer, like the city woman, "Where shall I walk? The road is unattractive, the meadows and woods are always more or less difficult to cross and often impassable." More paths and simple bridges and stiles are what we need, alike in the interests of healthful physical development and of healthful growth in the sentiment for Nature.

How to Mask the Foundations of a Country House.—II.

IT was stated last week that, no matter how good a chance Nature may give the architect to unite his house-foundations well with the soil, the aid of the planter is always needed to make the union perfect. Nature's help is greatest when the site is broken and rocky and the foundations can be built of rough-faced local stone. Then, as we tried to explain, vines alone may often suffice to blend her work agreeably with man's, but one kind is not so effective for the purpose as a mingling of several harmonious yet contrasting kinds.

Wistaria, Virginia Creeper and the so-called Japanese Ivy are most commonly used in this part of the country for planting against houses. They are very beautiful, each in its own way. The Wistaria needs some support other than that which a flat wall supplies, and though it may be trained on wires, it is most effective when covering a balcony or trellis, forming irregular masses that are scarcely more charming in profuse flower in spring than later when the foliage is fully developed. The Virginia Creeper adapts itself in the most versatile way to such support as it may find, now twining around a fence or lattice and throwing out long free garlands, and now spreading a flat yet gracefully flowing mantle over wide level surfaces. It stands midway in habit between the Japanese Ivy and the Wistaria, less massive than the latter, less close and uniform than the former. A judicious union of these three vines on a country house is far more beautiful than either alone could be, that spot being chosen for each where, from its manner of growth, it will look particularly well. But the list need not be so short as this. There are a multitude of other hardy creepers which ought to be commonly employed—Climbing Roses, for instance, Honeysuckles, Clematis, and above all the Trumpet Creeper. Quite apart from the splendid clusters of orange-colored flowers which this produces in mid-summer, the beautiful form of its leaves, the charming masses they make when it is rightly cared for, and especially its dark-green hue, render it a most valuable plant to contrast with others. The Japanese Ivy, it may be added, looks best when clinging to stone or brick. It is never lovelier than in winter with its delicate tracery of leafless branches, as though etched by some skillful decorator's hand; and this tracery does not show nearly so well on wood as on other materials.

Of annuals we do not speak in this connection. Their variety is endless, and the beauty of some of them is very great. But when the object is to give the walls of the house a garment which will unite it with the ground from which it springs, plants of a more lasting kind should be chosen. Otherwise the work will never be thoroughly well accomplished, and what is done will have to be done over year after year. Annual creepers may be planted among those that are permanently established, but should not be relied upon for the main adornment of the house. Moreover, if vines alone are used about the foundations of a house, some should be of evergreen varieties. We want the walls to look united with the site in winter as well as summer, though when all Nature is stripped half bare the harmonizing garment need not be so extensive as when she is fully clothed.

But in the majority of cases vines alone should not be depended upon for the purpose we are discussing. Unless very irregular rocks form the foundation upon which the walls are set, they will need more massive and spreading foliage at their base. The fact is generally acknowledged to-day by the owners of country and suburban homes—for we seldom see one where plantations have not been made close to the walls, at least along some part of their course. Unfortunately these plantations are usually flower-beds filled with annuals or tender

ornamental plants. Their effect is, perhaps, better than utter nakedness, although when the choice is a particularly tasteless one even as much as this cannot be granted. In the first place, what has been said of annual creepers applies equally to tender plants of other sorts—the work is done, the effect is produced, for the season merely. When winter comes, nakedness returns in a worse shape than if no flowers had been planted—the house stands not on grass even but on a line of empty earth which makes its want of harmony with its surroundings most painfully apparent. And then in the spring the labor of clothing its base must be begun again. In the second place flower-beds are too monotonous. We need variety in the clothing green; we need to diversify it by massing, by carrying it up in certain places higher than in others, and by spreading it out here and there to connect or group with other plantations in the vicinity. What we want to mitigate is that rigid formality of architectural features which does not blend with the undulating variety of growing things; and a flower-bed is almost as artificial, as rigid in effect, as foundation-courses of masonry. Of course, if the whole garden is formally disposed, then the base-plantations may correspond; but such cases are rare in this country, and a natural arrangement of the grounds demands a thoroughly natural looking garment for the lower walls. Hardy shrubs are the things required. How they should be chosen, and, in a general way, how they should be planted, we shall try to point out in a future chapter.

Recent Botanical Discoveries in China.—V.

Lilium.—Considering the number of magnificent species previously known to inhabit eastern Asia it was hardly to be expected that further discoveries would surpass them in beauty or brilliancy, yet Dr. Henry has added one very handsome new species (*L. Henryi*, Baker); and he has also sent specimens of *L. giganteum* and *L. cordifolium*, which were previously unknown, from China. In general habit, Mr. Baker states, *L. Henryi* most resembles *L. tigrinum*, but the fully-developed leaves rather recall those of *L. auratum*, and the narrow perianth segments those of *L. polyphyllum*. The flowers are borne in loose corymbs, sometimes a foot across, and consisting from four to eight yellow, red-spotted flowers from three to three inches and a half long. *L. Duchartrei* and *L. Davidi* are new species of the affinity of *L. speciosum*, discovered by the Abbé David in Eastern Thibet. They all await introduction.

Euonymus.—A score of species, at least, inhabit China, but among the novelties there is nothing to equal the familiar and favorite *E. japonicus* in its numerous varieties. *E. gracillimus* is an evergreen, exceedingly slender-branched species, founded upon a specimen collected by Mr. J. Reeves, who resided at Canton between 1820 and 1830, and introduced many Chinese plants into English gardens, and after whom Lindley named the Chinese genus *Reevesia*. *E. carnosus* is an evergreen species from Formosa, allied to and very similar to *E. japonicus*, but probably not so hardy. It is remarkable for the large fleshy calyx and disk. Among the unnamed specimens of *Euonymus* received at Kew since the publication of the second part of the "Index" is one with lanceolate evergreen leaves, three to five inches long. It is from the neighborhood of Ichang, and may be worth the attention of a horticultural collector.

Celastrus.—Two new species of this genus are described in the "Index"—namely, *C. latifolius* and *C. variabilis*. The former is said to be a dwarf shrub, though it has oblong or orbicular leaves six inches across, and the flowers are in long, narrow, terminal panicles, suggesting a plant of larger stature. It hardly comes within the category of ornamental shrubs, but is of interest in another respect. According to Dr. Henry it bears a name equivalent to "turnip-fly-killer," and the leaves and shoots are dried in the sun and pounded to a powder that is reputed to be very efficacious in killing insects that infest Cabbage, Turnips and allied plants. *C. variabilis* is a trailing, often spiny shrub, of interest only to those who form botanical collections.

Hydrangea.—Although the number of species enumerated as Chinese does not exceed seven, the forms are very numerous and many of them highly ornamental, and they probably originated under cultivation. Thus of the protean *H. Hortensia* I have seen no specimens of undoubted wild origin; possibly, however, those collected by Wright in the Luchu Archipelago may have been obtained from wild plants.

Among the novelties sent by Dr. Henry are several forms which I have doubtfully referred to *H. scabra*, which, so far as I am aware, is not in cultivation. One which I have named *H. scabra*, var. (?) *macrophylla*, has elegant leaves nearly a foot long and corymbs of flower six inches across. Another, var.

(?) *augustifolia*, has very narrow leaves, and between these there are various intermediate forms. The flowers present as much variation as the leaves, alike in the size, shape and color of the outer barren ones. In one of the intermediate varieties the barren flowers, which are apparently white, are nearly two inches in diameter, very strongly veined, and of such consistence that they persist long into the winter. In another they are of a reddish color, and there are specimens wholly destitute of these enlarged sterile flowers. *H. longipes* is an elegant new species, resembling the Japanese *H. scandens* (syn. *H. petiolaris*) in the shape of the leaves and in the very long petioles, but otherwise quite different. It has slender branches and papery, cordate, ovate, densely serrulate leaves on slender petioles, two to four inches long, or as long as the blade, and terminal small corymbs of minute flowers, with a few outer sterile ones, about an inch in diameter, on long, slender pedicels. It is of erect habit, and two or three feet high. There is a variety *lanceolata*, differing only in the shape of the leaves. The type is from Nanto and the mountains northward, and the variety from Patung. Both are worth looking after.

Spiraea.—A shrubby species named *S. Henryi*, and several forms treated as varieties of *S. Blumei*, are the best novelties in this genus. *S. Henryi* is a densely-branched shrub, six or seven feet high, with small leaves coarsely-toothed in the upper part, and small white flowers in very dense compound corymbs, differing in the last-named characters from those species to which it is most closely allied. The leaves are one of the many substitutes for tea in China. *Spiraea Blumei*, var. (?) *latipetala*, is remarkable for its large flowers, and may possibly be a distinct species. *S. Blumei*, var. *rotundifolia*, and var. *hirsuta*, differ respectively from the type in the manner indicated by their names. There are several less-marked varieties, and the species as a whole is a very attractive one.

Liquidamber.—The materials of this genus are sufficient to prove that *L. acerifolia* of Maximowicz (*L. Maximowiczii* Miquel) cannot be maintained as distinct from *L. Formosana*, but there are imperfect specimens of probably two other species. *L. Formosana* is an important tree, furnishing much of the timber used for making tea-chests, and it is probably a handsome tree, though too tender to succeed even in the south of England.

Acanthopanax.—A new species of this genus, *A. diversifolium*, has the appearance, from dried specimens, that suggests a striking object. It is a shrub about ten feet high, with stout, straight branches and very leathery, prickly-toothed leaves of two kinds, simple and trifoliate, intermixed on the flowery branches. Of course there is nothing particularly ornamental in the flowers of these Araliaceæ, but they afford variety when variety of this kind is cared for.

In concluding this my first series of notes on Chinese plants, I may mention that I have not yet examined the materials of many of the natural orders at all, but when I have, if it should be considered of sufficient interest to the readers of this journal, I may contribute another series. W. B. Hemsley.

Magnolia glauca in its Most Northern Home.

NEXT to the Mayflower (*Epigæa repens*), or "Trailing Arbutus," as it is too often called, there is perhaps no local plant whose flowers are more prized by lovers of native flowers about Boston than the *Magnolia glauca* of botanists, or "the Magnolia," as it is everywhere known in this vicinity. Although Emerson (Trees and Shrubs of Massachusetts, p. 603) says, in a note: "It is said to have been found in the County of York, Maine," I do not know that the fact has been proved. With this possible exception, the only place in New England where this Magnolia is known to grow is in the swamps of Essex County, about twenty-five miles north of Boston, and near the latitude of 42° 40'. Here it has been known for over a hundred years, having been first brought to notice by the Rev. Manasseh Cutler, who was famous as a botanist, a theologian and a statesman, and for many years (from 1771) minister of Hamlet Parish, then a part of the town of Ipswich.

The chief and original locality for this Magnolia here is in what is known as the Magnolia Swamp, not far from the famous old fishing-town of Gloucester, and within a short distance of the sea-coast, now occupied, as is nearly the entire stretch of the New England shore, as a summer resort.

So eagerly have the flowers been sought for by collectors, and especially by those who wished to make money out of the sale of both plants and flowers, that there has been some apprehension that the day would soon come when the Magnolia could only be classed in New England floras as one of the indigenous plants of the past. The hope is now entertained, however, that the owners of the woods where it oc-

curs, appreciating its rarity and interest, will take care that its existence, in a wild state, may be perpetuated.

Turning off from the main road into the Magnolia Swamp there is little to remind one of the vicinity of civilization. No attempt has been made to improve upon Nature, and rest and peace meet the eye everywhere. Few birds seem to make a home within the swamp, and the full, rich note of the wood-thrush is the most striking sound heard. If the explorer would find the swamp Magnolia in its best flowering condition, he must make his excursion about the first week in July, and be prepared for a rough tramp. Bogs, springs, rocks, thickets and fallen branches and trees may beset the way, but every plant is interesting, and bears testimony to the fact that Essex County contains, within its small area, one of the richest floras in New England. (Mr. John Robinson, in "The Flora of Essex County, Massachusetts," 1880, enumerates about twelve hundred species of flowering plants.)

The ground in the lower wet places is thickly covered with Cranberries (*Vaccinium macrocarpum*) in full flower, and growing out of the sphagnum, over which the Cranberry loves to spread, we find Habenarias, *Calopogon pulchellus*, the sweet-scented Pogonia and two species of Sundew (Drosera). On the hillocks or knolls are thick carpets of the Checkerberry or Partridge-berry (*Gaultheria procumbens*) in bloom, while the leaves and flower-stalks of *Cypripedium acaule* and other early-flowering plants stand above this low-creeping shrub. The Black Alder and *Andromeda ligustrina* are the most common of the larger shrubs in flower in the thickets. Several species of Blueberries and Huckleberries are common with ripening fruit, and *Clethra alnifolia*, which will not bloom until after Magnolia blossoms are mostly gone, is abundant everywhere. Indeed, plants of the Heath family seem to predominate in the shrubby vegetation of this region.

Several species of Cornus may be found, and *Viburnum acerifolium*, *V. lantanoides*, *V. cassinoides* and one or two other species are in fruit. The Common Elder (*Sambucus Canadensis*) is in full bloom, and it must be counted as one of the handsomest native shrubs flowering at this season. The other native species, the early-flowered Elder (*S. racemosa*), is much less common and has ripened its fruit, which has all been eaten by birds. The Wild Roses at this time cannot be surpassed for beauty and fragrance, and they grow wherever there is the least encouragement by soil and sunlight.

Among the most conspicuous trees is the White Pine (*P. Strobus*), which is found almost everywhere, while *Pinus rigida* and the Hemlock (*Tsuga Canadensis*) accompany it in many situations. The Red Maple is, perhaps, the most abundant of the deciduous trees in the swamp, and the Sugar-Maple, the Yellow Birch (*Betula lutea*), and the favorite aromatic Black Birch (*B. lenta*) grow wherever the ground is elevated enough to be moderately dry. Witch-hazels, Alders, Poison Dogwood (*Rhus venenata*), etc., may be found growing in the immediate vicinity of the plant sought for.

The Magnolia here grows as a shrub from five to ten or fifteen feet high. A great many of the plants have become badly broken by the recklessness and vandalism of collectors, so that well-grown, uninjured specimens are now rarely found.

Many have been transplanted from the woods to gardens in the surrounding country, and some fine bushy specimens are preserved in this way. Although naturally growing in swampy situations, the plant thrives very well on high and comparatively dry land, especially if a little shaded from the sun. In cultivation it grows much faster, and will produce finer specimen plants if grafted upon stock of the Cucumber-tree (*Magnolia acuminata*), the only other species of Magnolia in America which reaches as high a latitude as *M. glauca*. In western New York it extends about a degree further north to the southern shores of Lake Ontario. The Umbrella Tree (*M. tripetala*) is more generally used for stock, as it is more easily grown and transplanted. It is, however, more liable to sucker than the other species.

According to Dr. Charles Pickering ("Chronological History of Plants," p. 908), the first reference to *Magnolia glauca* was made in a report of some navigators, in 1584, who, proceeding to Roanoke Island (North Carolina), found "the tree that beareth rind of the Black Synamon, of which like Captain Winter brought from the Straights of Magellaun." It is found from New York and New Jersey through the Atlantic States, generally near the coast, to Florida, and through the Gulf States into Texas. In the southern States it sometimes becomes a large tree sixty or seventy feet high, with a trunk three or four feet in diameter, and is an evergreen.

It has been suggested by some enthusiasts that this should be chosen as the "national flower," if we must have one. But, although the exquisite beauty and fragrance of the flower

make it popular and desirable wherever known, it is recognized and prized by a comparatively small number of the people, and there may be other reasons why it would not be suitable. In the same swamp with it grows *Kalmia latifolia*, which cannot be surpassed in beauty, which has a much more extended geographical range, and whose merits for distinction as the national floral emblem are so well set forth by Mrs. Van Rensselaer in a recent number of GARDEN AND FOREST.

Jamaica Plain, Mass.

J. G. Jack.

Notes Upon Some North American Trees.—III.

RHAMNUS.—*Rhamnus crocea*, Nutt., must find a place among North American trees. It is a widely-distributed Pacific-coast species from the valley of the upper Sacramento to Arizona. It most frequently occurs and has been described as a low spreading bush, five to ten feet high, but Mrs. T. S. Brandegee, the botanical curator of the California Academy of Science, calls my attention to the fact that this species is sometimes truly arborescent in the neighborhood of Antioch, where it grows with a stout trunk ten inches in diameter. This is the form named *R. ilicifolius* by Kellogg (*Proc. Cal. Acad.*, ii., 37), a name which can hardly be retained even for a variety, as in his locality (Lake County) this species passes from a low, nearly prostrate shrub, with matted branches and minute, nearly acute leaves, into the arborescent specimens, with the large, nearly round, Holly-like leaves of Dr. Kellogg's plant.

Rhamnus insularis, Greene (*Bull. Cal. Acad.*, ii., 392), (not *R. insulus* of Kellogg, *Proc. Cal. Acad.*, ii., 20, which, according to Mrs. Brandegee, in litt., is one of the Mexican species, with black bilocular fruit, related to *R. terniflora*) inhabits the Santa Barbara group of Islands and Cedros Island off the California coast, and is not rare, apparently, on the mainland (Santa Cruz Mountains, Brandegee). This, although a much larger plant in every way, and quite distinct in the form and serratures of the leaves, I cannot separate specifically from *R. crocea*, and should therefore propose to call it *Rhamnus crocea*, var. *insularis*.*

It is a tree attaining a height of twenty or twenty-five feet, with a straight, naked trunk, five or six inches in diameter, covered with smooth, light-gray bark. The leaves are about three inches long and nearly two inches wide, but not distinguishable in texture and in the peculiar yellow color of the lower surface from those of *R. crocea*. The fruit of the insular form is much larger, but not otherwise distinct, and according to Mr. Brandegee, the variety flowers about the 1st of May, while *R. crocea* in the same regions flowers in March. The variety ascends to rather higher elevations in the Santa Cruz Mountains, although the two are found together on the foot-hills and in the gulches, nearly to the sea-level.

More information than now exists based upon field observation upon the different California species of *Rhamnus* is very desirable. Proper limitations of the different species and varieties are still doubtful, and really nothing is known of the life histories of these plants.

CEANOTHUS VELUTINUS, Dougl. Mrs. Brandegee reports that this widely-distributed shrubby species sometimes occurs as a tree in Lake County, California; and I should propose to consider as a variety† of the same species Mr. Greene's *C. arboreus* (*Bull. Cal. Acad.*, ii. 144), which I cannot distinguish from it except by its arborescent habit, its rather stouter and softly pubescent young shoots, the more constant pubescence covering the under surface of the leaves, and by the pale blue (not white) color of the flowers.

This interesting and very handsome plant is common on the northern slopes of the Island of Santa Cruz, the largest

of the Santa Barbara group, where it forms at the highest elevations a small round-headed tree twenty to twenty-five feet high, with a clean, straight trunk six to ten inches in diameter (Greene); it is less common and of much smaller size on Santa Rosa (Brandegee). It is the largest and most truly arborescent of all the *Ceanothus*. It was first detected by Nuttall, whose specimen is preserved in the herbarium of the Philadelphia Academy, and who noted its large size and arborescent habit (Trelease in *Trans. St. Louis. Acad.*, v., 365).

51. **ÆSCULUS FLAVA**, Aiton.—The oldest name for this species would seem to be *Æ. octandra*, of Marshall (*Arbustum Americanum*, published in 1785). *Æ. lutea*, Wangerheim, in "Schrift Gesell. Natuf. Fr. z. Berl.," viii., 133 (1788), is also older than that of Aiton published in 1789. The *Æsculus octandra* of Miller's Dictionary is the *Æ. Pavia* of Linnæus.

65. **ACER DASYCARPUM**, Ehrhart.—This is really the *Acer saccharinum* of Linnæus (Species, 1st ed., 1055), but although this has long been known, the change of names was never made, that the confusion which would naturally arise if the name *Acer saccharinum* was used to designate another tree than the true Sugar Maple might be avoided. The Linnæan name, according to the strict rules of botanical nomenclature, should be adopted; and, after all, it is not a very bad one, as sugar has always been made in small quantities from the Silver Maple. If the name *saccharinum* is transferred, another name must be found for the real Sugar Maple. The oldest for this tree is that of Marshall (1785), antedating by two years that of Wangerheim, who first (*Amer.* 36, t. 11, f. 26) called it *A. saccharinum*, confounding the real Sugar Maple with the plant described by Linnæus as *A. saccharinum*, and starting all this confusion. But Marshall's name is *A. saccharum*, and if the Silver Maple is to be called *A. saccharinum*, a name so nearly identical with it as *A. saccharum* for another species could only lead to hopeless confusion, and Michaux's *A. barbatum* (*Fl. Bor. Am.*, ii., 253) would have to be taken up. An older name for the Silver Maple than Ehrhart's (1789) is that of Marshall (1785), *A. glaucum*, which should be used if the Linnæan name is discarded.

68. **NEGUNDO CALIFORNICUM**, Torrey and Gray.—I cannot distinguish specifically this plant from the common eastern *N. aceroides*. The characters relied upon to separate the two species—the number and cutting of the leaflets, the pubescence on their lower surface, and on the shoots and fruit—cannot always be depended on, and the eastern species in the dry Texano-Mexican region approaches too closely to the California plant which I should propose to consider a variety and call *N. aceroides*, var. *Californicum*.

C. S. Sargent.

New or Little Known Plants.

Vaccinium hirsutum.

THE men who are now the editors of this journal made a horseback journey through the mountains of western North Carolina in the autumn of 1886. Starting from Cæsar's Head, an outlying spur of the Blue Ridge, in South Carolina, early in September, they explored the wild and picturesque region where the Horsepasture and the Toxaway unite their precipitous torrents and form the Keowee, the great eastern fork of the Savannah River, being rewarded here by the rediscovery of Shortia,* probably on the very spot where Michaux discovered it ninety-eight years before. They then crossed the Blue Ridge, and afterwards the Little Tennessee River at Franklin, and continued westward into Graham County, their object being to rediscover, if possible, a peculiar Blueberry found in "the mountains of Cherokee County" half a century before by Mr. B. S. Buckley, but not seen again. Their only way of conveying to the few inhabitants of this remote region, with whom they fell in as they rode along, an idea of the plant

* *Rhamnus crocea*, var. *insularis*, arbor. foliis petiolatis, oblongis-ovatis basi obtusis, apice mucronatis, minute glanduloso-serratis.

† *CEANOTHUS VELUTINUS*, Dougl., var. *ARBOREUS*, arbor, ramulis hornotinis villosis; foliis ovatis, acutis, serratis vel plus minus crenulatis, subtus discoloribus dense pubescentibus; floribus cæruleis.

C. arboreus, Greene, l. c.—Trelease in *Proc. Cal. Acad.*, 2 ser., i.—Brandegee, *Flora of the Santa Barbara Islands* in *Proc. Cal. Acad.*, 2 ser., i. 208.—Parry in *Proc. Davenport Acad.*, v. 169.

C. sordidatus, Lyon in *Botanical Gazette*, xx. 204, 333 (not of Hook & Arn.).

* See GARDEN AND FOREST, i, p. 506.

they were in search of was by describing it as "a hairy Huckleberry;" and at Robbinsville, the county-seat of Graham County, a man was met with who had "heard tell" of such a thing. A promised reward of five dollars for specimens of the plant set all the boys in the county astir, for five dollars is a great sum of money in Graham County, North Carolina; and during the following summer I received a box of *Vaccinium* fruit covered with short white hairs, from Mr. W. F. Manney, of Robbinsville, who had marked some of the plants from which this fruit was gathered, and later sent a supply of grafts and seedling plants to the Arboretum. Some of these flowered in the spring of last year, and Mr. Faxon was enabled to make the drawing which is reproduced upon this page.

*Vaccinium hirsutum** is, according to Mr. Buckley's description, a low shrub one or two feet high. The stems are green, grooved, obscurely four-angled; those of the year, covered with stout, spreading white hairs, which cover also the lower surface of the leaves, the calyx, corolla, and dark blue, globose fruit. The leaves are ovate, entire, tipped with a minute mucro, and an inch and a half long. The ovoid campanulate corollas, minutely five-lobed, are nearly half an inch long and pure white; they are borne on one to two bracted-pedicles in terminal or axillary racemes.

The hairy flower and fruit of this species will serve to readily distinguish this plant, of which nothing is known, practically, with regard to its geographical distribution or the situations in which it grows—information which botanical travelers in the extreme western corner of North Carolina will soon, it is to be hoped, be able to furnish, for it is hardly probable that another half century will pass before this little shrub is found again.

The plants sent to the Arboretum have flourished, and were covered in June this year with their handsome flowers.

C. S. S.

Foreign Correspondence.

London Letter.

ENGLISH gardens have this year been deprived of a great deal of their accustomed June brightness by the scarcity of *Rhododendron* bloom. This is attributable, no doubt, to the excessive rain last summer, which was conducive rather to the formation of leaf than of flower-buds. We hope, however,

that we shall reap the benefit of this strong leaf-growth next season, when, if this summer is warm and dry, the flower-crop will be of unusual splendor. The failure of such a popular garden-plant in setting flower-buds is a serious matter to the large growers of *Rhododendrons*, as there is an enormous trade in spring with *Rhododendron*-plants which give good promise of bloom. Many customers, too, go to the nurseries and select the sorts they most admire when in bloom. The failure has been general throughout the country, although it has not visibly affected the exhibitions of the flower that are annually made at Hyde Park and various other places in London. You notice it most in the nurseries where the *Rhododendron* is a specialty, and in no place more than in the extensive nurseries at Knap Hill, in Surrey, where no fewer than sixty acres are devoted solely to *Rhododendrons* and other

so-called American plants. Usually these sixty acres are ablaze with color from the middle of May till the end of June, furnishing a spectacle probably unequalled in any part of the world. But though the flower-crop was not abundant, the nursery, as I saw it the other day, was delightful, and you seemed to enjoy occasional glints of color amid the greenery much more than if the place was all bright with bloom. One could readily discern that there are some sorts of *Rhododendron* that produce a crop of bloom no matter what the previous season has been. I made note of a few of the favorite sorts that carried abundant flowers, and among them are Mrs. H. Ingersoll, John Walter, J. Marshall Brooks, C. S. Sargent, Lady Armstrong, Pink Everestianum, A. B. Mifford, Mrs. Arthur Hunnewell, Mrs. J. Clutton (one of the finest whites), Roseum Elegans, Album Elegans, and the ever popular Lady Eleanor Cathcart. These were some of the most conspicuous which had carried their flower-buds through a most trying winter and spring, which is valuable testimony to their hardiness. But some very beautiful sorts cannot so withstand the elements, and it is painful to see how

splendid sorts, such as Kate Waterer, for example, have their flower-buds killed by the frosts of early spring. The secret of raising thoroughly hardy *Rhododendrons* lies in the breeding from the robust and hardy *R. Catawbiense* strain, and this is what is done exclusively by Mr. Anthony Waterer. The new seedlings which I went to see specially were not up to the mark this year though last year among the virgin seedlings there were some startling novelties in color, in size, shape and truss, and these would have been finer still this year after another season's growth. One would have thought that the climax of perfection in *Rhododendrons* had been reached long ago, but one can see great improvements in the new sorts in color especially. Some have white flowers, with the petals margined more or less widely with bright colors, others again are spotted heavily like show *Pelargonium*-flowers.

Though the *Rhododendrons* were only moderate this year, their relatives, the Azaleas, were superlatively fine, and a wet



Fig. 119.—*Vaccinium hirsutum*.—See page 364.

* *Vaccinium hirsutum*, Buckley in *Am. Jour. Sci.*, xiv., 175.—Gray, *Syn. Flora N. America*, ii., 1, 23.

season is evidently most enjoyable to them. We look upon the Knap Hill nursery as the birthplace of this magnificent race of hardy shrubs, for here it was that the original species, brought here from North America, were worked upon by the Waterers of by-gone days. In Loudon's time, during the first quarter of this century, Knap Hill was the headquarters for Azalea-raising, and it has been going on ever since, for the present proprietor is as keen upon rearing new kinds as ever his predecessors were, the result being that the Azalea has been worked up to such a high state of perfection that one is inclined to wonder how it can be further improved. But Mr. Waterer will not be satisfied until he gets flowers as large and as fine in form as the best of his Rhododendrons, and he is certainly leading them up to that. One would think that nothing could surpass in richness and brilliancy the color of such old sorts as *Coccinea*, *Cuprea splendens*, *Fulgens* and the like, but they even are dull when compared side by side with the new race of seedlings raised within the last few years at this nursery. There are among them fiery scarlets and crimsons, the purest whites and yellows, and in not a few there is a striking combination of tints, such as scarlet and orange or white and orange. Parallel with the improvement of flower in size, color and form has been the improvement in the habit of growth, the aim being to get a race that will not grow into those straggling (though to some picturesque) specimens which are commonly met with in old gardens. But the greatest improvement, I think, is that of inducing a leafiness at the time of flowering. The old sorts, especially the light sorts bred from *A. nudiflora*, have a naked appearance when in bloom which detracts from their flower beauty. It has been Mr. Waterer's aim to get a race that produces flowers and leaves together, and is therefor far more effective than the majority of the old sorts. You see at Knap Hill acre after acre of nothing but Azalea-seedlings, among which exceptionally fine sorts are continually cropping up at flowering-time, and the process of selection and comparison goes on daily for weeks. But only a comparatively few from these great seedling-beds are selected as worthy of naming, so that one may be sure that those that are honored with names are of superlative merit. There was one new sort named Mrs. Walter Druce that struck me much. It has a pure white flower, with a bright yellow spot on the upper petal. The early-flowering Chinese *A. mollis* is now an established favorite in all parts of this country, both as an open-air shrub and for pot-culture for early forcing. There are a good many so-called varieties with distinctive names (chiefly Belgian), but the range of color is very limited. There are, in fact, very few shades of tint between yellow and the bright flame-colored sort, which, I believe, was that originally introduced. But time and industry will doubtless accomplish much in the improvement of this race, especially if it can be made to intercross with the American race. The double-flowered sorts, of which that named *Narcissiflora*, with yellow flowers like a double Jonquil, may be taken as the type, is decidedly popular, as the flowers last longer in perfection than the single ones. Bouquet-florists have already taken them in hand, as the flowers are just the size required for small floral devices. There is a fair range of color, too, among them—yellows of various shades, pure white and pale pinks, while all have a delicate fragrance. The thorough hardiness of all these Azaleas is a great point in their favor, and I imagine that they could be grown in America, even where the Rhododendron, on account of its evergreen foliage, would fail.

London, June 27th.

W. Goldring.

Cultural Department.

The Small Fruit Garden.

THE yield of Raspberries for the season of 1889 has been abundant with such varieties as passed the winter and spring unharmed. The excessive and frequent rains have favored the development of the fruit to its maximum size, and, at the same time, has ruined a large per cent. of the crop, making it so soft that a few hours of hot sunshine caused rapid decay. This was particularly the case with blackcaps, fully half of the crop being wasted. They, however, furnished fine feed for bees, and this, to some extent, kept them from the red varieties. The birds also have feasted on them in preference to the red kinds. The first crop of blackcaps is always the best; the second, though heavier, generally runs smaller, and after this I prefer to root them out and commence anew. The red varieties will give satisfactory returns for a number of years if well cared for. Our leading varieties are Caroline (yellow), Marlboro', Montclair and Cuthbert, ripening in the order named. The former we esteem very highly

for table use, but it is too delicate to keep long or carry any great distance. It is perfectly hardy here and very productive, and a general favorite with those who know it. Of the others the Cuthbert is the most productive, but Marlboro' and Montclair are firmer, "stand up" better and are a little superior in flavor; but to untrained palates there is little difference among the red varieties. All are highly esteemed for canning, with or without currants, and no house-wife's stores are complete without them. Shaffer's Colossal, a reddish-purple berry of the cap habit, is especially valuable for canning; a berry of the largest size, an enormous grower and very productive. The canes are sometimes injured during winter.

The crop having been gathered the old canes should be cut out, removed, and burned as a sanitary measure. The ashes are of more value and less unsightly than the canes. Some people advocate deferring this work till winter or spring, on the plea that the old canes protect the young ones, but I see no reason for the delay. As their duty in fruit-producing is ended, it only remains for them to die a natural death, and the process of ripening and maturing previous to this make an unnecessary draught on the roots and soil which the young canes need and which they can better utilize. Besides, the freer admission of sunlight and air will aid them to develop and mature, and better fit them for duty another season. For these reasons I practice the immediate removal of old canes and also thinning out the young canes to the needs of next year, unless the surplus plants are needed for planting elsewhere. Two or three good stout canes left in a hill is ample, and much better than a greater number. Weeds should be pulled out to prevent seeding, and they are useful as a mulching. On the approach of winter a dressing of stable manure will be found beneficial; the fertilizing properties will find their way to the roots and be all ready for the plants to appropriate it in the spring. People who desire the finer foreign or tender sorts must take the trouble to lay down and cover the canes during the winter. For small quantities this is not much trouble, but for large growers this is impracticable.

The same course may be pursued with the Currant-bushes. The fact that their fruit has been gathered is no excuse for general neglect, and especially for permitting weeds to grow and ripen their seeds among them to make extra work another season. The crop of this fruit has been abundant, but the four days' rain which ushered in the month of July just as the Currants were ripening caused them to burst to an extent I have never witnessed before. Quite one-half of the fruit remaining on my plants at that time split open and spoiled. Fay's Prolific maintains its reputation for size and productiveness. I do not think I ever made a better investment in the fruit line for its size than when I paid \$10 for a dozen plants of this Currant. It is not difficult to remember many poorer ones. A friend recently stated that he was surprised, in a recent day's drive through the country, to notice the numerous gardens where the Currant-bushes still held their fruit while entirely denuded of their leaves by the Currant-worm. Such fruit never can ripen and develop to perfection, and it is unaccountable that so many people, either from carelessness or a mistaken fear of being poisoned, will permit such an exhibition on their grounds when hellebore is so cheap and effective a remedy and is so easily applied. People whose Currant-bushes are allowed to become breeding-places for this pest do great injury to their neighbors.

The light Grass crop, generally, is favorable to a rank growth of the vines. If summer pruning has been attended to so far in the season the pruning now will be the final one. If the main canes and laterals are now stopped after-growth will not be excessive, and the remaining canes will have an opportunity to properly develop and ripen their wood. The season has been very favorable for wood growth, which, if allowed to go on unchecked, will result in feeble buds on the wood nearest the vine, and these are the ones needed for next season's fruiting. All the fruit a vine should carry can be produced within six feet of its trunk as well as twenty or fifty feet away. Bearing canes, if stopped three leaves beyond the last cluster of fruit, will have all the foliage necessary to perfectly ripen the fruit provided the foliage remains in healthy condition. Clean and healthy foliage elsewhere on the vine will not compensate for the loss of the leaves near the fruit. Mildewed and rotting berries should be picked off and buried or burned to destroy the germs of the fungus infesting them. The lightness of the crop ought not to prevent proper attention to the health of the vines on which next season's crop depends, but it will naturally tend to neglect in this direction.

Montclair, N. J.

E. Williams.

Rose Notes.

FROM the differences of opinion expressed by different Rose-growers in regard to their experience during the past season it is somewhat difficult to make positive statements as to the relative value of varieties. For instance, one large grower asserts that, after repeated trials, he has decided to discard American Beauty for forcing, because it has proved unprofitable. While another grower a few miles away from the first mentioned declares that American Beauty netted more money per square foot of space occupied than any other variety he grew last season, and a third man states that he cut thirty thousand blooms (good, bad and indifferent, but a majority of them saleable) from a house 135 feet long and twenty-five feet wide. The evidence seems rather contradictory, yet the balance is decidedly in favor of this Rose, and this judgment is confirmed by the large numbers of this variety planted this summer. In the newer Teas, Madame Hoste (Guillot fils, 1888) has been highly recommended by some growers and may prove of much value, its large buds of light yellow shaded with buff having encouraged the hope from some Rosarians that it may prove a worthy successor to the old standard variety Perle des Jardins. We should not forget, however, that alleged rivals of the Perle have been offered each season for several years past, and so far the old variety has been able to hold its own as a profitable sort. Madame Hoste has not yet been before the public long enough or in sufficient quantity for a thorough test, and it will, therefore, be better to withhold a positive opinion until some future time. Madame Cusin, though not of very recent introduction, having been in the market for the past eight years, has only become prominent as a forcing Rose during the last two or three seasons, its peculiar color and lasting qualities when cut having gained it much popularity, and it has doubtless proved profitable when well-grown. Madame de Watteville, another introduction by the same firm, has also attracted much attention, and though not specially notable in form, is very pretty, and is being planted in large quantities by some commercial growers. Miss Ethel Brownlow (Dickson, 1887), a much-prized variety in Europe, has not yet aroused much enthusiasm among American growers, though possibly a valuable Rose. But among so many good pink Roses already in general use, the test of a new variety of that color is apt to be somewhat exacting.

Mrs. John Laing retains its place among popular Hybrid Perpetuals, though not always entirely satisfactory for very early forcing, but as it may be depended on for a crop of flowers by the 1st of February, and is really a beautiful Rose, it is justly considered a decided acquisition either for forcing or for out-door planting, as in the latter case it is of vigorous growth and very free. I am reminded by this allusion to early forcing of another new Hybrid Perpetual, supposed to be of American origin, which is now in preparation for the market. It is somewhat in the style of Magna Charta, but is said to force easily in time for Christmas. Another new Hybrid Perpetual of value as a bedding Rose is Dinsmore, introduced by Peter Henderson & Co. in 1887, its bright-colored flowers being of fair size and freely produced during a considerable portion of the season. Earl of Dufferin (Dickson, 1887) has not as yet been extensively grown on this side of the Atlantic, possibly on account of the limited sale for extremely dark Roses as cut flowers.

As a winter-blooming variety the Tea Rose, The Gem (to which reference has been made in a former article), has not been highly commended by those who tested it during the past season, but as a bedding Rose it is useful, though the blossoms become much tinted with pink on the outer petals when grown in the open air, and consequently it cannot be compared with Marie Guillot for purity of color.

Possibly a valuable race of out-door Roses may be brought forth as the new type of hybrids of *R. rugosa* is further developed, the first variety of this class in commerce being Madame Georges Bruant (Bruant, 1888), the result of a cross between *R. rugosa* and the Tea, Sombreuil, and is said to be very vigorous in growth, pure white in color, and very fragrant. The blooms are produced in clusters. Another hybrid already alluded to in GARDEN IN FOREST is that peculiar one originated by Mr. E. S. Carman by crossing *R. rugosa* with Harrison's Yellow, the product bearing a flower somewhat like Jacqueminot in color.

Interest has again been aroused in some localities in the question frequently discussed before as to the value of worked Roses in comparison with those on their own roots, when used for forcing, and after comparative trials it has again been decided by some of the growers that plants on their own roots

are fully equal, and in some cases superior, to those depending on the roots of another variety for sustenance. From this it will be seen that the opinion expressed by Mr. John N. May and a few other noted growers, several years ago, to the effect that "a Rose that would not grow on its own roots was not worth growing at all," was based on the sure foundation of personal experience.

W. H. Taplin.

Holmesburg, Pa.

Orchid Notes.

Progress in Hybridizing.—There was quite a flutter among the Orchidists, at a recent meeting of the Royal Horticultural Society in London, when the new hybrid between *Lalia Digbyana* and *Cattleya Mossia* was exhibited. Nothing so remarkable had been seen since that charming little plant, *Sophrocattleya Batemanniana*, \times first appeared, and it was universally admitted that the plant was a great acquisition, and added yet another to the many triumphs of the great pioneers in Orchid hybridization—Messrs. James Veitch & Sons, of Chelsea. It may almost be called a *Cattleya Mossia*, with fringed flowers, though the influence of the pollen-parent is seen in several other of its characters—the long-beaked ovary, the tube-like base of the lip, and the white sheaths of the pseudo-bulbs, for example. "May possibly be the forerunner of a race with fringed flowers," said a writer in the *Gardeners' Chronicle*, when describing it.

And what possibilities for the future does such a success indicate? *Lalia Digbyana*, in spite of its gloriously fringed lip, does not appear to be a very popular garden-plant; possibly on account of that unmistakable tint of green in its flowers, but once the possibility of transferring the beautiful fimbriation to some of the more popular *Cattleyas* and *Lælias* is demonstrated, further experiments are sure to be made; though we must wait a few years for the result, as the present plant was seven years old before it flowered, and *Lalia caloglossa*, raised in the same establishment, did not flower until it was nineteen years old—certainly an inordinately long time to wait, even for the choicest of hybrids.

In spite of this, however, hybrid Orchids are now becoming a very numerous class, and include in their ranks some of the choicest ornaments of our gardens. *Lalia Exoniensis* \times is one of the showiest of autumn-bloomers; *L. flammea* \times a plant of unusual brilliancy, whose distinguishing characteristic is well indicated by its name; *L. Amesiana* \times , *L. bella* \times , and *L. callistoglossa* \times , are all magnificent flowers, and among the most brilliant of those raised by the Chelsea firm. "We grow our own new Orchids, instead of importing them," said Mr. Harry Veitch, during a recent visit.

Another good point about these hybrids is that in the majority of cases they possess good constitutions. Some of them are plants of remarkable vigor, as the showy *Cypripedium Sedeni* \times for example, and there are instances where two species difficult to cultivate have given rise to a hybrid of good constitution. *Cattleya porphyrophlebia* \times has been cited as a case in point, as of better constitution than either *C. intermedia* or *C. superba*, its two parents. Again, *Cypripedium Fairieanum* is reputed to be one of the most difficult species to cultivate successfully, while *C. vexillarium* \times , and *C. Arthurianum* \times , of which it is the pollen-parent, are among the easiest.

Cypripediums seem to be in the ascendent just now. The remarkable hybrids raised by Dominy & Seden have attracted others into the same field, and as *Cypripedium* is the genus which, of all others, is most easily managed, and as the seedlings reach the flowering-stage in a comparatively short period, it is not difficult to see why it should have been thus taken in hand. "So generally is muling among Cypripedes practiced," remark Messrs. Veitch in their recently-issued Manual, "not only in Great Britain, but also on the Continent of Europe and in the United States of America, that there is scarcely an Orchid collection of note in which a batch of seedlings may not be found." A considerable increase of novelties may therefore shortly be expected.

Already they are more numerous than the species, and a very various lot they are. Some of them are among the showiest grown, while others are of rather a weedy character, and suggest an early application of the principle of the "survival of the fittest." In some cases the characters of the parents seem to neutralize each other, with the result that the hybrid offspring is inferior to either parent, though more often, perhaps, the reverse is the case. The well-known *C. Sedeni* \times was a pleasing surprise, for so good a thing was not expected from a combination between such species as *C. longifolium* and *C. Schlimii*. The variety *C. candidulum* is still better, and the number of allied forms which have since appeared show what

a decided hit Mr. Seden made. Probably the ultimate fate of these hybrid *Cypripediums* is to become florists' flowers, for any amount of improvement in them seems possible.

London.

Calypto.

Cypripedium Rothschildianum.—It is now nearly two years since this handsome Lady's Slipper was first introduced to cultivation by Messrs. F. Sander & Co., and it is certainly one of the most interesting and remarkable novelties among Orchids

the months of February and March last several plants were in flower here, and remained in good condition over six weeks. Now here are several more blooming, and, if anything, an improvement on those produced earlier in the year. *C. Rothschildianum* has sub-erect, leathery leaves, of a uniform deep green color, and are from nine to eighteen inches or more long and two to three inches broad, with a sharp prominent keel on the under surface. The strong scape, which is over a foot long, is of a dull purple, covered with a downy pubescence,

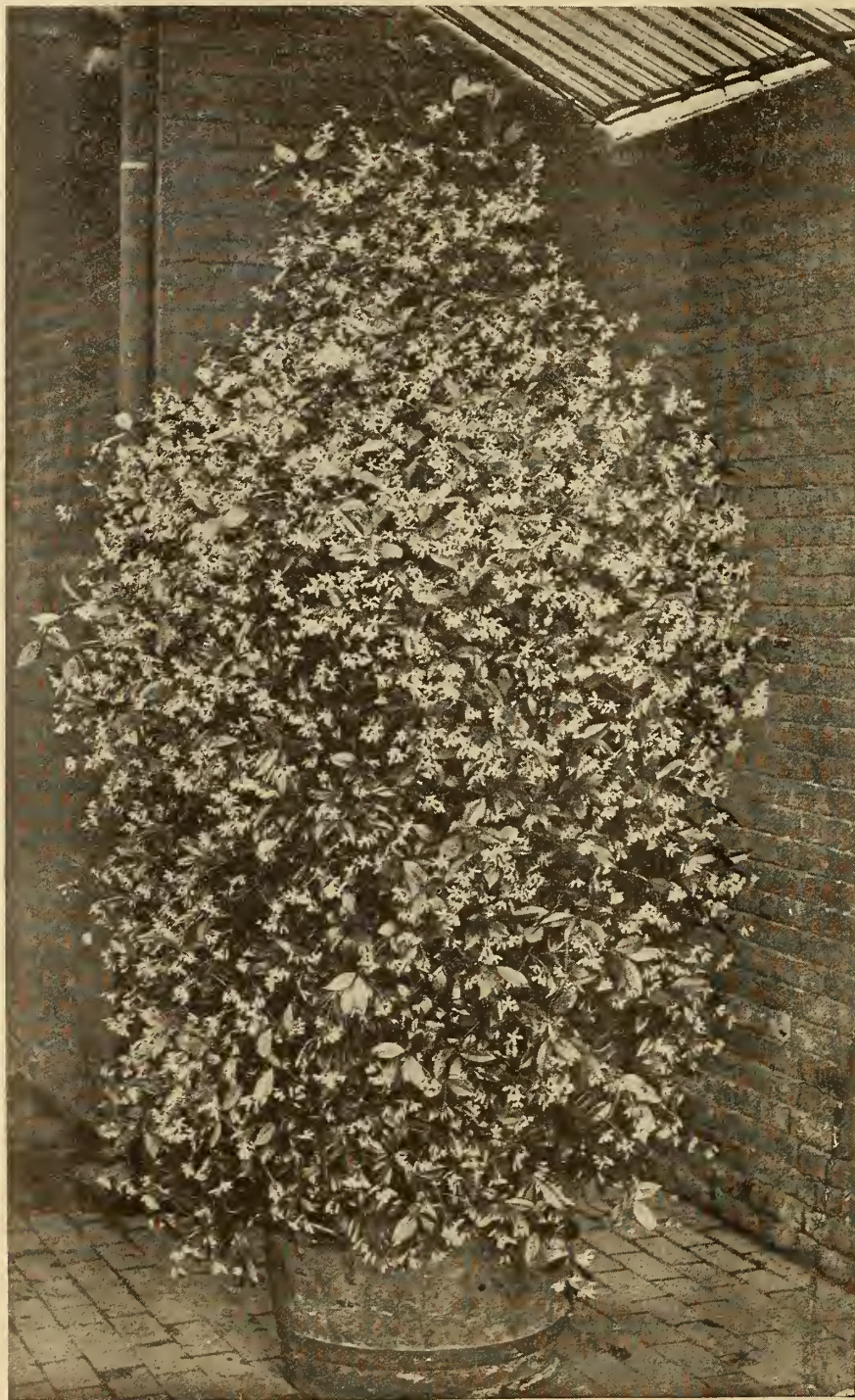


Fig. 120.—A Specimen plant of *Trachelospermum Thunbergii*.—See page 369.

which has been seen of late years. Although this species has been imported in large quantities from various places in the eastern Archipelago, it has not been long enough in cultivation yet for many to know it; but there can be no doubt that, in the course of a few years, a specimen of it will be found in every collection worthy of the name, for it is a species which not only produces remarkably large and handsome flowers, but possesses the additional recommendation of producing them very freely at two or three different times of the year. During

and generally bearing two or three flowers, the pedicels of which are clasped at the base by large showy bracts of a greenish-yellow color, handsomely and regularly striped on both the inner and outer surfaces, with dark purple. The ovate, elliptic-acute upper sepal is about two and a half inches long and a little over two inches broad in the widest portion, and fringed on the margins with short purplish hairs. The ground color is more or less of an agreeable pale yellow, longitudinally marked with broad blackish-purple stripes of unequal

length, which show through on the back, where they are more or less confluent in the centre. The lower sepal is slightly smaller, but otherwise similar. The tapering petals, at first, are spread out horizontally, but, as they become older, they get more or less depressed and much longer, eventually attaining a length of as much as six or seven inches. They are wavy on the margins at the base, pale yellow, marked with longitudinal lines and blotches of dark purple, which vanish towards the dull purple hairy-tips. The large projecting lip very much resembles that of *C. Stonei* in shape; it is reddish-brown in front, washed and veined with dull purple, and usually having a pale yellow stain just under the edge of the mouth, while the under concave surface, as well as the infolded lobes at the base, are of a pure creamy-white which presents a very striking contrast to the adjoining color. The peculiar staminode is one of the chief characteristics of this species; it is swollen at the base and densely covered with purplish hairs tipped with a whitish glands; the anterior portion is bent at a sharp angle to the basal portion, is cleft slightly at the tip, and fringed only on the sides with similar glandular hairs.

Judging from the plants growing here, it is safe to say that *C. Rothschildianum* may be grown with the greatest ease, provided that it has a warm and moist atmosphere. Rough, fibrous peat, with a little sphagnum and charcoal mixed, suit them admirably; abundance of water must be given at all seasons except during the winter, and even then the plants require a moderate supply. Shading is also necessary during hot days, otherwise the leaves are apt to become spotted and burnt, thus giving the plants a very unhealthy look.

St. Albans, England.

John Weathers.

Notes on Wild Flowers.

Asclepias tuberosa (Butterfly-Weed or Pleurisy-Root), now in flower, is one of the finest of this genus. Under cultivation the plant grows about two feet high, bearing one or more good-sized umbels of showy, orange-red flowers, which remain a long time. The plant is leafy throughout, and the dark-green foliage makes a pretty contrast with the bright flowers. It is one of the easiest plants to grow, and is largely cultivated in Europe. Another pretty plant of this genus is *A. quadrifolia* (Four-leaved Milkweed). This species grows about eighteen inches high, bearing an umbel of pale pink flowers which are quite pretty. This plant seems to prefer dry, half-shaded locations.

Astragalus Canadensis is a plant of the Pea family, which grows from one to four feet high, bearing its flowers in dense spikes, about two inches in length by three-fourths of an inch in diameter. There are often several stalks from one plant, and three or more of these flower-spikes on each stalk. The flowers are of a greenish-white color, slightly tinged with purple, not showy; but the plant is an interesting one, with handsome, dark-green foliage, and takes readily to cultivation.

Allium cernuum.—One of the wild Onions, now in flower, is a hardy species bearing a nodding umbel of pale pink flowers. The plant grows about a foot high from a bulbous root. It seems to thrive in almost any ordinary location, and may be planted at any season except in winter.

Calochortus flavus and *C. madrensis* (Butterfly Tulips), two species from Mexico, are in flower. The latter, in cultivation, grows from six to twelve inches high, bearing, in succession, several—sometimes eight—bright yellow flowers, an inch or more in diameter. Sometimes two are open at once, but often only one is in bloom, but the flower remains in good condition several days. *C. flavus* often grows fifteen inches high, bearing six to eight purple and yellow, nodding, bell-shaped flowers, three-fourths of an inch in diameter, and hairy inside. The flowers are not only very pretty, but they are durable and are produced in succession, so that the flowering season of the plant is greatly prolonged. The bulbs are easily kept in dry sawdust during the winter, and should not be planted in the open ground before the 20th of May or 1st of June. Early setting does not seem to hurry them at all. Both of these species produce their flowers on long stems, which makes them valuable for cutting. A warm, dry, gravelly loam seems to suit them best.

Another new and interesting plant just in flower is *Nemotylis Pringlei*, first found in northern Mexico by Mr. C. G. Pringle. The stems come from a small bulb, grow about eight inches high, bearing a light, bluish-purple flower, which this season is fully two inches wide. The leaves are long and narrow, and the plant is quite inconspicuous except when in flower. The flowers are as short-lived as those of the *Tigridias*, lasting only a few hours.

Oxalis decaphylla, also from Mexico, is a very interesting

little plant under cultivation. The leaves are divided into six or eight long, narrow sections, often two inches in length, deeply notched at the ends. The flowers are borne in umbels, on separate stems from the root, six to eight inches high. The numerous flowers are three-fourths of an inch in diameter, of a delicate pinkish-purple, with a green centre. They open in the early part of sunny days, closing in the afternoon, and last several days. The plant seems to have several periods of flowering during each season.

Charlotte, Vt., July 22d.

F. H. Horsford.

Plant Notes.

Trachelospermum Thunbergii.

THIS plant, known generally in gardens, where it has long been a favorite, under the name of *Rhyncospermum jasminoides*, is a native of southern China and of Japan. It is one of the best garden-plants of its class, and can be grown where the severity of the winter is too great for it, as our illustration upon page 368 shows, into a fine specimen pot-plant, suitable for exhibition or for the decoration of the conservatory or the veranda.

This plant is now a conspicuous feature in the gardens of some of the cities of the Southern States. It may be seen in New Orleans climbing to the third stories and completely draping some of the largest houses with its brilliant, lustrous evergreen leaves; the delicious perfume of the pure white abundant flowers pervading, during the month of April, the whole atmosphere of the neighborhood.

At the north it is not hardy, but it may be kept during the winter in a cold green-house, or much better in a cellar or pit, from which the frost can be excluded. It can then be brought into bloom any time after February in four or five weeks after the plant is removed from its winter quarters with the aid of a little artificial heat; or if it is allowed to bloom naturally—that is, without artificial heat—it will come into bloom in this climate about the 1st of June, and will remain covered with flowers during nearly a month. It thrives, as a pot-plant, in rich, rather heavy, well-drained soil, and it is found that the plants are improved and flower more freely if they are taken out of the pots and planted in the open ground as soon as they have finished flowering. They should, if treated this way, be planted in rich soil, copiously watered during periods of drought, and lifted in the early autumn and re-potted.

The plant which our illustration represents has been grown in the neighborhood of Boston, and is, probably, about twenty-five years old. It is eight feet high above the tub, and the frame over which it is trained is four feet through at the widest point.

Correspondence.

Thinning Forests.

To the Editor of GARDEN AND FOREST:

Sir.—I have read with interest the editorial on "Thinning Forests," in your issue of May 15th, and agree with you in the main proposition, namely, that it is necessary to show definitely whether the thinning of a White Pine growth for cultural purposes alone would at the present stage of our development pay in the end. I may be allowed to add, however, that the results of European experiments, as far as these furnish figures capable of mathematical handling—not simply general experiences and opinions—seem to me quite sufficient to teach us the general lesson of what results may follow certain operations.

These experiments, to be sure, have reference to species different from our own, and cannot therefore answer absolutely for our own conditions; yet if we compare results obtained with species of similar behavior, we may feel some confidence of approximating similar results. From my own observations I would claim that in the eastern United States forest-growth is more luxuriant than in Germany, for instance, and that since in general our soils are not overdrained like those of the Old World, thinning would produce even more favorable effects in quantitative production than there, and the result of European experiments in thinning would be rather under-statements of what we may expect here.

From these experiments we can show not only that "trees will grow more rapidly if they are judiciously thinned," but we can also show how much more rapidly they will grow. If our present ideas of value and quality of timber prevail, upon which you have made your calculations, we must admit that with White Pine or any other coniferous wood, rapidity of development—which is the object of thinning—does not go

hand-in-hand with appreciation of value and quality, as it would with broad-leaved trees. But our methods of utilizing wood material seem destined to undergo a rapid change by the introduction of processes which allow the utilization of inferior products (paper-pulp, indurated fibre, etc.) and the use of substitutes for the better qualities of timber (iron, stone, etc.). Thus, it may become a question whether it is not more profitable to produce the greatest possible quantity of wood per acre in the shortest time than with slower development to secure better quality. Let us now suppose that we are working our Pine growth simply for box-boards, where quantity and not quality, within reasonable limits, is to be sought for, and what may be the financial result of this thinning?

I have cited in the Report of the Forestry Division for 1887 a number of experiments on thinning, with their results, which will show the quantitative appreciation of the thinned growth. In making inferences from these results upon possible results with the White Pine, it may be expected with confidence that in regard to the effects of thinning, the White Pine compares more nearly with the Norway Spruce than with the Scotch Pine, that is to say, the effect of thinning would be at a greater ratio on the White Pine than on the Scotch. To these notes, from which it will appear that the rate of accretion can be accelerated by thinning three to four times, allow me to add the following as bearing upon the question:

Since thinning means reduction of the number of plants per acre, those experiments are here applicable which show us the result which a difference in the number of original plants per acre makes in amount of wood production. In 1862 there were eight fields sown and planted with Scotch Pine for experimental purposes in Saxony. The planting was done in the fall, the sowing in the spring; the field planted in squares at 4.7 feet distance showed the maximum production. In 1886, after twenty-five years, the results obtained from the field which was planted at three and a half feet distance each way compared with those obtained from a sowing in drills three and a half feet apart, after both had been moderately thinned of inferior material, showed the following:

	No. of trees per acre.	Aggregate cross-sections of stems, sq. ft.	Average Height, feet.	Amount of wood, cu. ft.
Planting.....	1,447	137.0	36.3	3,117
Sowing.....	1,464	102.6	31.0	2,073

The planting, or less crowded position, then had produced $3\frac{1}{2} \times 129.8$ cubic feet yearly average; the sowing, or dense position, only $2\frac{1}{2} \times 82.9$ cubic feet. There were 1,044 cubic feet difference in favor of the former, or an advantage of over 32 per cent. in material, and besides, with almost the same number of plants, better proportions.

Allow—for the sake of a comparison, which is not unfair—these conditions to hold to a New England White Pine-forest, and let us assume this growth to be cut for box-boards. The Scotch Pine, to be sure, would not yet have reached suitable dimensions, but I believe the White Pine does reach workable dimensions for box-boards at the age of twenty-five years; otherwise it would be reasonable to assume that the differential advantage between the two growths gained at this age would be at least maintained for the next five or ten years, where the trees may have attained such dimensions. We may allow sixty per cent. of the material useful for the purpose of box-boards in both cases, although, in fact, the planted growths would show less waste.

The more openly-grown part would have produced, if box-boards bring the present price of \$12.00 per 1,000 feet B. M., \$90.19 more than the denser growth. If, then, it should have cost \$5.00 to thin out the natural growth when six years old, and another \$10.00 when fifteen years old, this expenditure, with four per cent. interest at the age of twenty-five years, would have been equal to about \$25.00, and the balance in favor, \$67.19 per acre. And even if we had to wait ten years longer before utilizing the crop and paying interest on the expenditure for thinning, the balance in favor of thinning would be \$52.00. In this case the sowed part started under more favorable conditions than most of our natural growths, in which the dense position increases the struggle for existence unduly.

When we admit that the "finest Pines grew without any assistance from man," we must also admit that time was no object to Nature, and that if we apply strict financial calculation—figuring interest on the value of land—these giants of Nature's forest would be immensely dearer than the price we now pay for the lumber furnished by them.

I do not mean by this to underestimate the value of forestry

experiments to be undertaken in this country—which I have strongly urged in my report—but I do believe that the knowledge of such experiences as those cited above can only encourage and induce an early beginning of similar experiments here, and that nothing is gained by disregarding and discrediting, in a general way, the experiences of Europeans in the art of forestry.

Washington, D. C.

B. E. Fernow.

Rosa humilis, Marsh., var. plena.

To the Editor of GARDEN AND FOREST:

Sir.—Humphrey Marshall, in the "Arbustum Americanum," 1785, enumerates and, in part, describes four species of Roses as being indigenous to Pennsylvania, among which is *Rosa Pennsylvanica plena*, differing from his *Rosa humilis* in no important respects save in its having double flowers. Ehrhart, in *Beitrag zur Naturkunde*, 1789, describes, from bushes taken from this country and cultivated in the gardens at Hanover, *Rosa parviflora*. This Rose, likewise, had double flowers, which, however, were attributed to the stimulus of cultivation. Marshall's Rose could not be thus accounted for.

These three Roses are regarded by botanists as being one and the same, in name, *Rosa humilis* having priority. It would seem strange that a flower so markedly disposed to become doubled under cultivation should not now and then exhibit the same tendency in its wild state, yet, so far as I know, there is no recorded instance of the kind from Marshall's time to the present. *Rosa Pennsylvanica plena* has been a standing puzzle among rhodologists. Dr. Watson, in speaking of *Rosa humilis* says: "It is not easy to account for the double-flowered form of this," and Dr. Porter, who has collected extensively in almost every part of Pennsylvania, says he never saw it. It is, therefore, evident that the Rose in question is rare, or rarely observed—perhaps the latter.

On the 12th of June, about three miles from Rosemont, New Jersey, growing by the road-side, I found a large patch, fifty bushes or more, of the double-flowered form of *Rosa humilis*. On either side, the ordinary single-flowered form grew in profusion, but not a bush of that kind among these; all were doubled, having from fifteen to thirty petals, much smaller, however, than usual. This, in all probability, accounts for Ehrhart's name, *Rosa parviflora*, small-flowered Rose, a name very inappropriate when it is remembered that this Rose is two or three inches in diameter in full bloom.

The historical associations make this a very interesting find. The influences of cultivation, I think, can be eliminated without a doubt; I never saw it cultivated. While I do not think it possesses characters sufficiently distinct to separate it from *Rosa humilis*, yet it has a *cachet* that marks it as different from the ordinary forms of this variable species. I suggest that it be known as *Rosa humilis*, Marshall, var. *plena*, n. v.

Rosemont, N. J.

G. N. Best.

Flower-beds in Chicago Parks.

To the Editor of GARDEN AND FOREST:

Sir.—Allow me to express my satisfaction at Herr Jaeger's denouncement of the "lunacy" of the flower-bed decorations of the South Park of Chicago.

I speak feelingly on the subject, not only because I have been held responsible for them, but what is still more aggravating, because I have been complimented upon them—and that by educated people—oftener than for any portion of what really constituted my design for the park. Only last summer a gentleman from New England, and a graduate of Harvard, to whom I chanced to be introduced, asked if the South Park was not my work, and immediately launched into an enthusiastic description of a life-size floral representation of three men rowing a boat!

My hope has been that men of sufficiently cultivated taste to appreciate justly the floral eccentricities that have distinguished that city for years (camels, elephants, baseball players, etc.), would equally appreciate the anomalous position of a landscape-gardener in the mind of the average Park Commissioner, and not hold him responsible for outrages he is powerless to prevent. But the number who have spoken to me of this form of monstrosity in terms of admiration is so large in comparison with those who have treated it as it deserves, that at times I have felt disheartened and ready to despair of ever finding a more elevated standard of public taste.

Minneapolis.

H. W. S. Cleveland.

The Bermuda Lily.

To the Editor of GARDEN AND FOREST:

Sir.—A note in GARDEN AND FOREST recently spoke of imported flowers of this Lily as inferior to home-grown flowers

of the same kind. There may be a difference in the quality of the Lily-flowers grown at Bermuda, but it would be impossible to find anything more lovely than some groups of this Lily now in flower at Kew. These are all from bulbs imported from Bermuda last year. They are from five feet to six feet high, well-leaved down to the base, and each stem bears from five to eight large flowers of the purest white. Nothing to equal them has been seen in England (so it is said). Certainly I never before saw this Lily so strikingly beautiful as it now is here. The bulbs are cheap enough, and they are as easily managed as Hyacinths. Unfortunately this extraordinary vigor and floriferousness is not permanent in the Bermuda Lily, as when grown a second year in England the plants are simply *L. longiflorum*. But the Bermuda Lilies the first year after importing are grand beyond all question.

Kew.

W. Watson.

The Albemarle Pippin.

To the Editor of GARDEN AND FOREST:

Sir.—Allow me to inform Mr. E. J. Wickson, in reference to his note on page 346 of the GARDEN AND FOREST, that in the later editions of the "American Fruit Culturist" (see page 530) I gave Albemarle Pippin as a synonym of the Yellow Newtown Pippin, although in my statement to which he refers (in a private letter not intended for publication, as stated by the editor) I did not go into any distinction between the two sub-varieties of this Apple, which I did fully on page 250 of that work.

Union Springs, N. Y.

J. J. Thomas.

Recent Publications.

All About Pasadena and its Vicinity, by C. F. Holder. Boston: Lee & Shepard, 1889.

This unpretentious little handbook to one of the tourist-haunted districts of California gives some interesting facts with regard to local fruits and flowers, wild and cultivated. To show the perennial richness of the climate of Pasadena in edible fruits, the following catalogue is given: "Oranges, lemons and limes are found in the market every month in the year, and may be kept a year or more on the tree. These fruits naturally ripen in February, March or April; cherries from June to August; blackberries and apricots from June to September. From June to January you have raspberries and peaches; from June to November plums and prunes; nectarines, July to September; grapes from July to January; pomegranates and quinces, August and December; Japanese persimmons, November and December; loquats, April to July; guavas, all the year; currants, May to July; apples, May to February; alfalfa, five to seven crops a year; potatoes, two crops a year, and on good land two crops of grain have been taken. By the use of a system of cold storage now introduced here, nearly all fruits can be had at any time during the year. Vegetables are raised all the year round. The Orange groves, taken in masses, constitute the chief beauty of the country. . . The Orange was probably introduced into this country from Spain, and the oldest trees, of seventy years or more, are to be found down at San Gabriel. Hardly a portion of Pasadena but boasts a grove; in fact, the city is laid out as a vast Orange-grove. Orange Grove Avenue, the finest resident street, is cut through one. . . Trees will bear when three or four years old, and begin to pay when five or six. The third year one may count on a few Oranges for home consumption; the fourth year upon fifty oranges to a tree and the fifth year upon 200. The trees attain their full development at fifteen years, and may then be twenty-three or twenty-four feet high, with a trunk three feet in circumference. Such a tree may bear 4,000 Oranges a season, the retail value of which at the East would be \$200. The Orange, Lemon and Lime-trees are the ones which need irrigation, being watered well three or four times during the season. This is done by scooping up basins about the trees and connecting them by canals, so that the basins are all filled." The fruit is gathered by Indian, Mexican and American gangs of peripatetic pickers, then washed, wiped and sorted, according to size and color, and shipped to the East. "On many ranches . . . are fine groves of the English Walnut. The trees are extremely beautiful, and those of some orchards realize \$200 per acre in a season. The tree comes into bearing when about ten years old. . . The vast vineyards that cover miles of country here attract attention in winter by their grotesque appearance, resembling roots set on end with some regularity. This is due to the fact that every fall the vines are cut back." In 1885 southern California sent out over half a million boxes of raisins. "At Linda Vista the visitor will find an experimental station where forest trees are

to be planted. . . In almost every place in the city are found Fig-trees bearing a large crop. . . There are up to date about a thousand acres in California planted with Olives. The tourist will notice in the Pasadena landscape square blocks of forest trees rising plume-like to a height of from 60 to 100 feet. These are the Eucalyptus forests, or groves, planted for fire-wood by ranchers who have land to spare. Taking an actual case, a rancher planted sixty acres with 26,000 Eucalyptus plants which cost \$10 a thousand. Planting, mowing and cultivating cost, including the trees, nearly \$1,000, which was the expense for the first year. The second year it cost \$480, after which there was no expense. The trees grow rapidly, and at five years are large enough to cut."

Mr. Holder speaks appreciatively of the wealth of herbaceous plants, Ferns and shrubs which clothes the plain and the mountains during the various seasons of the year; and the frontispiece to his little volume gives an instance of luxuriant development that it would be hard to overmatch. It shows the gable end of a house which cannot have been standing many years. It is apparently about twenty-five feet wide and thirty feet to the top of the gable; yet it is entirely covered, so that small trace of the windows appears, with the prolifically flowering branches of a single climbing Rose.

North American Birds, by H. Nehrling; with colored plates after water-color paintings by Ridgway, Goering and Muetzel, Milwaukee. Published by George Brumder, Part I, 1889. This is the beginning of a new popular history of North American Birds, upon which the author has spared neither labor nor expense. The text is not burdened with dry scientific details, but is filled with pleasant reading about the habits of the different species considered; with much information upon the forests and fields which they frequent at the different seasons of the year, and many pleasant allusions to trees and herbs. These extracts, taken at random, will give an idea of the writer's style and of the sort of information which may be gathered from his thoroughly interesting and always readable pages.

"Among wild fruits the Robin is particularly fond of Elder and Poke-berries. In winter these birds are unusually common in the beautiful Hammock-woods of Florida, where the mealy Sparkle-berry and the Holly with its shining vermilion berries grow in abundance. The plumage of the bird's breast is often stained with the violet juice of the Poke-berry.

"From early in the morning to late in the afternoon these birds are busy almost without interruption. It is only during the hot part of the day that they are somewhat less active. Their flight is smooth, rapid and skillful, and does not lack grace and beauty. To one who has seen, during migration, flocks of several hundred individuals rapidly flying high over the forest trees it seems easy to understand how they can traverse such an immense expanse of country in so short a time. They move about nimbly among the boughs and are perfectly at home on the ground." And of the Mocking Bird—the finest songster of them all—we read: "Most of the males commence singing between three and four o'clock in the morning. First a single individual begins its lay from a Magnolia draped with gray Spanish Moss, or from its hiding place in a Banksian Rose, or even from the top of a chimney. Another male sleeping in the neighborhood, probably in a tree overgrown with a large Wistaria, or Trumpet-Creeper, excited to rivalry, also begins to sing. The song, first softly uttered, gradually grows louder, intenser, more inspired and modulated. More singers join in the chorus, till one can often hear five or six different voices at the same time. Thus they excite one another to greater efforts. These are incomparable bird concerts, which produce a deep and lasting impression on the listener in the quiet nights when all nature lies in deep slumber. When the gray dawn appears in the far east, and soon afterwards the sky reddens, all the Mocking Birds sing diligently, and the Cardinal Red-birds, the Nonpareils and others join in the chorus of jubilation to greet the day-star as he rises above the horizon. Very rarely a Mocking Bird is heard during the hot hours of the day; the greatest number are silent, and only towards the late afternoon does the chorus commence again."

But it is not necessary to continue these extracts in order to show that their author is a keen lover of nature; and that much information can be gathered from his pages.

The illustrations are carefully and accurately drawn by accomplished naturalists, but the coloring of the chromo-lithographic reproduction is not very successful; and the grouping of the individual birds is not always fortunate. The thin red margin-line which surrounds the pages of text detracts from their otherwise good typographical appearance.

Notes.

The *Horticultural Times* notes with approval an increasing use of Ivy-leaved Geraniums in window-gardens.

In the latter half of August a Botanical Congress will be held in Paris, when an exhibition of maps, photographs, books and other articles relating to botanical geography will be opened.

Our readers will be glad to hear that Belmont, near Boston, the old estate described in GARDEN AND FOREST, for July 10, has been purchased for the use of a new boys' school, to be called Belmont School. A finer setting for such an institution can hardly be imagined.

The Kansas Board of Agriculture reports that chinch-bugs are dying by the million of some contagious disease. Experiments are now in progress to ascertain whether the disease can be introduced artificially among healthy bugs, so that the ravages of this most dreaded enemy of the western farmer can be held in check.

Major O. P. Rooks, in a recent address at Fruitland, Florida, spoke of some admirable seedlings from both the Peen-to and Honey Peaches. The fruit of the Peen-to seedlings was so large that a peach would rest on the top rim of an ordinary tea-cup, and peaches borne by the Honey hybrids were eight inches in circumference. The fruit was also of excellent quality and beautiful color.

Colonel J. A. Price argues strenuously for the selection of Indian Corn as the national flower on account of its essential beauty and the adaptability of all its parts—stalk, leaf, plume, silk, husk, ear—to purposes of art and architecture. Its cheerful colors, too—the green of summer, the gold of autumn and the tinted red and yellow of the ears—all contribute to the infinite variety in which it can be used for ornament. In the *Decorator and Furnisher* for the current month Colonel Price offers a prize of \$100 for the best adaptation of Maize to the industrial and architectural arts.

In a careful review of the spring plant trade *The American Florist* observes that there has been a decrease in the total sales from those of last season. Among causes assigned for this are: (1) The mild winter, which permitted many plants to be carried over; (2) the general curtailment of trade among the people who are the largest buyers of ornamental plants; (3) the unfavorable weather, which discouraged planters during the selling season. A smaller demand for Coleus and similar plants was generally reported, and for this a partial explanation is found in the prevailing cold weather, which would naturally check the sale of such tender plants. It is probable, however, that the popularity of this class of plants is beginning to wane.

Professor Forbes gives an account in *Insect Life* of some experiments with the Plum curculio, from which it was learned that they would eat the petals of Roses and the blossoms of bush Honeysuckles and Snowballs, so that it seems not improbable that the beetle gets only a small part of its subsistence from fruit-trees. It is therefore worth while to make the attempt to attract the adult insect to other plants than the Peach or Plum for the purpose of poisoning it there. This is especially worth trying late in the season, when the use of arsenites upon fruit might be dangerous. There is no longer any doubt that very weak solutions of London purple or Paris green will be fatal to the beetle. It is true also that the leaves of the Peach are liable to be scorched by a mixture of London Purple, even when applied at a rate of one pound to 200 gallons of water.

Mr. W. T. Thiselton Dyer, in writing of the principles of Orchid nomenclature, argues that all the botanist can do is to refer any Orchid submitted to him to some well-defined species which has already been described in intelligible terms, or to describe it as new if this has not already been done. For horticultural purposes it is evident, however, that something more than this is wanted. Within the limits of a species it is known to every one that there are variations of size, color and texture which practically elude botanical terminology, and yet are of paramount interest and value to the cultivator. The difference between a fine form and a poor one of the same species can often with difficulty be seized, even in ordinary language, and yet it is recognizable at a glance by every experienced Orchid-grower. It is a great mistake to suppose that a botanist can deal with such forms in any useful way. Their distinctness and merit is a matter for the judgment of experts, just as in the case of any other cultivated plant. Nothing, then, is gained by giving such forms Latin names, which imply that they are well-marked varieties. The proper course is to

give them arbitrary names in English or some other language, and these should not be accepted as authoritative till they have received the approval of the Floral Committee of the Royal Horticultural Society.

An investigation at the Delaware Experiment Station shows that the farm and garden seed found in the markets of that state has a germinating power up to the average standard. The purity of the seed, too, was found to be above the average, and yet the report makes it very plain where most of the farmer's weeds come from. He sows their seeds, and he sows them on well-prepared land, where they are sure to thrive. For example, a moderately pure Clover seed, with but a trifle more than one per cent. of impurity by weight, was found to contain the seeds of Plantain, Rag-weed, Smart-weed and Foxtail Grass in sufficient numbers to put one seed every foot in drills fifteen inches apart if the Clover seed were sown eight pounds to the acre. In another instance, a very clean sample of Alfalfa seed, with less than one-half of one per cent. of impurity, and that mainly dirt, showed the presence of the minute seed of the Clover Dodder (*Cuscuta Trifolii*) at the rate of 720 to the pound. If the Alfalfa were sown at the rate of fifteen pounds to the acre, this would place one seed of Cuscuta every two feet in drills two feet apart. The sowing of so much of this seed would be a dangerous proceeding, for when this Dodder once winds its wiry stem about a Clover plant and begins to suck its juices, the doom of that plant is sealed, and the Dodder is soon reaching out its arms for a new victim. These seed-tests were made by Professor F. D. Chester, and the bulletin containing his report furnishes some instructive reading for the farmers and gardeners of Delaware.

A writer in the *Gardeners' Chronicle* speaks with enthusiasm of the natural beauty in the extensive gardens and pleasure-grounds of Baron Ferdinand de Rothschild's noble estate, Waddesdon Manor, a beauty which has been developed to the very highest by the arts of the landscape-gardener at every point. From the elevated plateau on which the mansion stands some of the most beautiful views in the country are commanded, and the devious and carefully-arranged walks in the grounds reveal different gardens, each distinct, but all in harmony, a result which the clever planting of the whole of the grounds in clumps and groups of the same kind does much to secure. By planting in this manner, each thing, whether flowering Weigelas, Rhododendrons, Escallonias, Philadelphus, double and scarlet Thorns, or whatever it may be, appears to make its individuality distinct, which is not the case where single plants, instead of groups of each kind, are used. The effect of planting in groups brings out some fine effects in the Waddesdon gardens—notably in the case of the silvery-leaved Sea Buckthorn, the mingled white variegated Maples and Copper Beech, and the noble clumps of Pampas-grass. There is plenty of bloom in every part of the gardens. The view from the terrace over the main flower-garden being especially brilliant with the rich scarlet of Pelargonium, Henry Jacoby, the pink of Pelargonium, Mrs. Lever, and other effective flowers worked in with variegated foliage, among which the Pelargonium, Flower of Spring, employed amounts to over 8,000 plants.

The edible Banana, it is said, is known to seed only in one small spot on earth, the Andaman Islands. However this may be, it is universally grown from suckers. Its cultivation in the West Indies has vastly increased during the past fifteen years, owing to the demands of the United States for its cheap, wholesome and luscious fruit. About 400 or 500 trees are planted to the acre, and the plantations are called "Banana-walks." In former days any available spot was chosen, usually an abandoned cane-field, where the ground was most easily prepared for the new crop. But experience and competition have brought about more careful methods of planting, and the best place for a Banana-walk is now considered a valley or hill-side with a western prospect. The tree fruits the first year, and the expense of cultivation is so small that a bunch of Bananas, delivered at the sea-coast, need have cost its owner no more than four or five cents, while it may be sold in the winter months for from twelve to eighteen cents, and in the spring months for four times as much. There are risks attending Banana cultivation, however, for the thievish negroes often seriously decrease the value of a crop, and it may be entirely swept away in a single hour by a hurricane. As soon as the Bananas begin to cast a shade, young Cocoa plants are set out between them, as this tree needs protection from the sun in its youth; and when the Bananas cease to be profitable—which is at the end of three or four years—Almond-trees or other fruit-trees are often set in their places while a new "walk" is laid out elsewhere.

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A Worthy Example.

A CORRESPONDENT describes in another column the means adopted by a few public-spirited people living in a rural neighborhood for preserving a piece of natural scenery, which, without such intervention on their part, was doomed to speedy destruction. In many other places objects of great natural beauty have been sacrificed because no organized effort has been put forth to save them, and this little body of men and women—neighbors and friends—deserve the thanks of all intelligent and patriotic people, because they have acted on the principle that the destruction of an attractive bit of scenery, like the fringe of forest on a lake border, or a glen through which a mountain stream foams and tumbles, is a public loss. They believed that natural beauty is something to be cherished because it has a genuine value, and that we have no more right to waste it than we have to squander any other inheritance. The community for whom the scenery of the Chittenango has been preserved will be richer for all time because this possession has been secured to them and to their children, and many another community would have reason to rejoice if this example of establishing a trusteeship to hold against invasion and defacement some characteristic piece of wild nature were often imitated. The illustration of a portion of this amphitheatre, on page 379, from a photograph kindly furnished by Mr. L. W. Ledyard, will give some suggestion of the beauty which was threatened and rescued.

A special act of the Legislature was needed before a body corporate, with the power of succession, could be formed to hold and guard these falls and their surroundings, and keep them free forever for public use. But a general act for the incorporation of societies for providing parks and children's play-grounds was passed by the Legislature of this state, and approved by the Governor on May 15th, 1888. This act not only authorizes the acquirement of land by an association of citizens for use as public pleasure-grounds and play-grounds, but it gives them the right of employing officers, who shall, for the purpose of enforcing order and compliance with their rules, have all the powers and authority of public officers or patrolmen

in the city, town or village where these parks or play-grounds may be situated. It enables any fifteen or more citizens to do, under certain restrictions, what the public-spirited people of Cazenovia have done. It permits them to secure lands for park purposes and for play-grounds when the municipal authorities of such communities are not inclined to do this as representatives of the people. Corporators, under this act, can acquire property by gift, purchase or bequest to the amount of half a million dollars, "and such additional amount as may be authorized by the Mayor and Common Council of any city, or supervisor of any town, or trustees of any village in which it is proposed to establish such parks."

It seems probable that, in many towns, parks and reservations can be established under this act, when it would be impossible to acquire them in the ordinary way. Distrust of the local government often restrains the generosity of those who would otherwise be inclined to give or bequeath land or money for such purpose. If the donor could name the men whom he desires to administer the trust, instead of turning over the property to officials subject to the mutations of politics, and to the influences that control professional politicians, donations of this sort would be more common. At all events, associations of citizens have now another way of securing reservations for parks and play-grounds besides the tedious and uncertain one of laboring for them through the municipal authorities, and any community which is willing to pay for a reservation can command the assistance of the local government to enforce their regulations for its control.

We observe that an association, under this act, has been formed in the city of Brooklyn for the purpose of establishing small parks and play-grounds about the city. It is to be hoped that other cities and towns will follow this lead, and that the act, which seems to us a wise one, will be fruitful of good results throughout the state.

The series of letters by Mr. J. B. Harrison, Corresponding Secretary of the American Forestry Congress, now in course of publication in GARDEN AND FOREST, deserves the attention of all who are interested in forestry in this country. Few American writers have studied the subject so long or so thoroughly, or have seen so much of the treatment of forests and woodlands throughout our country. His clear perception of the value and functions of forests, and his thorough comprehension of their importance to the national welfare, give to his discussions, in an unusual degree, the quality of directness and reality. We owe to him a vital development of the idea of the relation of forests to civilization, and his treatment of this subject is remarkably practical as well as philosophical.

After many years of familiarity with the Adirondack forest-region Mr. Harrison has recently engaged in a new examination of it, and our readers will find in this series of letters more complete information regarding actual conditions and tendencies there than they can obtain in any other way.

A joint resolution for the appointment of a Commission to ascertain the feasibility of purchasing and preserving the forests of New Hampshire has been introduced in the Legislature of that state, and referred to the Judiciary Committee. It is a model of clearness and brevity.

Whereas, The preservation of the forests of New Hampshire is essentially necessary, not only for the prosperity of our vast manufacturing interests, but also to preserve and increase that natural beauty of scenery which is so attractive to our visitors; and

Whereas, The hills and mountains in this state are being rapidly denuded of timber, and rendered unsightly by the acts of private parties owning the same; therefore

Resolved, That the Governor, with the advice of the Council, is hereby authorized and empowered to appoint a Commission, consisting of three able and discreet men, who shall examine and ascertain the feasibility of the purchase by the state of the whole or any portion of the timber-lands upon the hills

and mountains in the state, near summer resorts, or bordering upon the principal sources of the water-supplies needed for manufacturing purposes, with the view of preserving the same as public lands and parks, and report their finding to the next session of the Legislature.

Another joint resolution provides for the appointment of a Commission to inquire into the subject of preserving a portion of the unoccupied or other lands within the state as a public state park. The preservation of the mountain forests of New Hampshire is a subject of great importance to the manufactures of that state, to the owners of hotel property at the summer resorts, to land-owners, lumbermen, and, indeed, to the entire population. It is encouraging to see that the representatives of the people are disposed to action in the matter.

Some Popular English Plant Names.

IN English books, both old and new, the American reader often comes upon the names of flowers and plants, names which seem to be commonly used in England, but are not quite clear to him.

How often, for example, have we read of the Guelder Rose, naturally fancying it must be a Rose of some sort. But it is simply *Viburnum Opulus*, the familiar Snowball of our gardens. Michaelmas Daisies, again, are very well known to us, though we never use this name for them. It denotes various species and varieties of our wild Asters, which are largely cultivated in English gardens and much prized because they bloom so late in the year. For the same reason the so-called Christmas Rose is prized—another "Rose," which is not a Rose at all, although the Germans likewise call it the *Christ-rose*. It is the Black Hellebore (*Helleborus niger*), a perennial herb of the Ranunculus family, which has large palmate leaves, and on leafless scapes bears from one to four flowers, some three inches in diameter, white, five-petaled, with a tuft of yellow stamens, and, altogether, not unlike single Roses in appearance. In the warmer parts of England the Black Hellebore blooms as late as December; in the few American gardens where it is cultivated its flowers appear in winter or in earliest spring.

The Rowan-tree of Scotch literature is the Mountain Ash. The tree commonly called the Scotch Fir is not a Fir, but *Pinus sylvestris*, properly the Scotch Pine. The Weymouth Pine, of English books and nursery catalogues, is simply our common White Pine (*Pinus Strobus*), which was introduced into England by Lord Weymouth in the last century, and is now very largely grown there. The Sycamore of English writers is always the Sycamore Maple (*Acer Pseudo-platanus*), never the Buttonwood (*Platanus occidentalis*), as with us. Sallow is a common name in England for several species of Willow, but especially for *Salix Caprea*. The Wayfaring tree is *Viburnum lantana*, which we often grow as a garden shrub. A Lime-tree means a Linden, as every reader probably knows, although the name is rarely, if ever, used in this country. The true Lime is, of course, a relative of the Orange and the Lemon—*Citrus Limetta*. The Service tree is *Pyrus domestica*, but the name is also often given in England to some other species of *Pyrus*, as to *P. terminalis*, which is properly the wild Service tree.

Every one says "as black as a sloe," but many Americans would be puzzled to identify this fruit. It is the fruit of the so-called Black-thorn, which is not a Thorn, but a species of Plum (*Prunus spinosa*) that is a native of Europe, and possibly the remote ancestor of the cultivated varieties of to-day. It may be found in many old-fashioned New England gardens, and seems to have naturalized itself to some degree in their neighborhood. Witch Hazel is the name we give to *Hamelis virginica*, and this signification is accepted even in English horticultural dictionaries; but when we meet with the term in transatlantic literature it denotes the true Hazel, for the *Hamelis* does not grow spontaneously in Europe. The two plants belong to quite different orders, but the shape of their leaves is similar. The American tree, doubtless, got its name from this resemblance, while the Hazel had been often called Witch Hazel in England because of the use of its twigs for divining-rods.

The Laurel of Europe is, of course, not our Mountain Laurel (*Kalmia latifolia*). The true Laurel (*Laurus*) is a genus of two species of evergreen shrubs, one of them a native of the Mediterranean regions and the other of the Canary Islands. The Daphne, of the Greeks, is another name for the Laurel; and so is the Bay. Again, the Hemlock of the Greeks and of

modern Europe is not our familiar forest-tree, which is properly the Hemlock-spruce, but a genus of biennial poisonous herbs, belonging to the *Umbelliferae*. The generic name is *Conium*, and the common Hemlock is *C. maculatum*. And Myrtle is another name that we misuse, often applying it to *Vinca minor*, which is properly the Periwinkle, and is always so called in England. The true Myrtle is *Myrtus communis*, a sweet-scented shrub with white blossoms, which is a native of southern Europe and hardy in the warmer parts of England. It was dedicated to Venus in classic times, and is still the accepted flower for bridal wreaths in many parts of Europe.

Traveler's Joy is *Clematis Vitalba*, and all native species of *Clematis* are called in England Virgin's Bower. The Woodbine is a species of Honeysuckle (*Lonicera Periclymenum*). In this country the name is often applied to the Virginia Creeper, but the practice should be avoided, in spite of the fact that it is recognized in certain English horticultural dictionaries. When a plant has so pretty a popular name of its own as the Virginia Creeper, it is foolish to forget it and increase the confusion which, do what we will, can never be wholly obliterated from vernacular terminology.

"Trailing Arbutus" is plainly a misnomer for our May-flower (*Epigaea repens*); but the genus properly called *Arbutus* belongs to the same great Heath family. It includes trees and shrubs with evergreen, laurel-like leaves. The Strawberry-tree is *Arbutus Unedo*, and Pliny is said to have given it the name *Unedo* because the fruit was so bitter that no one would eat it twice. Yet, Ovid writes of "The *Arbutus* heavy with its warm, ruby fruit," and says that in the Golden Age it afforded acceptable food. Perhaps no fruit was bitter in the Golden Age!

Whin, Furze and Gorse are all the same thing—*Ulex Europæus*, a plant of the Pea family, with small yellow flowers. Broom (*Cytisus scoparius*) belongs to the same family, and has likewise yellow flowers. Another allied genus is *Genista*, which includes the Woad-waxen that has naturalized itself in certain districts near Boston. A popular name for the Broom was once *Planta genista*, as all readers of English history know.

There has been much uncertainty even in England in the use of the pretty word Eglantine. Many old writers undoubtedly intend by it the common English Sweet-Brier (*Rosa rubiginosa*), as Shakespeare, when he writes:

"Quite over-canopied with luscious woodbine,
With sweet moss-roses and eglantine."

But the Woodbine (which has already been identified as *Lonicera Periclymenum*) now goes by the name of Eglantine in certain parts of England, and this is probably what Milton means when he speaks of the "twisted Eglantine." Gilliflower, or Gillyflower, is another name which has borne various significations. It was borrowed of the French *Giroflée*, which signified some species of Pink, usually a Carnation. With the older English writers—Chaucer, Spenser and Shakespeare—it likewise meant the Carnation (*Dianthus Caryophyllus*). Now, however, it is commonly given in England to one species or another of the *Cruciferae*, as to the Wall-flower or the Stock; and if used in this country it is apt to denote the Stock. Stockgillies is a name not infrequently heard.

With the Shamrock we have a third case of confusion. In Ireland to-day a Shamrock is often a White Clover (*Trifolium repens*), but as often the Nonesuch (*Medicago lupulina*), which belongs to another genus of the same great Pulse family. In England the name is commonly given to the Wood Sorrel (*Oxalis Acetosella*), and antiquaries are puzzled to decide which plant should be deemed the original Shamrock of St. Patrick. They have even discovered that among early authors the Water-cress was called the Shamrock, and meet the objection that it has not a three-fold leaf by saying that the now accepted interpretation of the Shamrock's significance is of comparatively modern origin.

The tall Shrubby Althæa (*Hibiscus Syriacus*) is usually called the Rose of Sharon in this country, and in view of the specific botanical name of the plant that seems an appropriate term. But in England to-day the Rose of Sharon is *Hypericum calycinum*—a dwarf under-shrub, with yellow flowers, belonging to the same family as the St. John's wort.

The true Daisy—the Daisy of Chaucer, of Burns and of all English poets—is, of course, not the White Weed to which we give the name, but *Bellis perennis*, the low-growing little double flower which we know only in the garden. The White Weed is commonly called in England the Ox-eye Daisy, a term which we apply sometimes to the Cone Flower (*Rudbeckia*). But the White Weed and not the true Daisy is the *Marguerite* of the French. All these Daisies belong to the vast composite

family, but the White Weed is not closely related to Bellis, being *Leucanthemum vulgare*, or *Chrysanthemum Leucanthemum*, the genus that includes all our cultivated Chrysanthemums.

When we use Bitter Sweet we write it as two words, and apply it to *Celastrus scandens*, which we also call Wax-work. When an Englishman uses it he writes it as one word—Bittersweet—and means a species of Nightshade (*Solanum Dulcamara*). This is a trailing perennial, with small, red berries, which is not native to America, although naturalized now in some places. Another species of the same genus (*S. Sodomum*) is supposed to be the Apple of Sodom, described by Tacitus and Josephus.

London Pride is a Saxifrage (*Saxifraga umbrosa*), of southern Europe, which is very commonly cultivated in England, but rarely in this country.

The common Primrose of England is *Primula vulgaris*, and bears pale-yellow flowers. *Primula officinalis*, of a brighter yellow, is the Cowslip—a name we often give, unfortunately, to that very different plant, the Marsh Marigold. The Oxlip is still a third species, pale yellow and taller, *P. elatior*. The Pimpernel, known to all readers of Tennyson, belongs to the great Primrose family, but to another genus. It is *Anagallis arvensis*, also called Poor Man's Weather-glass—a little, low herb, with tiny white, red or blue flowers that close at the approach of rain. It is grown in gardens in this country, and in some regions has run wild in waste, sandy spots. When Longfellow wrote "Blue are her eyes as the Fairy-flax," he doubtless meant *Linum perenne*; but the name is more commonly given in England to the common Flax (*L. usitatissimum*).

Ophelia's Rue, which might be called "herb-grace o' Sundays," was, of course, not the Meadow Rue which is the only American plant we call by the name, but *Ruta graveolens*, which we sometimes see cultivated in gardens—an evergreen, somewhat shrubby plant. The Fennel which she mentions should not be conceived as the Fennel-flower, also called Love-in-a-Mist (*Nigella Damascena*), but as the herb of the vegetable garden (*Foeniculum vulgare*), which was regarded as a plant of ill-omen in former days. An old proverb says "Sowing Fennel is sowing sorrow." Rosemary we also sometimes find in our gardens—*Rosmarinus officinalis*, an evergreen shrub. The Basil of the poets is an East Indian plant, *Ocimum Basilicum*; but the wild Basil of northern countries is *Calamintha Clinopodium*, a plant of the Mint family.

Amaranth is a word often used by the poets to denote some unfading flower. One species of Amaranth is called, to-day, Love-lies-bleeding, and another Prince's Feather; but it is doubtful whether in poetical speech any particular flower has always been intended. It would be difficult to decide just what Milton had in mind when he wrote:

"Amaranth, a flower which once
In Paradise, fast by the tree of life
Began to bloom."

The Gardenia, so often mentioned in English novels, is the flower we more often call the Cape Jessamine, although Gardenia, which is both the botanical and the proper vernacular name, is gradually coming into use with us. The plant is not a Jessamine, and it is not a native of the Cape. It belongs to the *Rubiaceæ*, and was introduced from China.

The Cuckoo-flower is the same as the Lady's Smock, a Cruciferous plant—*Cardamine pratensis*. The name Cuckoo-flower is also sometimes applied in England to one of the Pinks—*Lychnis Flos-cuculi*. Good King Henry is the Mercury Goosefoot (*Chenopodium Bonus-Henricus*), a common pot-herb in the northern parts of England. And the Love Apple of England, like the equally high-sounding *Paradisappfel* of Germany, is nothing but the Tomato.

Notes Upon Some North American Trees.—IV.

RHUS INTEGRIFOLIA, Brewer and Watson.—This species must find a place among the arborescent species of this continent. In southern California, where it abounds near the coast, covering the hills over great areas with an impenetrable mass of dense foliage, it rarely rises to a height of more than a few feet; on the Santa Barbara Islands it is sometimes a stout tree with a short, much-branched stem; and south of our boundary in Lower California it becomes a tree with a trunk sometimes nearly three feet in diameter.

No. 74. PISTACIA MEXICANA, HBK.—This plant, so far as is known, has been seen within the limits of the United States only near the mouth of the Pecos River, where Dr.

Bigelow, the botanist of one of the Pacific Railroad-route expeditions, found a single plant forty years ago, which, in his notes, he described as "a small tree." It is widely distributed in northern Mexico, and very abundant on the mountains near Monterey. It is not a tree there, however, and it may be safely dropped from the North American Silva.

82. CLADRASTIS TINCTORIA, Raf.—The proper naming of this plant involves a question of nomenclature, which just now much interests botanists, who are pretty equally divided in their opinion with regard to it. The tree was discovered by the elder Michaux, whose son bestowed upon it the name of *Virgilia lutea*. Much later, Rafinesque, discovering that the plant was not a Virgilia, created the new genus Cladrastis for it, and ignoring Michaux's specific name called the tree *Cladrastis tinctoria*. One school of botanists affirms that a specific name being once given to a plant referred to its proper genus it cannot be changed unless an older name under the same genus is found. This school would, in changing a plant from one genus into another, retain for it the specific name under which it was first published, but in the case of a plant changed by some earlier author who had not retained the first specific name (either intentionally or accidentally), as in the case of our Virgilia, they would not correct his mistake. The other school takes the ground that the specific designation is the most important part of the name, and that it being once given to a plant it should be retained for it; and that if an author in changing a plant from one genus into another has neglected this rule, his mistake should be corrected under all circumstances, except, of course, where the specific name is already occupied by another plant in the same genus. M. A. De Candolle, the author of the "Rules of Botanical Nomenclature," whose particular studies and peculiarly critical mind give the highest value to his judgment in all such questions, supports, in a letter addressed last year to the *Journal of Botany* (xxvi., 287), the views of those authors who would retain the first specific name for a plant, even when another had come into long-established use. Mr. Bentham, the most experienced and judicious systematic botanist, held the other view; and so did Professor Gray, although he did not always strictly follow his rule in his works of descriptive botany. A rule which is not absolute, and which can be changed to meet special cases or to suit the personal inclinations of different authors, is likely to be often disregarded, and so to increase rather than diminish confusion of names. Changes in the names of plants are greatly to be regretted; and the creation of synonyms is an abomination, which nothing but the hope of reaching stability in nomenclature by this means can justify. For the changing of long-used specific names must cause confusion and inconvenience; but the tendency of the times points to the strict adherence to fixed rules in natural-history nomenclature, and the sooner changes are made, which sooner or later are destined to occur, the more easily will the new names be adopted and the smaller will be the inevitable confusion which such changes occasion. A rule which provides for the adoption of the earliest specific name and allows of no exception, if strictly carried out, must eventually bring stability. I shall follow, therefore, in the Silva the custom partially adopted in the "Prodromus" of De Candolle, in Koch's "Dendrologie," and more recently in the writings of several American botanists, notably in the "Preliminary Catalogue of Anthophyta and Pteridophyta reported as growing spontaneously within one hundred miles of New York City," and restore, as far as possible, the specific names first applied to our trees. *Cladrastis tinctoria*, Rafinesque, will, therefore, become *C. lutea*, Koch, who first (*Dendrologie*, i., 6) united the specific name of Michaux with Cladrastis.

85. GYMNOCLADUS CANADENSIS, Lamarck.—This tree was named by Linnaeus *Guilandina dioica*, and I follow Koch in calling it *Gymnocladus dioica*.

87. GLEDITSCHIA MONOSPERMA, Walter.—Carl Koch (Dendrologie, i., 9) called attention to the fact that the oldest name for this plant is *G. inermis*, of Miller (1768), and that Walter's *G. monosperma* (1788) is later also than Marshall's *G. aquatica* (1785) and than Lamarck's *G. Carolinensis* (1786). The change from *G. monosperma* to *G. inermis* is certainly to be regretted, for the Water Locust is horribly armed, while the name *inermis* was used by Pursh (in 1814) to designate a thornless variety of *G. triacanthos*. If, however, the rule of priority is to be followed, the change seems necessary, as it is certainly contrary both to the spirit and to the laws of nomenclature to change a name simply because it happens to be inappropriate. C. S. Sargent.

New or Little Known Plants.

Rosa Engelmanni.*

MR. FAXON has here given a very good representation of a Rose that is widely distributed through our western region, but which has not hitherto been recognized as distinct. It has now been in cultivation at the Arnold Arboretum for several years, having been raised from seed collected by Dr. Engelmann near Empire City, Colorado, in 1881. It is the only species in temperate America that is characterized by an oblong fruit, and it is in this respect the representative of the Old World species, *R. acicularis* and *R. alpina*, to which it is otherwise also nearly allied. It is, indeed, in part the *R. acicularis*, var. *Bourgeauiana* of M. Crepin, the distinguished rhodologist of Brussels. But the only specimen of this species in the Gray Herbarium that was collected by Bourgeau (at "Fort bas Garry" in 1857) is ticketed by M. Crepin as *R. blanda*, var. *setigera*, while most of his variety *Bourgeauiana* (including Bourgeau's own specimen, ticketed "Mt. Roches à la base, 8 Aout, 1858"), belongs to the somewhat similar, but still quite distinct species, *R. Sayi*. In my revision of our species, published in 1885, the fruiting specimens that I had seen were referred to as belonging to a possible new species of the *R. Fendleri* group, though most of the flowering specimens were disposed of under *R. Sayi*.

R. Engelmanni is distinguished from *R. acicularis* most prominently by the frequent occurrence of a pair of slender spines below the stipules, by the resinous puberulence often found upon the leaves, with the accompanying glandular serrulation of the teeth, by the naked peduncles, and in growing specimens (so far as *R. acicularis* is represented in our gardens) by a difference in appearance of the foliage and in habit, which it is not easy to describe. The stems in both species are usually covered with slender prickles, and the rather large flowers are almost always solitary.

R. acicularis is rather more northern in its range, extending through northern Russia and Siberia to Japan and across Behring Sea into northern Alaska. *R. Engelmanni* appears to be frequent on the shores of Lake Superior and at some points on Lake Huron, and thence ranges westward by the Lake of the Woods, Pembina, and the upper Missouri to the Rocky Mountains. Here it is found from central Colorado to north of the boundary in British America, and westward to Idaho, and the upper Columbia in Washington Territory, where I collected it in 1880 near Fort Colville. It is a showy species in cultivation, both from its large flowers and its conspicuous bright red fruit.

S. W.

Foreign Correspondence.

London Letter.

IT is nearly midsummer, and the Rose still monopolizes the talk and the work of the floral world; it is teeming in every garden, in every drawing-room, in every flower-shop, and even the street-hawkers' barrows are laden with Roses in

early morning. The Rose exhibitor never was so busy, for he well knows that, if this hot and dry weather continues, the Rose season, like that of the Strawberries and Peas, will be very brief. One week we have a Rose Conference, and the next the Royal Botanic Society initiates a "Floral Parade and Feast of Roses," with an accompaniment of harmless absurdities. At the Alexandra Palace the populace is treated to "a celebration of the beautiful festival, 'The Crowning of the Rose Queen,' with full procession, choir, band and organ," while the great show of the National Rose Society, at the Crystal Palace, is patronized by the Persian monarch and the Prince and Princess of Wales. As to the Rose Conference, held by the Royal Horticultural Society, I hardly know whether to call it a success or a failure. It was a failure as regards the patronage it received, for it leaves the Society none the richer. It was a success both as regards the exhibition and the high character of the discussions. The majority of the visitors were those who took a real interest in Roses, and all seemed delighted at the abundant gathering of all sorts and conditions of Roses that could not possibly be seen at an ordinary Rose show or in the most richly-stocked Rose-garden. Besides an ample display of the modern Hybrid Perpetual race, the Teas and Noisettes, there were to be seen hundreds of old-fashioned Roses, which for real beauty, fragrance and interest do not yield much to their fashionable successors. Under the same tent were displayed the Roses loved by the gardeners of the last century, such as the Provence, the Monthly and the Damask, with the latest productions of modern growers, and though the difference between the old and the new is striking, the true rosarian loves them all.

It was an excellent opportunity for such noted growers as the Pauls, of Waltham Cross and Cheshunt, to exhibit the hundreds of the old flowers that blossom in comparative obscurity in their historic rosaries; and Mr. William Paul not only showed a marvelous array of old sorts, but a first-rate collection of new Roses that he has raised or put in commerce so that he might fairly lay claim to having shown the Rose as it was a century ago and as it is to-day. What delighted and interested visitors most were the collections of old garden Roses, especially the rambling sorts still found in some of the oldest English gardens, where change of fashion is unheeded. Of late years there has been a demand for these old climbing Roses, but the supply in many cases cannot be met. The fact is, the modern race had almost entirely supplanted the old sorts, and it did not pay nurserymen to keep them in stock. The date of the conference was a week too late for the full flower-tide of the climbing varieties, but, as it was, there were to be seen huge clusters of such favorites as the Ayrshire, the semi-double white Dundee Rambler, the pink Virginian Rambler, the old white Bennett's Seedling, called also Thoresbyana, which is one of the best of pillar plants. Then came the Evergreen Roses (*R. sempervirens*), such as the beautiful Felicité Perpetue, Flora, Myrianthiflora and others, all of which are matchless for festoons and pillars. The other climbers and ramblers were of the Polyantha, Multiflora and Hybrid races, and among them was the exquisite little Laure Davoust, a Multiflora with clusters of small pink rosettes; the Garland Rose, with its fawn-colored buds; Madame d'Arblay, a hybrid Musk Rose, with pink flowers; the nankeen yellow, Claire Jacquier and numerous other double ones. The typical *Rosa polyantha*, with clusters of small white single blooms, is very lovely if you catch it at its best, but it does not last so long as the double ones. As to the other old-fashioned Roses, the French, Gallica, Boursault, Provence and Damask, I imagine that almost every variety was to be found in the Waltham and Cheshunt collections, and amongst them were such much-prized climbers as Blairii No. 2, one of the best of all pillar Roses, Madame Plantier, Paul Perras, a pink climber, and the old Charles Lawson, still among the best kinds for growing in or near a shrubbery, where it will hold its own and ramble over the shrubs in a beautiful way. The variegated or striped sorts, such as the York and Lancaster, Rosa Mundi, Perle de Panachées, represent a distinct and beautiful class, to which has been lately added the Pride of Pergate, which is a striped petaled sport from Countess of Oxford.

The more modern garden Roses include, of course, the charming American W. A. Richardson, which grows more and more popular; Perle d'Or, a neat little variety of the Polyantha race with flowers paler, but of a similar tint to W. A. Richardson. It is, I am told, greatly in demand for coat bouquets. Quite a new addition is a sort called L'Ideal, also a climber, with smallish flowers of a sort of salmon-buff tint. It is quite different from any other in color, and is sure to become popular. Of the Pacquerette Roses, which is the

* *R. ENGELMANNI*, Watson.—Stems three to four feet high or less, usually more or less densely covered with scattered prickles, the infrastipular spines, when present, straight and slender, often wanting; leaflets five to seven, often somewhat resinous, puberulent beneath, and the teeth glandular-serrulate; stipules narrow; rachis unarmed; flowers usually solitary, the peduncle and receptacle naked; sepals entire, naked or somewhat hispid; fruit oblong-obovate, six to twelve lines long.

general name for the double Polyantha sorts, the best were Annie Marie de Montravel, producing an abundance of white rosettes; Cecile Brunner, a bright pink, and much better than Mignonette Gloire des Polyantha. Golden Fairy and Little Dot would be my choice among the rest. I must not omit the much cherished Moss Roses, which in every garden are indispensable. Here one could see all the sorts of the *R. centifolia muscosa* arrayed before him. Among the whites the best

huge flowers of lovely color, and of fine form and substance. Its defects are the flatness of the blooms when fully open, and the absence of strong perfume. But it is a noble Rose, and a triumph for the English raiser. It is *par excellence* an exhibition Rose, and no collection is complete without it. Other Roses of Mr. Bennett's raising were also uncommonly fine, especially such first-rate sorts as Grace Darling, Princess Beatrice, Lady Mary Fitzwilliam, all of which are to be found



Fig. 121.—*Rosa Engelmanni*.—See page 376.

were Blanche Moreau, Perpetual White, Mousseline, Reine Blanche and White Bath, and of the colored varieties there were few that were so worthy of admiration as the old Common Moss which everybody knows.

Among the hundreds of varieties of Hybrid Perpetuals, Teas and Noisettes familiar to your readers, there was no Rose throughout the show so much in evidence as Bennett's new Her Majesty, which, I hear, bears such a high character in America. Here it was on every stand in superb condition,

in every Rose collection now. Mr. William Paul celebrated the occasion by a special exhibit of his new Roses. These included Duchess of Albany, a dark sport from La France, which is sure to make a way for itself; Marchioness of Lorne, an extremely fine Rose; Queen of Queens, shown splendidly in several collections; Pink Rover, which, as I have before remarked, is a really valuable addition to large-flowered climbing Roses; Sappho, a Tea-scented variety of a distinct rosy-fawn color, excellent in form and size. In Messrs.

Keyne's collection were specimens of the new Climbing Niphetos, which seems to differ from the well-known favorite only in its climbing habit of growth, and which will prove a valuable quality, especially in house culture. The novelties at this exhibition, it will be seen, were comparatively few, and it was remarkable, not so much for new things as for old. The conference was held on two days, but, as none of the papers will appear in print before the journal of the society is issued, we shall have to wait an indefinite time for them. What to me seemed the most important outcome of the conference was the introduction to the notice of rosarians of a grand new rose, *Rosa gigantea*, a native of India. Dried specimens were exhibited, which showed what a large size the flower attains. It measures five inches across, and is pure white. It is satisfactory to know that seedlings have already been raised at Kew, but so far no one seems to know whether it will be hardy enough for open-air culture. Even if not, it will make a beautiful green-house plant.

W. Goldring.

London.

Entomological.

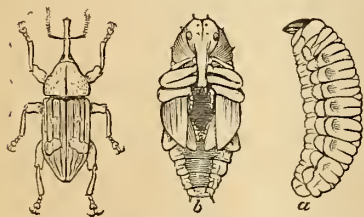
The White Pine Weevil.

(*Pissodes Strobi*, Peck.)

THIS insect causes considerable damage in gardens and on grounds where evergreens are grown for ornamental purposes; not only White Pines are attacked, but other species of Pine and Spruce suffer equally. A letter recently received from Warren County, New Jersey, describes the injury so well that I reproduce parts of it. "Many of my evergreens—Spruces especially—are much infested by a borer which seems to deposit its eggs at the base of the new shoots and leaders, and spreads downward, killing all of the tree that is above it. . . . In this section every White Pine has lost its leader. I don't think I have seen a single exception. Is this done by the same insect that attacks the Spruces, or is it a different one? It is most provoking to see one's best and most promising trees cut down in this way."

The letter was accompanied by specimens of infested Spruce twigs, which showed the characteristic work of the White Pine weevil, *Pissodes strobi*. The insect is a well-known one, and its history was first made out many years ago by Dr. Harris, who thought it required more than a year to come to maturity. Dr. Fitch afterward gave a very full account of the species, giving it a period of one year to undergo its transformations. Other writers have mentioned the insect at intervals, until most recently Dr. Packard has written on the subject and has recorded the species from April to September, his dates leaving little margin for intervals. Dr. Packard gives one brood for the species, the generalized account being that the imago appears in spring or early summer and oviposits soon after. From my collecting and observations, I believe there are in the latitude of New York two broods annually. The first of these issues as imago early in spring, say the latter part of April, or early in May, ovipositing in May, the larvæ of the second brood coming to maturity the latter part of July, the imago issuing during early August and ovipositing during that month.

The larva is a white grub, about one-third of an inch long,



with a horny, yellow head, slightly curled as it lies in its cell. When full grown it forms an oval cell either just under the bark or in the pith, and changes to a white pupa, and very soon afterward to an imago. The imago is an oblong-oval and rather narrow weevil, about a quarter of an inch long, of a dull, dark chestnut color, with two dots on the thorax, the scutellum and a short irregular band back of the middle of the wing-covers white, the wing covers also variegated with a few patches of tawny yellow. The eggs have not as yet been described. They are deposited in the leaders and other small twigs and branches—sometimes also on the trunks of old trees—at very short intervals. The larvæ eat very little more than twice their own length into the wood or under the bark, and a single, comparatively small shoot will harbor thirty to forty of them. Of course the smaller twigs thus interrupted in growth, and damaged, die, and the shape of young trees is spoiled, unless the owner believes—as some do—in small, bushy trees, in which case they are no serious drawback, since they seem never to kill larger branches or trees.

No satisfactory remedies for borers have yet been discovered. Their mode of life is such that they are at no time in position to be attacked by insecticides. This weevil has its parasites that keep it in check somewhat, and some of our smaller birds seek out the larvæ and pupæ under the bark, and feed upon them. The only way of checking their ravages when they appear in parks is to trim out and burn all the infested branches and twigs very early in spring, and again about the middle of July. In this way the larvæ will be prevented from coming to maturity, and there will be no imagos. So long as there are other unpruned trees about, this remedy is palliative merely; but still, so many will be destroyed that a much larger proportion of leaders will escape, and the injury will be considerably reduced.

Rutgers College, July 25th, 1889.

John B. Smith.

Cultural Department.

Shrubs with Conspicuous Fruit in July.

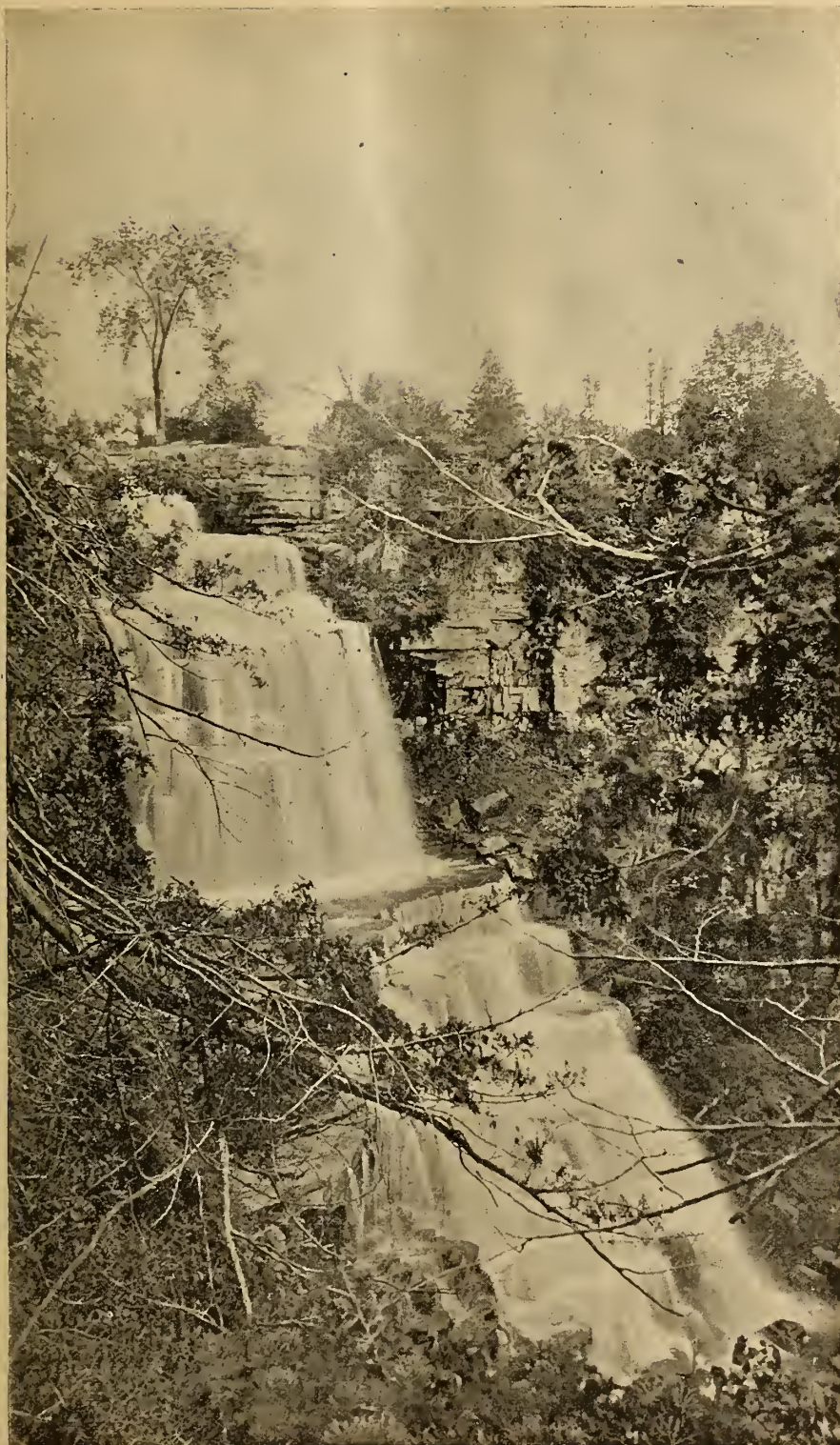
IN the early part of July there is usually no lack of shrubs in flower, many of which begin to bloom in the latter part of June. In the first week or two of July some of the Spiræas continue to give a more or less abundant show of flowers. *Spiræa sorbifolia* and the Steeplebush (*Spiræa tomentosa*) come into their best condition then, and they are accompanied by the fragrant Swamp Rose (*Rosa Carolina*) and by the odorless but very showy Prairie Rose (*Rosa setigera*).

The Common Elder (*Sambucus Canadensis*) is the most conspicuous native white-flowered shrub, and it is followed by the rarely seen *Stuartia pentagyna*, by the St. John's Worts (*Hypericums*), and by the Pepper bush (*Clethra alnifolia*), which joins the procession just in time to be counted a July bloomer, but will continue to open its fragrant blossoms throughout August. These are among the most conspicuous of the shrubs which flower about Boston in July, but as flowers become scarce, ripening fruits, or those that assume rich colors, come daily more and more into notice. The list of shrubs with showy or highly colored fruit in this month is short. There are many fruits which ripen, but most of them are insignificant in quantity, or inconspicuous, or, in some cases, so concealed by dense foliage that they are rarely observed.

The Early Elder (*Sambucus racemosa*) is one of the earliest to fruit of the tall, growing shrubs. Two groups of these plants growing side by side in the Arboretum present distinct variations in time of ripening and in color of fruit. The plants of one lot, originally collected in the western part of this state, had begun to ripen fruit by June 12th, and at the end of two weeks the berries had all been eaten by birds. This fruit was of the ordinary type, bright red, in somewhat loose cymes. The other group of plants, obtained from a New York nursery, did not ripen its berries until several days after the birds had eaten the last one of the first lot. These berries were very handsome, bright coral red, in close compact bunches, and they remained on the bush until about the middle of July, when the robins ate them.

Although these berries attracted the attention of all who saw them, there is probably no fruit so much remarked upon, at this season, as that of a form or species of bush Honeysuckle at present known as *Lonicera Ruprechtiana*. In many respects this species greatly resembles the common Tartarian Honeysuckle, but the flowers differ in size and shape, while the fruit of some individuals at least is incomparably superior. This fruit begins to ripen about the end of June, and up to the end of July the plants are beautiful objects. The shining dark-red berries, hanging in pairs on each stalk, almost literally cover the branches, which droop nearly to the ground under the weight.

Another Asiatic species, *Lonicera Morrowii*, also bears an abundance of handsome fruit on a background of lighter colored leaves than the last. The fruit of this species is said to be poisonous, but toward the end of July, when it has become very ripe, robins and catbirds eat it as freely as they do the fruit of *L. Ruprechtiana*. Some forms of the common Tartarian Honeysuckle also have claims to attention for their beautiful fruit, which is found to vary from dark red to orange on different plants when grown from the same lot of seed. When a plant of any of these Honeysuckles bears exceptionally beautiful fruit, it should be propagated by cuttings or layers, or in some other way than by seeds, if its special characteristics are to be preserved. Some varieties of the well-known *Lonicera Xylosteum* are exceedingly handsome, with shining, dark cherry-red fruit, which remains on the bushes throughout the month and often through August. Occasionally plants are found which are unusually prolific,



The Falls of the Chittenango.—See page 373.

and their berries are often half an inch or more in diameter. This species does not grow as large or tall as the Tartarian Honeysuckles, and the flowers are not as attractive, but it is a neat compact shrub.

Some of the fruit-eating birds are very partial to the white or bluish-white fruit of *Cornus alba*, a shrub usually sold by nurserymen under the names of *Cornus sanguinea* or *Cornus Sibirica*, with additional names for varieties. The red or scarlet bark of this species is its chief attraction, but the fruit is pretty and reaches its ripest state about the middle of July or even earlier. About ten days later it is followed by *Cornus alternifolia*, the berries of which begin to ripen and become blue-black. *Elæagnus longipes* (figured in GARDEN AND FOREST, vol. i., p. 499) does not appear to be one of those plants which

produce a full crop of fruit only every second year, but annually bears an abundance of its rich, red, plum-like fruit, which, on long peduncles, hangs thickly along the under side of the branches for several weeks. When fully ripe this fruit is much liked by many persons, and it might be improved in flavor and size by cultivation and selection. Birds have found out that it is palatable, and this season, for the first time at the Arboretum, it was all carried away by them.

It is a pity that such a charming native shrub as the Cranberry Tree (*Viburnum Opulus*) is not more frequently seen in gardens. The showy flowers of the sterile form, known as the Snow-ball, and so commonly cultivated, are not as graceful or pretty as those of the wild plant. The sterile plants are very apt to look diseased and to be infested with Aphides, and, of course, they bear no fruit. The Cranberry Tree does not ripen its broad flat panicles of fruit until much later in the season, but in the latter part of July the berries, which are then quite large, assume a striking greenish-yellow tinged with bright red on the side toward the sun. The fruit of the Wayfaring Tree (*Viburnum Lantana*) is still green, but it, too, is bright red on the exposed side.

The Staghorn Sumach, with its large cone-shaped heads of scarlet fruit, which it retains during the rest of the summer and autumn, makes a most pleasing effect when grown in groups, and is always certain to attract attention in its native haunts.

The well-known Smoke Tree (*Rhus Cotinus*) hardly needs a notice. Its "smoke" is in its best condition during June and July, and in the latter month the few very small fruits it bears usually disappear, leaving only the pedicels with their feathery hairs and branchlets, which give the loose panicles the appearance from which the plant takes its popular name.

The different species of Amelanchier, Service-berries or June-berries, ripen their dark-blue, purple, or black fruits in the latter part of June and during July, but, as soon as ripe, they are eaten by birds. The native American species generally seems to ripen earlier than those from Europe and Asia. Two species of low-growing Cotoneaster in the Arboretum have ripe fruit in the last two weeks of the month, and it remains on the plants for a long time. The color of one is purple, and the other bright scarlet.

Daphne Mezereum, though a small shrub, and generally not very attractive, has two periods in the year when it does not fail to attract attention: (1), when its purple blossoms appear, before the leaves, in early spring; and (2), when the bright-red berries are seen among the foliage at the end of June. There is no plant more deserving of a place in small gardens or in larger shrubberies than *Rosa rugosa*. It continues to bear some of its large, single, purple or white flowers until frosts check all growth, and its fruit, which begins to ripen in the latter part of July, is at first bright scarlet, and later changes to a dark red. It is often an inch and a half in diameter, and remains on the plants until winter.

Arnold Arboretum.

J. G. Jack.

Transplanting Conifers in August.

IN the year 1870 I proposed to overflow a tract of land for the purpose of ice-cutting. In order to do this it became necessary to remove about 40,000 trees of my nursery-stock, consisting of Spruce, Pine, Hemlock, Arbor Vitæ, etc., of various sizes, ranging from two to seven feet in height. The

transplanting was done during an unusually dry August, and the distance of removal was about half a mile. The fall months continued to be so exceptionally dry that many trees in the forests perished in consequence, yet the new plantation proved to be remarkably successful. This was due to the fine, yet compact, condition of the soil enabling the young roots to form rapidly, and the trees were well established before winter set in. Perhaps this was the first extensive experiment in the August planting of conifers in this country. But it was so conspicuously successful that confidence in the practice was soon established. The common name, Evergreen, indicates the persistence of the foliage, and these trees must be in full leaf at whatever season they are planted. The essential point to secure is quick root-action, to sustain the tree as speedily as possible. It is well known that the roots of evergreens are in active growth long after the upper growth is formed and while it is hardening. Hence it seems reasonable to conclude that when the soil is warm in the last half of August and early September and the air is growing cooler the equilibrium of a transplanted tree will speedily be restored. In the month of May, when by far the largest number of trees are planted, active growth soon follows, evaporation is excessive during the hot June days, and it is the common experience that the strain, upon trees of any size, is severe.

Let me cite two cases during the past year by way of comparison. On the 25th of August, 1888, I transplanted from the nursery into groups on an avenue eleven White Spruce trees, averaging five and a half feet high. They had ordinary care and have made healthy growth, none of the terminal shoots being less than twelve inches in length. Indeed, they compare favorably with their companions, which remain in the nursery. On the 14th of May last Mr. Bowditch, the well-known landscape-gardener, ordered 200 Spruce trees of the same size, and, as is his custom, sent his men to dig and replant; but, finding that he had dug forty trees more than were wanted, he requested permission to replant these in my grounds. Now, since his men are as careful planters as mine, a good opportunity offers to compare the results of planting in August or in May. Mr. Bowditch's trees lived, of course, but they look as May-planted trees usually do—that is, as if they had passed through a fit of sickness from which they were slowly recovering. In no case is the annual growth more than seven inches, and the average is less than six inches. In my judgment the different times of planting will account for all the difference in growth, and this is so obvious that I am sure Mr. Bowditch will excuse me for citing the case.

Newton Highlands, Mass.

Wm. C. Strong.

Two Lessons in Strawberry Culture.

DURING a recent visit to the extensive small fruit and vegetable gardens of Mr. J. M. Smith, of Green Bay, Wisconsin, my attention was called to two striking facts in Strawberry culture. Mr. Smith is a large grower of Strawberries, and still adheres to the old Wilson as the most profitable variety, all things considered. Although this time-honored sort has generally failed of late years to maintain its former excellence, on his grounds it continues to yield immense crops, and has not as yet been surpassed in productiveness by any of the more recent introductions.

Mr. Smith ascribes his success with the Wilson chiefly to his method of propagating the plants. About ten years ago he noticed the fact that a bed set with plants that had grown from a setting made the preceding spring, and which had, consequently, never yielded a crop of fruit, made a better growth and bore more Strawberries than another bed of plants formed on a setting that had already yielded a crop. This raised the question in his mind whether the vital force required to mature a large crop of Strawberries in a productive variety like the Wilson may not so far impair the vigor of the plants that their progeny will become weakened. Since that time Mr. Smith has been careful, in setting new beds, to use only plants propagated from those that have never borne a crop, and as the result his Wilsons have fully maintained their original vigor and productiveness. In favorable seasons they still yield as high as 400 bushels per acre. The rust, which has been the ruin of this variety in most localities, does not appear in his newly-planted beds. After a bed has yielded a large crop of fruit, however, the plants are severely attacked by the rust; but as Mr. Smith does not usually take more than one crop from a setting, the rust has no opportunity to work harm.

Now for the two lessons. Mr. Smith generally, after plowing up a bed of Strawberries, devotes the ground to other crops for a year or more before re-setting it again with Strawberries. In the spring of 1888, however, he found it conve-

nient to vary the rule, and to re-plant a portion of some beds that had produced Strawberries the preceding year. Although this ground had been kept in a high state of fertility, the result was most marked. The stand of plants on the ground that had produced a crop the year before was noticeably thinner and less vigorous, and the yield was smaller by half.

In one part of this ground, that was occupied the second time in succession, another experiment was tried. Mr. Smith departed from his custom here in another particular, and used young plants that had been propagated from a bed which had already borne a crop. He expected little from this portion of his field, but he received literally nothing, for the plants, which suffered a double abuse—first, in having been raised from weakened stock, and again, in having been planted in old Strawberry-ground, unrefreshed by rest and rotation—were so far enfeebled that they were abandoned as worthless and plowed under.

Mr. Smith's experience has proved it unwise to grow Strawberries after Strawberries on his ground, even with high manuring. There is nothing particularly novel in this, however; but very full of suggestion is the fact that a variety like the Wilson, which has been considered "run out" in many places, has not only maintained its vigor when propagated from vigorous young stock, but has also escaped damage from rust. Here is another field for experiment, not only with Strawberries, but with other fruits, upon which our experiment-stations should be prompt to enter.

Madison, Wis.

E. S. Goff.

[Professor Goff sent with this article a photograph of the field described, and it enforces in a striking way the lessons of the text.—Ed.]

Orchid Notes.

Odontoglossum Harryanum.—Although only in cultivation for the short space of three years this species has acquired great popularity, and is universally acknowledged to be one of the best *Odontoglossums* yet introduced, presenting, as it does, a type of beauty different from that of any other species of the genus. It is not generally known that *O. Harryanum* is a native of Colombia, where it was discovered by a traveler named Rodriguez Pantoja, who, in 1886, sent plants of it to Messrs. Horsman & Company, of Colchester, England, from whom the stock, at that time, was obtained by Messrs. Veitch, to the head of whose establishment it was dedicated by the late Professor Reichenbach. Since then quantities have been imported by Messrs. Sander & Company, so that there is not much doubt of it being soon found in most collections.

The much compressed oval-oblong pseudo-bulbs, which become more or less wrinkled and furrowed when old, have on their summits two strap-shaped, pale-green leaves, from nine to twelve inches long. Cultivated plants generally produce racemes about a foot or eighteen inches long, bearing from four to twelve flowers, each over three inches in diameter; but in imported plants, racemes over a yard long, and having from twelve to twenty flowers, have been seen. Perhaps they will produce as many some day under cultivation! The elliptic oblong sepals are slightly recurved at the tips, more or less undulate on the margins, and of a deep chestnut-brown with yellowish, transverse, hieroglyphic markings, chiefly on the basal portion, while all round the margins is a conspicuous, narrow, yellow border. The petals have usually the appearance of being only partly expanded, a fact which many consider to be the only defect in the flower; occasionally, however, flowers may be seen which have the petals well spread out. They are oblong-acute in shape, reflexed at the tips, and much narrower than the sepals; the basal portion is pure white, blotched and spotted with mauve-purple; the upper portion is deep chestnut-brown, passing into a golden-yellow blotch at the tip, from which it extends into a narrow border on each side to the base. The subcordate-pandurate, acuminate lip is remarkable for the great beauty of its colors which present a striking contrast to each other. The basal portion is bright yellow, with a few brown spots, and from seven to nine serrulated crests, on each side of which are oblique stripes of rich violet-purple on a white ground; the anterior portion of the lip is infolded or convolute at the apex, and pure white in color, which, however, changes to bright yellow in old flowers, and in dried ones also.

O. Harryanum seems to be a continuous bloomer, as plants were in flower here last Christmas, and since then there has always been some in flower. July, however, seems to be the proper flowering season, there being several plants with fully expanded blooms, and many others in bud. During the summer months a cool and somewhat moist atmosphere

—such as *Miltonia vexillaria* likes—suits this species well, and a moderate supply of water, which, however, must be reduced in quantity while the plants are in flower, and for sometime afterwards, also. When the new growths appear, the plants, if necessary, should be repotted or top-dressed, and the compost should consist of rough fibrous peat, with a little sphagnum and charcoal mixed.

St. Albans, England.

John Weathers.

Erises Lobbi.—This is a handsome and useful Orchid, flowering profusely at a season when flowers in variety are scarce. It may be grown with little trouble in a warm, moist house, suspended in a basket filled with moss and charcoal. The lorate, leathery, deep-green leaves are about a foot long, and from the axils of these are produced densely-flowered racemes, from one to two feet long, and often branched. The flowers are white and rose, prettily dotted with amethyst. When placed in a cool, dry atmosphere, these flowers will last in perfection quite a long time. There are several varieties in cultivation, though none are particularly distinct. The type was introduced from Moulmein in 1868.

Another Orchid profusely in bloom just now is *Rhyncostylis retusa*, popularly known as *Saccolabium guttatum*. This is an old plant introduced from Java nearly seventy years ago. The short, stout stems are clothed with distichous, leathery, deeply-channeled leaves, about a foot long, and dark green. The cylindrical racemes are drooping, closely set with small white flowers, spotted and blotched with rosy-purple. There are a great many varieties of this fine Orchid. One of the rarest and best is *Holfordianum*, now in flower with us, a much stronger plant than the type, with longer and broader leaves, larger inflorescence, and a lip of rich crimson. *Giganteum* is not much inferior to this. These plants thrive in the warmest house, with abundance of water, if placed in pots, baskets or cylinders in a compost of peat, moss and chopped leaves. Without abundant sunlight good spikes need not be expected, but care should be taken that the leaves do not get burned.

Oncidium luridum.—This is not a very showy Orchid, but, if it lacks in quality, it certainly does not in quantity, for its flowers are produced by the hundred even on quite small plants. They last a long time in perfection, and are welcome at this season. It is an old plant, having been introduced in the early part of this century from Mexico, but some choice varieties have since been found in the West Indies. It is a bulbless Orchid, with large, very thick, carinate leaves, more than a foot long, dull green or nearly reddish-brown, and much spotted. The panicle is produced from the base of these matured leaves, and is from six to nine feet long. The flowers, nearly an inch across, are olive-green, blotched and spotted with brown. In the variety *Dodgsonii* the ground color is yellow; in *Morrenii* it is rose, spotted with crimson and tipped with yellow; *Roseum* is mottled with white and bordered with yellow. This Orchid is very easily grown in small pots and little soil, which should be rich and open. After growth is finished the plants should be put in a dry, airy house, with a good exposure to sunlight, and should be kept pretty dry through the winter, but while growing they require the maximum of heat and moisture.

Dendrobium crystallinum.—This is a fine summer-blooming Orchid, which we have had in flower for several weeks. It is a Burmese species, with long, slender, upright stems, from the sides of which the flowers are freely produced. These are white, tipped with magenta, the lip being orange at the base. They last a long time in bloom. This is an easy plant to grow, with the ordinary *Dendrobium* treatment.

F. Goldring.

Some Native Plants.

ONE of the Gentian family (*Frasera Carolinensis*) is now worthy of notice. A remarkably fine plant, seven feet high, was found here in full bloom early in July. The stem about two inches through is a dark-purple color, with the oblong pointed leaves growing in whorls; these are light-green, smooth and glossy. The compound panicles of flowers follow the same arrangement as the leaves; in color greenish-white marked with dark spots, and with a fringed gland on each petal. The stately bearing and subdued color of this plant render it a pleasing object among gayer flowers and darker foliage. Moisture favors its growth, though it will live in dry situations. For brilliancy of color the *Asclepias tuberosa*, already spoken of in GARDEN AND FOREST, is now the most conspicuous of our wild flowers. It is not unusual to see upon one plant a mass of bloom two yards or more in circumference. All shades of orange are represented on different plants. Several of the Milkweed family have more attractive foliage than this,

but none with us equal it in brightness and profusion of flowers. Among others, the slender *A. verticillata* is found here, and its threadlike leaves and tiny flowers are in strong contrast with its coarse relatives.

A pretty vine is *Dioscorea villosa*, on which the inconspicuous flowers are giving place to racemes of three-winged seed vessels of great beauty. Notwithstanding the angularity of these pods, the slender stems by which they hang admit of a very graceful arrangement, and their pale-green color and glossy surface add to their beauty. Of these clusters, containing from five to nine pods each, I have counted twelve on two feet of vine. The twining habit of this vine leads it into higher places than it could reach by the support of shrubs. In the instance noted it is so closely wound about a *Smilax* as to be scarcely distinguishable from it at a casual glance, the leaves of the two plants somewhat resembling each other in shape, color, and veining. The *Smilax*, with its profusion of tendrils, has climbed a rail-fence and grasped an overhanging apple bough, carrying with it the weaker neighbor. Both these vines would be valuable in the wild garden, though, perhaps, their mission is better fulfilled in this tangle by the roadside, where, shaded by a thicket of Hazels, they help to form one of Nature's charming masses of verdure.

Parnassia Caroliniana is an interesting little plant just coming into bloom upon the low wet ground. The flowers, which last well into autumn, are of a creamy-white color marked with delicate lines of green. The symmetrical arrangement of the stamens surmounted by little spheres is most noticeable, being in rows of three opposite each petal. It makes an admirable addition to the bog-garden or water-border.

Klinger Lake, Mich.

Dorcas E. Collins.

The Pyramidal Saxifrage.—During the last few years the great value of this alpine plant for culture has been fully recognized by the London market florists, who were the first to bring it out of the obscurity of botanical collections. Its scientific name is *Saxifraga Cotyledon pyramidalis*, but is well known now as the Pyramidal Saxifrage. It belongs to that large section of the genus having fleshy-incrusted leaves, arranged in symmetrical rosettes. The rosette of a full and well-grown plant of this variety measures quite nine inches across, and from its centre springs the tall flower-spike, which rises from sixteen inches to twenty-four inches high and about half as much in diameter. It is minutely branched and bears thousands of white flowers about half an inch across, and these remain in perfection for several weeks if the plant is kept out of doors or in an airy green-house. The exquisite beauty of this Saxifrage makes it a great favorite with window-plant gardeners, and I have seen plants of it in window-boxes that came into bloom a month ago still in perfection and with more flower-buds to expand. Though it is a perfectly hardy plant and grows and flowers well on an open rockery, it is only by careful pot culture it can be flowered to perfection. The plants require to be grown in good, rich, loamy soil, and every runner picked from the main rosette as soon as it appears, otherwise the plant exhausts itself in feeding the runners instead of gathering strength for the production of a fine flower spike. Unheated frame culture is the best treatment for it, and a runner, if strong, taken off and rooted this year will flower the next; but, as a rule, three-year plants flower best. If this plant is not already known with your market florists, they should get it, as it would always repay culture. It sells as well as anything we have in Covent Garden at the present time.

Kew.

W. G.

Turnips.—Many persons, in their fear of an early freezing, sow seed of the Flat Dutch and Purple-Top Strap-Leaf Turnips too early. These Turnips can be grown very quickly, and are only good when so grown, like a Radish. If sown early they grow too large for table use, and are worthless for any purposes but stock feeding, and only a little short of worthless for that. Flat Turnips, grown rapidly in the cool autumn weather, to about the size of an ordinary biscuit, are good enough for any one. When grown on a large scale, I have never found it profitable to sow in drills or rows. For sowing broadcast, I plow the ground and give it a heavy coat of manure on top, then harrow so as to slightly mix the manure with the surface soil, sow the seed and roll. The most difficult thing is to sow the seed uniformly without getting it too thick. This is best accomplished by roasting a lot of old and worthless seeds of Kale, Cabbage or Turnip in an oven until certainly dead. One part of good seed is then mixed, and mixed thoroughly, with about ten parts of the dead seed. This seed is then sown as uniformly as possible all over the ground at the rate of about ten (10) pounds of the mixture to

the acre, and this scatters the good seed thickly enough. The sowing may be done at any time in August, the latter half being better than the first, and, in the latitude of Virginia, September is early enough. Still, unless plenty of manure or fertilizer is used, the crop will not be of the first quality for table use—a quick growth being essential. For late use in winter and towards spring these flat Turnips are not desirable, and if none of the Long White French Turnips were sown early in July, a crop of Robertson's Golden Ball sown the first week in August, in drills, well enriched and carefully thinned and cultivated, will make a good crop of a very superior quality for winter keeping.

Fall Peas.—It will always pay those who are fond of Green Peas to use a spot otherwise vacant for sowing a crop of Premium Gem Peas about the middle of August, with a succession some ten days later. Select, if possible, a piece of land naturally moist, and plow a deep furrow by running the plow twice in a furrow. Scatter the Peas along the bottom of this deep furrow and cover lightly. This will leave the rows in a depression, which will be gradually filled in cultivation, and the plants will be able to stand an autumn drought better than if sown nearer the surface. The chief trouble will be from mildew, and if they escape that, the crop is reasonably sure. It will be worth while to experiment with some of the copper mixtures now used for fungus on Grape-vines, for preventing the mildew on Peas.

Crozet, Va.

W. F. M.

Correspondence.

Forests and Civilization. IV.—The North Woods.

To the Editor of GARDEN AND FOREST:

Sir.—The boundaries of the original Adirondack forest-region are not very distinctly marked by Nature, and estimates of the extent of its area differ as the lines may be drawn so as to include more or less of the foot-hills, or slopes, connecting the more elevated central region with the plain below. It is, however, probably safe to say that we had here a tract of at least five millions of acres, or nearly eight thousand square miles, all of which was much better adapted to permanent forest growth than to agriculture, and upon which, therefore, forest conditions should have been permanently maintained. It would have yielded a steady revenue forever, as the trees matured and were cut off; the rivers would have been sustained by unfailing springs, and the uncontaminated air of this mountain forest-region would have made it the most valuable sanitarium in the world. It would have become a resort for health-seekers from all lands, and the addition to the wealth of the State from this latter use would have been far greater than the value of all the lumber it would have produced.

The State should never have sold the land or any part of it, but should have trained and equipped some of its young men for the care and management of this inestimable possession. This policy of State ownership and intelligent administration of this forest-region would have aided greatly the development of all the interests and resources of the State of New York, and would have made it far richer and more highly civilized than it is to-day. But we are obliged to accept the past, because it is out of our reach and beyond the possibility of change. We can deal only with existing facts and conditions. After a careful examination of nearly every part of the entire region I conclude that more than three-fourths of the original forest has been cut off, and that not more, probably, than about a million acres of virgin forest remains.

Most of this is in Hamilton County. St. Lawrence County has considerable, Herkimer has less, and Franklin County still less. Clinton County has been nearly all cut over. Essex County has but a small extent of virgin forest. Warren County has very little, and Saratoga none. Lewis and Oneida Counties have none, or next to none. Fulton County is nearly all cut out. The annual cutting increases every year, much more ground having been cut over, or more timber taken out, during the last season than in any one year before. Twenty years ago the Glens Falls lumber people thought that they had cut about as far up into the woods as they could go, and had nearly exhausted the region which was then accessible to them—that is, that they had cut nearly all the timber that could be floated down the streams to the mills. (The hard woods will not float.) But soon after that time they began "improving" the smaller streams, straightening and deepening them here and there, building dams, etc., and now they run logs down little threads of streams where a few years ago they never dreamed that they could float timber out profitably.

A tract of three hundred and eighty thousand acres in Her-

kimer, Lewis and Hamilton Counties, which formerly belonged to the Durant estate, has recently been purchased by a company of capitalists and lumbermen. Two of them are now in the St. Regis Lumber Company, and they will go on at once to begin cutting off the timber of the new purchase. Of this seventy-five thousand or a hundred thousand acres have been partly denuded of timber; the rest is all virgin forest. Most of it is Spruce, then Hemlock and White Pine. They will cut the hard-wood timber where they can get it out, and when it is wanted there will be means for getting it out everywhere. But the first thing thought of is the Spruce, of which between the Lowville region and Lake Ontario there are tens of millions of feet. The Popple is about all cleared out. This is the greatest body of Spruce now remaining in the country, and the plan is to make a Spruce trust. It is expected that the price of Spruce to be used in paper-making will go up, perhaps fifty per cent.

The Saranac water-shed was cut over long ago, and there is very little first growth now remaining. Upper, Middle and Lower Saranac, and their tributaries, drain a large region, but the cutting here has been light of late years, mostly second growth. The lumbermen have cut down to eight inches or below. It is absurd to cut so small timber, taking out young saplings which would be so much more valuable in a very few years, but in all that region there is very little thought about the future.

The Morgan Lumber Company bought the Oxbow tract in Hamilton County some time ago, and are cutting it off, and here they have met the cutting from the west.

There have been very heavy cuttings in the Grass River country, in St. Lawrence County, during the last year.

As has already been noted in your journal, the various railroads which penetrate the wilderness are being extended, and the destruction of the forest will, in consequence, proceed much more rapidly than heretofore. There has been a great deal of very indefinite writing and talk about the Adirondack forests, some of it misleading, because not based on any considerable knowledge of the facts of the actual condition and course of things in the woods. From three-fourths to four-fifths of the original forest has already been cut off, and hundreds of square miles—hundreds of thousands of acres—have been utterly denuded and ruined by the burning and washing away of the soil, so that centuries must pass before these vast tracts of bare and sun-scorched rocks can again produce valuable trees. Any rational or fruitful way of thinking of the matter must embrace a recognition of these facts. Whatever we may desire, whatever "might have been" if things had been entirely different, no amount of rhetoric or sentiment will avail to make the facts other than they are.

Carthage, N. Y.

J. B. Harrison,
Cor. Sec. American Forestry Congress.

Mountain Meadows.

To the Editor of GARDEN AND FOREST:

Sir.—Your article on "A Mountain Meadow" on page 314 reminded me of what are without doubt the most striking mountain meadows in the eastern United States.

The highest mountains east of the Rockies are on the borders of Tennessee and North Carolina, the loftiest point being Mount Mitchell, 6,717 feet high. The traveler among these mountains will notice as a strange feature, the absence of crags and precipices. As a general rule, from the foothills to the summits of the highest mountains, we find moss and verdure. In May I climbed to the summit of Clingman's Dome, an altitude of 6,660 feet, and all the way to the summit, excepting in case of two or three short passes, our way led over nothing but rich loamy soil or turf. Just before ascending the Big Balsam mountain, from the west, one traverses the "Silas Meadows," fully 6,000 feet in altitude, a beautiful stretch of as true meadow as can be found in the lowest valleys. Here were ranging about 150 horses and cattle, alone on the summit with no cabin within miles. From this mountain meadow one can look over a grand wilderness, covering hundreds of square miles, where the axe of the wood-chopper has scarcely been heard, a truly virgin wood with magnificent forests of Balsams, Beeches, Birches and Tulip-trees extending in all directions.

On the summit of Thunderhead, made famous in Craddock's dialect stories of the Tennessee mountains, at a height of over 6,000 feet, in May, were grazing on a meadow of hundreds of acres, 500 cattle, 200 swine, and a large herd of horses and mules. The turf is fine and compact, and consists of Poas, Panicums, and other grasses. This meadow is not a little cleared patch of a few acres, but is of large area, bare of growing trees. In places on the summit may be found groves of

Beeches and Red Birches, stunted, gnarled and twisted, but they grow in a moist soil comparatively free from stones, and attain a height of 20 or 25 feet. On Defeat Knob, a part of Thunderhead, at the very top, is clustered a clump of Rhododendrons covering several acres, compactly growing together. And about this group is an abundance of moist sphagnum, which is fully three inches deep.

From this meadow, with an entirely unobstructed view, I counted nine distinct mountain ridges lying in various directions. And here on this top, where in May the snow had been "shoe mouth deep," were grazing on fine pasturage hundreds of domestic animals. Truly this was a strange sight!

Early in March the Trailing Arbutus had been on sale in Knoxville market, and the trees were leafing out, while in early May vegetation was well advanced, the trees being in full leaf. Yet on the tops of these mountains in May, when the trees were just expanding the bud, I gathered in their prime, Spring Beauties—Anemones, Trailing Arbutus—all the earliest flowers of spring. It was a striking fact that the clusters of Arbutus, which were much larger than any I had ever gathered among the hills of New England, were almost entirely devoid of odor. Yet they were exceedingly beautiful.

I cannot draw this communication to a close without referring to the enormous fields of Rhododendrons, or Laurels, as the mountaineers term them. They grow in such dense masses that it is absolutely impossible to pass through them, excepting over a bear trail which has been enlarged. For four miles a companion and myself struggled over the trail, passing down Miry Ridge, between thickets of Rhododendrons through which the only course was in the beaten path, just wide enough for cattle to pass on their way to the summits of the Smokies. This ridge, at least 5,000 feet high, comes to a sharp edge, and up the sides to the narrow top crowd these evergreens. And strangest of all, at times the trail is so mucky and wet that it is almost impassable. Frequently our horses, on a top not over forty feet wide, where one would have thought all moisture would rapidly drain off, sank into the muck above the knees, and nearly stuck fast.

In almost any direction, from these summits, one can see the dense green, level tops of Rhododendron thickets passing up and down the mountain slopes, and, as my companion remarked to me, "patches of fifty acres make a mighty small showing." Certain it is, northern people who have never been in these mountains can have no conception of the remarkable abundance of the Rhododendron.

Knoxville, Tenn.

C. S. Plumb.

The Preservation of Chittenango Falls.

To the Editor of GARDEN AND FOREST:

Sir.—Permit me to report an instance of the preservation of a beautiful natural object by a rural community, a case that is probably quite unique. Two streams flow from the hills of Central New York; one, the Chenango, an Indian name meaning waters flowing south; the other, the Chittenango, the waters flowing north. The Chenango winds through broad, fertile valleys until, lost in the Susquehanna, it finds the sea in the gleaming Chesapeake; the Chittenango plunges eight hundred feet within a few miles, over crag and boulder, to the lowlands, and on through Oneida and Ontario to the wild St. Lawrence.

Midway between Cazenovia and the village named for the stream, the Chittenango plunges over ledges of the limestone that upholds the hills of many midland counties, and falls one hundred and forty feet into as beautiful an amphitheatre of fern-clad rock as fancy ever painted. (See page 379.)

Cedars, Hemlocks and kindred trees cling to the ragged cliffs, where, dripping with spray, they shelter rare forms of *Scolopendrium vulgare* and other dainty Ferns and flowers. Since Jan Van Lincklaen, an officer of the Dutch navy, won by the beautiful surroundings of Cazenovia Lake (Owahagina), settled the place nearly a century ago, the falls of the Chittenango have been dear to all who loved undisturbed nature, and when plans for turning their power to mechanical use were proposed, the idea gave a shock to many of the old residents of the hill-top village, whose solicitude was so aroused that it assumed a protective purpose two years ago. Then a generous "trust" was formed; and money was raised with which the property was purchased; and an especial Act of the Legislature was procured, forming a perpetual trusteeship to hold and guard the falls free and forever. A little prudent work has opened a drive, enabling persons who cannot scramble to view the falls; but no art will be allowed to mark or mar the exquisite work that centuries have wrought with water, frost and glacier crush—the free-hand tools that have

rough-hewn the crags which dainty nature decorates anew with the frailest and fairest plants, watered with the spray that drifts from forming rainbows in the sunlight to pearl drops in the shade.

The general Government has the Yosemite and the Yellowstone; New York and Canada have rescued Niagara; and the small rural community of Cazenovia has found the temptation to preserve the Chittenango Falls strong enough to win several thousand dollars for this unusual and, perhaps, all considered, unique purpose.

The late Horatio Seymour often said that "good works were catching." Perchance many other picturesque places may yet be saved from the axe, the forest-fire and the heavy tread of material purpose.

Cazenovia, N. Y.

L.

The Floods in Pennsylvania.

To the Editor of GARDEN AND FOREST:

Sir.—The accounts of the late damages by flood in Pennsylvania and New York are accompanied, in nearly every instance, by statements of large losses of timber and lumber, washed away by the high waters. At Milford, Pennsylvania, it is said that \$200,000 worth of unidentified lumber was deposited upon one single farm by the receding waters. The presumption, therefore, is that the water-sheds from which these floods originated have been recently and largely denuded. It would be well worth the while of friends of forestry, accessibly situated as to these devastated districts, to look thoroughly into the conditions of these water-sheds, and to publish the scientific results of their investigations. The statements in the newspapers indirectly confirm what foresters would expect to find as one cause of such unusual floods as have occurred this summer; that is to say, forest-destruction upon the water-sheds of the streams—and the amount of this destruction is shown by the immense losses of lumber—has presumably helped to swell these floods. Each new flood is headed in the newspapers by "Waterspout," or "Cloud-burst." It is hardly reasonable to suppose that so many of these rare phenomena of Nature have occurred within so limited an area, and within so short a time. It is much nearer the results of experience to say that these terrible floods were caused by heavy, but not unprecedented, rainfall upon surfaces denuded of forest-growth by the axe, or fire, or both, and consequently unable to detain or absorb the rainfall, as they had formerly done. I trust that competent persons will be led to investigate the true facts as to the floods referred to.

Santa Monica, Cal.

Abbot Kinney.

Recent Publications.

My Handkerchief Garden. By Charles Barnard. E. H. Libby, New York, 1889.

Mr. Barnard is popularly said to write on more subjects than any one else, not excepting Mr. Gladstone, and to write equally well upon them all. Certainly nothing could be better of its kind than this little volume, into the sixty-nine pages of which is crammed much useful information, conveyed in a delightfully easy way. His "Handkerchief Garden" was a house-plot in a suburban town, measuring twenty-five by sixty feet. In one year it yielded him "a garden, fresh vegetables, exercise, health and \$20.49," and the why and the how are so clearly explained that any one who reads and remembers need not despair of doing likewise. How the beginning was made, what work was done, and at what times and seasons; how preparatory plans were laid and plants started in the house, are successively set forth. A couple of chapters on special products follow, and then two—perhaps the most interesting of all—called "What to Do With a City Yard" and "A City Fruit Garden." For those unfortunates who are compelled to pass the whole summer season in large towns, there is a wealth of happy suggestiveness in these pages, where we find no vague bits of general advice, but exact directions, what is best to plant, and how to plant it, and sketch-plans illustrating the text. We should have liked to see more attention paid to flowers, the culture of vegetables being that which Mr. Barnard most insistently recommends. Nevertheless, it is certainly true, as he says, that while vegetables can be cheaply bought in the city, it is hard to get any of them fresh, and many kinds cannot be considered perfectly fresh except when gathered just before they are eaten. No extracts from the little volume would be valuable—its merit is in its continuity and careful regard for details. Nor would it in any case be necessary to cull for our readers' benefit any information from a work which can be purchased for so small a sum as twenty-five cents.

Notes.

A Redwood-tree, twenty-eight and a half feet in diameter, was recently cut in Tulare County, California.

Mr. Henry Shaw, the founder of the celebrated botanical gardens in St. Louis, has just celebrated his eighty-ninth birthday.

During the wet, warm weather Tomato-plants have been making extraordinary growth, while setting very little fruit. Good gardeners often run a sharp spade down beside the plants to prune their roots and induce the formation of fruit.

The Asparagus beetle this year seems proof against air-slacked lime. London purple and Paris green are out of the question while the plants are being cut for table use, but an occasional sprinkling with the arsenites even now will materially lessen next season's labors to hold the pest in check.

In California the fruit of *Prunus Simoni* develops into a handsome oblate, deep purple Plum much larger than it appears in the engravings of the fruit grown elsewhere. It ripens very early, and is very durable in shipment, so that it promises to take a high rank there among early-market Plums. The *Pacific Rural Press* observes that nurserymen are propagating it extensively.

The Longfellow Memorial Association in Cambridge, Massachusetts, is now preparing the land which lies between the old mansion and Charles River. The plan includes a terrace, commanding a wide view over the broad green river-marshes, a loggia upon this terrace, the walls of which will bear reliefs and inscriptions, and a garden lying below the terrace and overlooked from it. The object is to unite to appropriate monumental memorials the open prospect which Mr. Longfellow so much enjoyed. Charles Eliot, landscape architect, and C. Howard Walker, architect, are in charge of the work.

A bulletin just issued by Professor Cook of the Agricultural College of Michigan, illustrates the important services of parasitic and predaceous insects in overcoming our insect foes. About July 1st the wheat heads throughout a large region in the western states were crowded with aphides, five or six often attacking a single kernel and sucking out its vitality. It seemed as if the grain crop was doomed, but in a week the rapidly increasing enemies of the lice were in the ascendent, and in ten days the crop was safe. The bulletin gives illustrations of these parasites, together with the predaceous flies and the Lady-bird beetles and of their mode of attack. Tiny as these insects are, they have saved millions of dollars to the farmers of the West this year.

In a recent work by Professor Hartig it is stated that a count of the annual rings of a tree when cut three or four feet from the ground may not give the accurate age of the tree. Where trees are crowded in a forest and have developed feeble crowns, the greatest annual increment is just below the crown, and it diminishes regularly downwards. When the leaf-area is not sufficient to afford food-material to provide for a sheet of cambium all over the tree, the growth stops before reaching the bottom, and the ring which is found twenty feet up the trunk may fail altogether before it reaches the ground. In such trees there may be rings lacking at three feet high for certain years, and the total number of rings would be less than the number of years in the tree's life.

A bill has been introduced into the English House of Commons, the object of which is to provide instruction in agricultural and horticultural subjects in public elementary schools, and to afford practical illustration in such teaching. The Industrial Agricultural Education Bill, as it is called, would not only secure for children in rural districts practical instruction on such subjects as fruit, flowers, and vegetable growing, the proper method of keeping cattle, rotation of crops, packing fruit for market, and other matters of equal importance; it proposes, further, that the instruction in these branches shall be carried on after the children leave school. To effect this, it is proposed to establish schools at which lessons would be given in the evenings and on Saturday afternoons. To induce parents to keep their children at school for a longer period, or to send them to the new schools, the promoters of the measure advocate the provision of a small number of scholarships of the value of thirty shillings per annum, and tenable for two years, for children who have passed the fourth standard.

The free Gladiolus show, which Peter Henderson & Co. have established as a regular feature of the floral year in this city, was visited by several thousand people last week, and the flowers, in spite of the drenching and pelting they had received from unusually violent rain-storms, were notably good. A new Gandavensis seedling, nearly pure white, was greatly admired, as was a fine group of hybrids

containing the blood of *G. purpureo-auratus*. Mr. Sturtevant sent, from Bordentown, a tank full of Nelumbiums and other aquatics. Mr. Henderson showed some remarkable flowers of a variety of *Lilium auratum*, known as Rubro Vittatum, in which the golden band through the petals is replaced by one almost crimson. A superb display of flowers of tuberous-rooted Begonias was contributed by Mr. T. Griffin, gardener to Alfred Sully, Esq., of Hackettstown, New Jersey. Many of the single flowers were nearly five inches in diameter, and the double ones were nearly as large as Hollyhocks, while the colors could hardly be excelled in richness, delicacy or variety. The plants were seedlings, and had grown in the open air and exposed to full sunshine. The exhibition remained open three days.

Constant and growing demand on a constantly diminishing timber supply in all the civilized countries is beginning to have a visible effect. In a careful article the *Lumber World* states that despite the systematic efforts of the various European countries to maintain by forestry regulations an adequate supply, the whole wooded area of Europe has dwindled to 500,000,000 acres, or less than one-fifth of the area of the continent, while the demand goes on increasing as the population increases in density and consequent poverty, forcing them to use timber, as a cheaper material than brick and stone, to build houses. Norway and Sweden have parted with nearly all their available forests. Northern Russia has been stripped so bare that at present the single city of St. Petersburg demands more than that country can spare. The fostered German forests yield an ever decreasing supply, which constantly deteriorates in quality. Bohemia, Galicia, Transylvania and some adjacent sections still possess considerable areas of forest, but they are in inaccessible mountain regions, with neither railroads nor navigable streams to make the timber available. The forests on the shores of the Adriatic have disappeared. France and Spain, Portugal and Italy, Turkey and southern Russia have little or no timber that is available. Great Britain long ago ceased to depend to any extent upon her own small woodland areas for timber. In the United States the consumption of timber goes on at an amazing rate, each year seeing hundreds of thousands of acres stripped of forests. Canada has large wooded areas yet, but the demand upon them makes it only a question of time when they shall be stripped. Asiatic, African and South American forests are still important, but at present they are unavailable because of their remoteness from the centres of consumption. The civilized world will soon awake to the fact that its timber supply is exhausted to a serious degree, but as yet there seems to be but little appreciation of the true state of affairs.

According to the New York *Lumber Trade Journal* Birch twigs are worth a good deal, besides their reputed value as accelerators of the sluggish school-boy. Even the leaves and young shoots secrete a resinous substance, which, under long names, is sold as a medicinal preparation for as high as sixteen dollars a fluid ounce. The inner bark secretes a bitterish alkaloid, not unlike cinchona in its nature, and is used largely as an adulterant for quinine in many parts of Europe. The so-called "Cinchona Mixture" has been found by analysts to consist, in many instances, of the alkaloid found in the inner bark of the humble Birch tree. The outer bark, subjected to dry distillation, yields an empyreumatic oil, having the peculiar odor of Russia leather; and the secret of preparing skins—and that too of the very poorest quality of skins, being taken from cattle that have perished on those barren, desolate plains—is the only obstacle, thus far, to prevent American artisans from competing with Russia and Austria in fine leather goods. The oil of Wintergreen, so useful, fragrant and expensive, is nearly always adulterated with Birch oil—much of it even is Birch oil, pure and simple, but is sold as Wintergreen oil, and is Wintergreen oil to all intents and purposes, having, when properly prepared and refined, the same properties. The Birch limbs, twigs, bark, and even the leaves, if a more commercial oil is to be made, are gathered and placed in a large tub containing a coil for steam heating, and as fast as the mass accumulates it is kept covered with water. After becoming nearly full, steam is turned on, and the batch kept about blood-warm for twenty-four hours. This will dissolve nearly all the oil and resinous matters, which, being precipitated, causes the mass to assume a very sticky consistency. By means of a wooden connection with a small barrel or keg, the tank is made tight and brought to a boil. The steam, having previously dissolved the oils, etc., will now vaporize them, and will condense in the last named keg. After a few hours the job is done, the keg is bunged or corked up, and is ready for shipment as commercial Wintergreen oil, though made from Birch refuse.

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A Literature Worth Indexing.

WITHIN the past three weeks we have received as many reports of state horticultural societies, each one a stout volume, and each containing papers of genuine and permanent value. In most cases the states print these books as public documents and distribute them free within their respective limits. Add to these reports the bulletins from the experiment stations, the official reports of state entomologists and botanists, the proceedings of such bodies as the pomological and viticultural societies, and the associations of seedsmen, nurserymen and florists, and we begin to realize how rapidly the volume of this literature is increasing. In fact, if one were in the way of securing all these books, he would soon find the shelves of his library filled with works on horticulture and agriculture.

We do not speak of this to question the wisdom of this distribution. As a matter of fact, these reports are year by year growing better, as increasing popular knowledge on the subjects discussed makes a demand for the more thorough treatment of them by men of special training. But it is none the less plain that they could be made much better without serious difficulty, and the information they contain could be made much more accessible, and therefore more widely useful. These books should be more carefully edited, and much that is of ephemeral or local interest, like the average "address of welcome," for example, should not be allowed to cumber their pages and add to their expense. The only way to secure careful editing is to pay for it, and, as the secretaries of these societies do not now receive adequate salaries for the duties demanded of them, an increase of their salaries is the obvious suggestion. If the money expended for printing and publishing and mailing thousands of pages of useless matter were paid to judicious men for editing out of these documents all that is not worth preserving, this important literature would at once take a higher rank.

But perhaps the most serious defect of these books is their lack of proper indexing. A hasty examination of each of the three reports alluded to at the beginning of this article disclosed many things to which we might often have occasion to refer, but it would be necessary to search

through the books, page by page, before the desired passage could be re-discovered. More than a year ago it was suggested in these columns that the work of making a full topical index of these reports was one not unworthy of the Department of Agriculture. Since then an officer has been appointed by the Secretary, whose duty it is to collate and classify the bulletins of the experiment stations as they appear, to make a condensed statement of progress in the various lines of investigation, and to publish this periodically, with notes for unscientific readers. Beyond question, this new office is capable of wide usefulness. The indexing of state and society reports would not naturally, however, come within its scope, and yet we cannot but hope that the Department of Agriculture will find some way to accomplish this work. This is the only agency through which it is likely to be undertaken.

In the June number of *Harper's Magazine*, Professor George H. Darwin writes of an important discovery relating to the constitution of Saturn's rings. This discovery was made forty years ago by M. Edouard Roche, but it has taken all these years for the scientific world to discover the discoverer and his works. M. Roche patriotically gave his memoirs to the Academy of Sciences of Montpellier, where he was professor, and there they were published—practically buried, that is; for so many learned but local societies are publishing papers that none but the largest libraries can collect them all, and no one can hope to read them all. Unless, therefore, scientific memoirs are issued at such centers as London or Paris, years may pass before their merits are recognized. Accident directed Professor Darwin to the work of this man of genius, and he could not find a single English mathematician who had read M. Roche's papers. We can hardly imagine any great horticultural discovery buried in a state report, but suggestions of great practical moment might easily be lost in this wilderness, which is now trackless and rapidly growing more dense and more extensive. It would be worth while, we repeat, for the Department of Agriculture to explore and make it accessible.

The inhabitants of dry regions like central and southern California, where Grass will not grow in the summer without irrigation, would welcome with grateful appreciation any plant which would keep green under these arid conditions, and furnish them with something like a lawn or stretch of greensward. In the issue of GARDEN AND FOREST for March 13th, 1889, M. Charles H. Naudin, director of the gardens of the Villa Thuret, who has an unrivaled knowledge of dry-country vegetation, suggested the names of two or three plants which he thought might answer this purpose. In a personal letter to the editor of this journal, M. Naudin again alludes to the subject, and we quote his interesting statements in regard to two other plants which may be used to furnish lawns for California. Our readers are aware that it is a species of *Pyrethrum* which is successfully used as an insecticide under various names, so that the effect upon mosquitoes of *P. Tchihatchewii* is not altogether surprising.

"I think *Pyrethrum Tchihatchewii* would succeed in California. It has done remarkably well here, and makes a beautiful sward, without watering, wherever the soil is not of too poor a quality. Perhaps it will do as well in California, especially where the soil has been tolerably well tilled. Besides its ornamental uses, this plant, which is a native of Asia Minor, serves here as a destroyer of mosquitoes. It asphyxiates them, so that they are harmless for several hours at a time. We dry the heads when the plant is in flower, and in the evening burn them on a red-hot iron plate, or otherwise. The essential thing is to produce a smoke which can circulate through the apartments. The pests fall insensible, and it becomes possible to sleep in peace.

"Another plant, which might succeed even better for grass-plots, and which is very suitable to dry soil, is *Lippia canescens*, or *L. repens*, a little plant which roots as it creeps in every direction along the ground, and multiplies very rapidly. It is a native of the dry regions of Peru, which explains its ability to resist drought."

A WELL-WRITTEN letter from Walnut Grove, Arizona, in the *Evening Post* of July 24th, describes the great dam recently built for a storage reservoir at that place. It took more than a year to construct it, the work going on day and night. It is of solid masonry, and is 110 feet high. It is thirty miles southeast of Prescott, on the Hassayampa river. Above it is a wide valley, shut in on all sides by high mountains, the only outlet a narrow cañon, through which the river runs. The dam blocks up the mouth of the cañon where it leaves the valley, and the valley is changed to a lake basin. There was a heavy snow on the mountains, and at last a great rain.

"Every crack in the rock fed a hollow, the hollows fed the streams that grew quickly into torrents that tore their way down the sandy washes into the lake. The lake rose three feet in an hour as the result of the local rain, but the warm rain and snow on the mountains were yet to be heard from. The catchment area of the reservoir, extending over 300 square miles, has its outer circle of mountains at least thirty miles away. It might take all night for the snow to melt and come down. But at midnight a cowboy rode in on horseback to tell us there was a wave anywhere from 50 to 100 feet high coming down the 'Hassayamp.' We took our *ponchas* and lanterns, and started for the boom. We could hear the roar of the water three miles away, but it was an hour before the wave rolled in upon us, like a great tidal swell, fifteen feet high and fifty feet across, boiling and bubbling with foam, and carrying huge rocks and trees along with it. Above the roar of the storm we could hear the boom of the other streams that one after another came on, great rivers, where an hour before there had been nothing but creek-beds.

"We went home to find the water half-way up the camp-hill, and everybody awake and rustling. The croakers who had built on the edge of the flat, in defiance of the dam level, were scurrying about in the dark, scooping their belongings into gunny-sacks, and hurrying up the hill to establish new and rival claims above the 110-foot line."

When the letter was written the water was within five feet of the top of the dam. If the mountains above were clothed with forests, the water would not be likely to come down in such enormous waves, carrying huge rocks and trees along with it. Such masses of *débris* will, of course, fill up the reservoir rapidly, but that is not so serious a matter as the probable effect upon the dam of the pressure of an unusually heavy flood. Let us hope that the dwellers along the stream below who cannot keep their claims and belongings "above the 110-foot line" may never learn from experience the destructive force of so great a volume of water when once it is set free.

How to Mask the Foundations of a Country House.—III.

HARDY shrubs, it was said in an earlier chapter, are the best things to plant close to the foundations of a house to give it the look of being integrally united with the soil beneath it, and to bring it into harmony with the natural features around it. Whether creepers are profusely used or not, whether or not trees stand near by, shrubs can hardly be dispensed with if the house is to seem to belong exactly where it stands, and nowhere else. Flower-beds can never rightly take their place, for they are at once too formal, too monotonous and too ephemeral. What is wanted is a garment that can be high in some places, low in others; here dense and massive; there light and graceful; that can now cling closely to the walls, and now spread away a little to unite them with neighboring plantations. Shrubs give us everything that is thus required, and in endless variety.

Just in this profusion of species among which he can choose lies, however, danger for the planter. When so many beautiful shrubs are offered, and so many striking novelties, he may easily forget the exact purpose in question and think too much of the claims of individual plants, and thus produce a confused medley of inappropriate plants instead of an harmonious and appropriate variety. If "specimen plants" are wanted, their place should not be here. Here the effect of the house is the first consideration. If a tall shrub is planted, it should be because a tall one is needed, not because a particularly handsome tall one has been seen in a nursery or in some neighbor's grounds. The question should not be whether one likes Lilacs especially, but whether Lilac-bushes

can be well used in the general scheme. With a little care a good spot can be found for any special favorite; or, if not, something that will win itself as high a place in its owner's affections can be found to use instead.

Of course an over-use of shrubs should be avoided. We do not want a house to look as though it grew in a thicket, or as though the cultivation of shrubs were its owner's chief concern. Mass shrubs in the angles of stoops or bay-windows, carry them along in lower groups, then break them, and for a little space let the foundations be seen resting on the grass, in order that their stability may be clearly manifest, and then in another angle place another more important group. Take the outline of the house and the character of its features as your guide, and accent these while uniting the building, as a whole, with its site. Do not conceal beautiful features, but sedulously plant out those which, like out-houses and drying-yards, should not be seen.

Plant closely at first, and then as the individuals develop thin out those which are no longer needed, for crowded, ill-grown shrubs are as ineffective as a garment for the walls as painful to the eye of the true lover of plants. Each shrub should be well developed and have room to display its peculiar habit, and the masses, as a whole, should have that play of light and shade and that freedom of movement which overcrowding ruins. Above all, never shear off the tops of these shrubs to a horizontal line; nor clip them into stiff or formal shapes; nor trim away their lower branches and cut back their heads to make them look like dwarfed trees. If the proper selection has been made, all pruning and training should be with a view to bring out the distinctive character of each shrub, and not to force any of them into alien and unnatural forms. Shrubs which stand in front of a plantation should sweep the ground with their branches. Behind these may stand others of a different habit, but to place individuals which naturally grow well above the soil in the foreground, or to clip others till they present a similar, but, of course, less pleasing appearance, is to give a shrubbery a bald, ill-grown and ungraceful look. Nor is there any place where this look is so unfortunate as in shrubs, the very purpose of which is to unite the base of a house with the ground upon which it stands. If a shrub thus placed grows too large, take it out and let its neighbors gradually fill the space, or plant a smaller one in its stead. Severe cutting will only spoil it, and in spoiling it you will injure the effect of the whole group to which it belongs.

Color should be especially regarded in choosing shrubs and creepers. One monotonous tint of green is to be avoided, and, still more, an excessive use of bright-hued plants. Green is Nature's color. The bright-hued plants which, in this climate, she spontaneously produces are few, and the vast majority of those which the nursery-gardener offers us are those sports and freaks of Nature which she herself, perhaps, would regard as lamentable mistakes. Curiosities have, however, a great attraction for the average man, especially at the moment when they rank as novelties also, and far too many places are disfigured by an accumulation of abnormally colored plants, with striped or blotched or speckled foliage, and especially with foliage of those sickly yellow hues which go in nursery catalogues by the attractive name of "golden." A single plant of this sort may often produce a pretty effect, if grouped among others of a normal tint—as a slender Golden Honeysuckle climbing amid others of ordinary kinds, or a single red Japanese Maple, associated with a mass of dark-green shrubs. But to plant too many of them, and to mingle reds and yellows, streaks and spots, in the reckless manner that we often see, is to destroy all peacefulness and unity as well as all naturalness of effect.

But, even when shrubs of a normal hue are adhered to, there is still need for selection. The different shades of green should be well distributed. Each should form a mass of sufficient size to prevent any look of spottiness and restlessness in the general effect, each should harmonize with its neighbor, and each should be in right relationship to the house itself. A dark-blue green should not stand next to a light and rather yellowish green—there should be a medium tint to make a transition between them. Nor does a pale grayish-green harmonize well with a yellowish tint, although, against a dark blue-green, it may look well. Again, a rather yellowish shrub, which might have an excellent effect against a shingled or a painted wooden house, may look too crude against a red brick wall, while each different color in stone will make a different demand upon the exhaustless resources of the intelligent planter. In general, if dark-colored foliage is used in the background and lighter colored in the foreground, and if there is more variety of hue near the eye than further back, the shrubbery will gain in depth and richness of effect.

Florence Nightingale's Home.

MISS Nightingale was born in Florence and named after that beautiful city, but her early years were passed in England, where her father owned two estates, Embley Park, in Hampshire, and Lea Hurst, in Derbyshire. Lea Hurst was the favorite residence of the family during the summer months, and it is this house which our picture on page 391 represents. It is a stone house, not very large, which stands among woods in a place containing about 5,000 acres, and commands wonderful views of the Peak country. It is about two miles from Cromford station, and not far from Matlock, in a delightful district watered by the river Derwent, and rich in picturesque dales and dingles, moss-grown masses of limestone rock, and wide stretches of moorland. In the vicinity of Lea Hurst stands Willesley Hall, formerly the home of Arkwright, with the mill where the spinning-jenny was first used; and likewise Wingfield Manor, where Mary Queen of Scots was imprisoned for nine years.

The house at Lea Hurst is in the Elizabethan style of architecture, but we can find no evidence that it is a genuine relic of Elizabethan times, and, at all events, the bay-window in the foreground of our picture, with its balustraded roof, is a piece of modern construction. The interest of the building lies, first, in its associations with a very famous and admirable woman, and then in its typical charm as an example of an English country-house of a modest kind, tastefully surrounded by luxuriant plantations. The point to which we especially desire to call attention—as illustrating the counsels we give on another page—is the intimate union into which these plantations have brought the house and its site. The clinging robe of vines, clothing yet not wholly concealing the walls, and the masses of shrubbery, highest opposite the high gables of the front, and sloping irregularly downward toward the entrance steps, form a delightfully soft, graceful, and natural-looking transition between the house itself and the landscape which we imagine further away; and the rugged irregular Cedars of Lebanon on either side of the steps give a desirable accent of force and picturesqueness. If we fancy this house deprived of its shrubberies and standing naked on a stretch of lawn, or encircled by flat, formal, gaudy flower-beds, we realize the advantages of the more rich yet natural arrangement that we see.

The Art of Gardening—An Historical Sketch.

VIII.—The Love of Nature.

THE Greeks and Romans, we are often told, cared much for art, little for nature; a genuine appreciation of the charms of the inanimate world is a product of modern civilization, and only within the past two centuries, with the general growth of "romantic" habits of mind, has it reached its full development. Of course a comparison of classic with modern literature has been the basis for this belief; and it certainly seems justified if we study both classes of writings from the same point of view and confine ourselves strictly to the one subject under discussion.

Nevertheless, while it cannot be denied that there is a distinct and important difference between the classic world and ours as regards the love of Nature, its degree has been much exaggerated, and the true reason for it is not generally understood. The first approach to a right conception of the matter was made, I think, by Humboldt in the second volume of his "Cosmos," but even yet his views do not seem to have greatly influenced current thought. As he points out, the witness of Greek literature to a want of poetic sentiment in the presence of Nature is negative, not positive; it consists in the almost total absence of such descriptive passages—analytical, rhapsodical, sentimental—as occur in profusion in all the verse and prose of our day. But, he explains, this negative evidence does not prove a "deficiency in sensibility" so much as a lack of strong desire to express it in words. The Greek was chiefly interested in active life and in the spontaneous movements of the human soul; his poetry therefore took a dramatic, lyric or epic form; in neither of these is there much place for descriptive writing, and his love for Nature was commonly expressed in the personification of all its elements, not in panegyrics upon its actual aspect. If Greek writings are studied with these fundamental and illuminative facts in mind, they unquestionably prove that a stronger feeling for natural beauty existed than we have been taught to believe. It revealed itself in a way quite unlike our way, yet was vital and widespread. Do what a modern writer will, man is always the central figure in his pictures, as in the pictures of the ancients. But to-day it is contemplative, receptive man, as affected by the emotions

which Nature excites; and her aspect is therefore portrayed with infinite detail and extended explanatory comment. In the classic world, on the other hand, active man—doing, thinking, originating man—was always the central figure; his feeling for Nature expressed itself by reading into her beauty his own spontaneous emotions; by vivifying, personifying her elements; by giving her, so to say, a multitude of human hearts and souls.

But, it may be objected, this is a mere begging of the question. If the Greek had really loved Nature as we do, his mood would often have been like ours—subjective, contemplative, receptive; and he would have created a form of literature proper for its expression. Humboldt's position, as he explains it, is indeed open to this charge; but he might have greatly strengthened it by showing that the Greek's lack of impulse toward descriptive expression was not confined to the emotions which Nature excited. It will hardly be disputed that the Greek, above all other men, had a true, passionate, acute and widespread appreciation for art of every kind. Yet how much does his literature contain in the way of an analysis of the emotions that works of art excited in his mind, or even in the way of detailed description? Almost endless catalogues of buildings, statues and paintings exist from the pen of travelers and historians; but if a phrase of description or criticism occurs, it is so brief and superficial that we might fancy it written by some barbarian stranger rather than by a man akin to those who had created such marvels of beauty and skill. How little we know about the perished paintings of Greece—how much we should know had a single essay of the modern kind been written about them—a single tourist's record, a single chapter of criticism! No Greek writer helps the modern antiquary in his disputes over the manner in which the temples were adorned with color; and even of such celebrated works as the Olympian Jove and the Cnidian Venus we know less than a newspaper reporter of to-day would have told us in a passing paragraph. Works which have excited modern men to a hundred volumes of rhapsodical description and hair-splitting analysis are passed over by the old writers with a word; they were eager enough to tell what fine things could be seen in this place or in that, but it rarely occurred to them to say just how they looked, never to explain how they affected their own sensibilities. If we take up such a book as Jefferies' "Field and Hedgerow," we may think that it reveals more love for Nature than the whole literature of Greece, but all this literature contains less evidence of a delicate feeling for the qualities of a work of art than the single essay in this same volume on the "Crouching Venus" of the Louvre. And if we do not draw the conclusion that modern Englishmen feel art more keenly than ancient Greeks, we should be careful not to be too hasty in our generalizations with regard to a love for Nature.

I do not mean by all this to assert that the Greek loved natural beauty just as we love it to-day. Perhaps he felt it as intensely in some of its manifestations, but he seems to have been comparatively blind to others. Or, to speak more exactly, while he loved all that he thought beautiful in Nature, the term was not so wide a one for him as for us. All his works of art unite in proving that beauty to a Greek meant simplicity, sobriety, clarity, grace, balance and repose. The stern majesty of Egyptian architecture was as foreign to his spirit as the elaborate variety of Gothic; the fantastic rhapsodies of an Indian epic could no more have sprung from his brain than the awesome, terrible imaginings of a Dante. He had no love in art for the complex, the irregular, the mysterious, the grotesque, or the gloomy; and I think almost the same can be said of his love for Nature. In classic thought, moreover, a far greater place than we give to-day was given to the claims of the physical as distinguished from the spiritual man, and this fact naturally limited the Greek and Roman in their appreciation of such scenes as are palpably unfit for man's comfortable habitation. The love we now feel for the awful, the terrible, the savage and grandiose in Nature, was certainly not shared by the men of classic times; but this truth—illustrated by many hackneyed anecdotes—has too often been misread to prove that they did not really care for Nature in any shape.

Another point which Humboldt makes has regard to the reason for this difference in sensibility. As I have said, it is usually cited to mark an unlikeness between ancient and modern times, but it is rightly explained, not by facts of time, but by facts of race. That kind of love for art and Nature which the Greek displayed is "classic" in the narrower sense referring to Greece and Rome, not in the wider popular sense which includes all the races and peoples of the ancient world. The Greek differed from the modern German in his love for Nature, not because he was earlier born, but because

his blood was different, and with it his whole mental and spiritual attitude. As were the Greeks and Romans, so, broadly speaking, are their descendants of to-day in the south of Europe; as are to-day the peoples of the north of Europe, so, broadly speaking, must have been their ancestors in central Asia. The Teutonic influence has now largely permeated the south, and the classic influence has spread everywhere at the north; but fundamental, racial characteristics have nowhere been obliterated, and whenever a genuine, spontaneous impulse speaks through art, then they are still clearly voiced. As, after centuries of effort and practice, classic architecture has never become thoroughly at home in England, so the true subjective Teutonic sensibility to all forms of Nature, and its marked preference for awe-inspiring, irregular or picturesque types of landscape, has never become part and parcel of the Italian temperament.

I have had to make a place for these general explanations in order to show later on why the art of gardening developed as it did in different countries. Of course the attitude of a community towards the beauty of natural scenes was not the only cause which affected the development of this art; but it was one of the causes, and it should not be left out of sight if we wish to understand how gardening, like all its sister arts, illustrates the fundamental characteristics of each nation that has practiced it.

New York.

M. G. Van Rensselaer.

Notes Upon Some North American Trees.—V.

PARKINSONIA.—Mr. Watson finds (*Proc. Am. Acad.*, xi, 135) that "the characters which have been relied upon to separate *Cercidium* of Tulasne from *Parkinsonia* do not hold good in regard to our western species," and he therefore unites, so far as concerns our North American plants, these two genera. A re-examination of all the available material in our eastern herbaria shows, however, that the valvate imbrication of the calyx-lobes is constant in *Cercidium* and that the thickened glandular claw of its upper petal does not appear in our species of *Parkinsonia*. But the real distinction between the genera lies in the fruit which in *Parkinsonia* is linear, rounded and torose, while in *Cercidium* it is linear-oblong compressed, and in one species slightly contracted between the seeds. This difference in the fruit seems sufficient to keep the two genera apart, and I should therefore propose to replace *Parkinsonia Torreyana*, Watson (*l. c.*), and of the Census Catalogue, by *Cercidium Torreyanum*; and to include in the *Silva* the original North American species *C. floridum*, Benth., which, it is now known, becomes a tree of considerable size in the valley of the lower Rio Grande, especially south of the river, where I have seen it in great numbers along the road between Monterey and Seralvo, growing to a large size. The eastern and western species are very closely related, and the two trees are hardly to be distinguished as they are seen growing. Mr. Watson's characters (*l. c.*) for the fruit of the western species—"pod with a double groove along the broad, ventral suture, usually two inches long or more, two to eight-seeded, straight or somewhat contracted between the seeds; seeds very thick"—serve, however, to distinguish it from the lower Rio Grande-valley plant, which has much smaller and thinner pods, with a narrow acute margin on the ventral side, and smaller and thinner seeds; but the flowers of the Arizona species are certainly axillary, and only accidentally terminal, as described, an error due, perhaps, to the fact that the original flowering specimen which served for the figure published in the Pacific Railroad Reports (v., t. 3), and preserved in the herbarium of Columbia College, is an unusually vigorous shoot from a broken branch, with larger leaves than are usually produced, and terminated by a short raceme of flowers. From this single shoot the branch which appears in the figure, with numerous terminal racemes, must have been made up. The racemes in all the other specimens which I have been able to examine are axillary, as they are in *Cercidium floridum*. Mr. C. G. Pringle, who has enjoyed excellent opportunities for observing these trees where they grow, sends me the following note, which serves to confirm Mr. Watson's opinion that they are specifically distinct: "I have given considerable attention to *Parkinsonia Texana*

(the *Cercidium floridum* of Benth.), but did not arrive at a clear opinion as to its relation to *P. Torreyana*, of Arizona. The Rio Grande tree has a bright-green bark, even to the trunk, while the other has a rough-barked trunk in adult specimens, and the bark of the limbs is olive-green or yellowish-green, a difference which may be caused by differences of climate. The Texan, even on fertile plains, appeared to be a much smaller tree, which seemed surprising to me if both belong to one species. The Arizona tree flowers profusely in April, and few leaves put forth until after the mid-summer rains come. I do not know the habit of the Texan tree; last year it must have flowered, though but scantily, throughout July and August, and it must be in full leaf from April till October." I found it early in April, 1887, in full flower on both banks of the Rio Grande.

96. *LEUCENA PULVERULENTA*, Benth.—This, "the *Mimosa*" of the American inhabitants of the lower Rio Grande Valley, is a much larger and more beautiful tree than the notes of early travelers in the region implied. I have seen specimens growing wild on the banks of the Rio Grande, ten or twelve miles below Brownsville, which were fifty or sixty feet high, with straight trunks, covered with cinnamon-brown bark, at least twenty inches in diameter; and there were specimens in some of the gardens of Matamoras which were nearly as large. This tree is exceedingly ornamental in habit, in foliage, and in flower; it grows with great rapidity, and it might be introduced advantageously into all the Mediterranean countries and into California as an ornamental tree. The wood which it produces is valuable, too, being very hard, heavy and close-grained, of a rich, dark-brown color; the color of the sap-wood being bright, clear yellow. The large specimens, however, in its native country, are generally hollow or defective, so that it is esteemed as an ornamental tree only. The illustration upon page 389, which is made from a photograph taken last summer by Mr. Pringle, represents a moderate-sized specimen, and shows the graceful habit of the trees of this species. C. S. Sargent.

New or Little Known Plants.

The Chinese Quince.

M. ANDRÉ joins some interesting notes to a beautiful colored plate of *Cydonia Sinensis*, published recently in the *Revue Horticole*. This plant, which must not be confounded with the Japanese Quince met with so generally in gardens, is not often seen in cultivation, although it may be expected to thrive in the middle and southern states.

Cydonia Sinensis is a small tree, with numerous upright, slender branches, oblong or obovate glandular-toothed stipules, and oval, serrate leaves, pointed at the two extremities, the lower surface at first pubescent, but becoming quite glabrous at maturity. The calyx-lobes are acuminate-reflexed, and the petals are small, not more than half an inch long, oval, pale pink, streaked with red. The fruit is shaped like a barrel, five or six inches long. The diameter of each of the two ends is somewhat greater than that of the middle, and it is prominently depressed at the top and bottom. The flesh is hard, granular and dry, creamy-white or yellow. The skin, at first green, ripens to a beautiful dark yellow, dotted with brown or nearly black spots. The odor is peculiar, and intermediate between that of the fruit of the common Quince and of *Cydonia Japonica*. M. André notes that the figure in the *Revue Horticole* is the first that has been published of this beautiful fruit, and that the climate of Paris is not hot enough to thoroughly ripen it without the aid of espalier cultivation. The Chinese Quince flourishes, however, in the south of France, and its fruits, sent from the neighborhood of Toulouse, are seen sometimes in the markets of Paris, where, although not very well known, they are esteemed for preserves.

Cydonia Sinensis is widely distributed through western

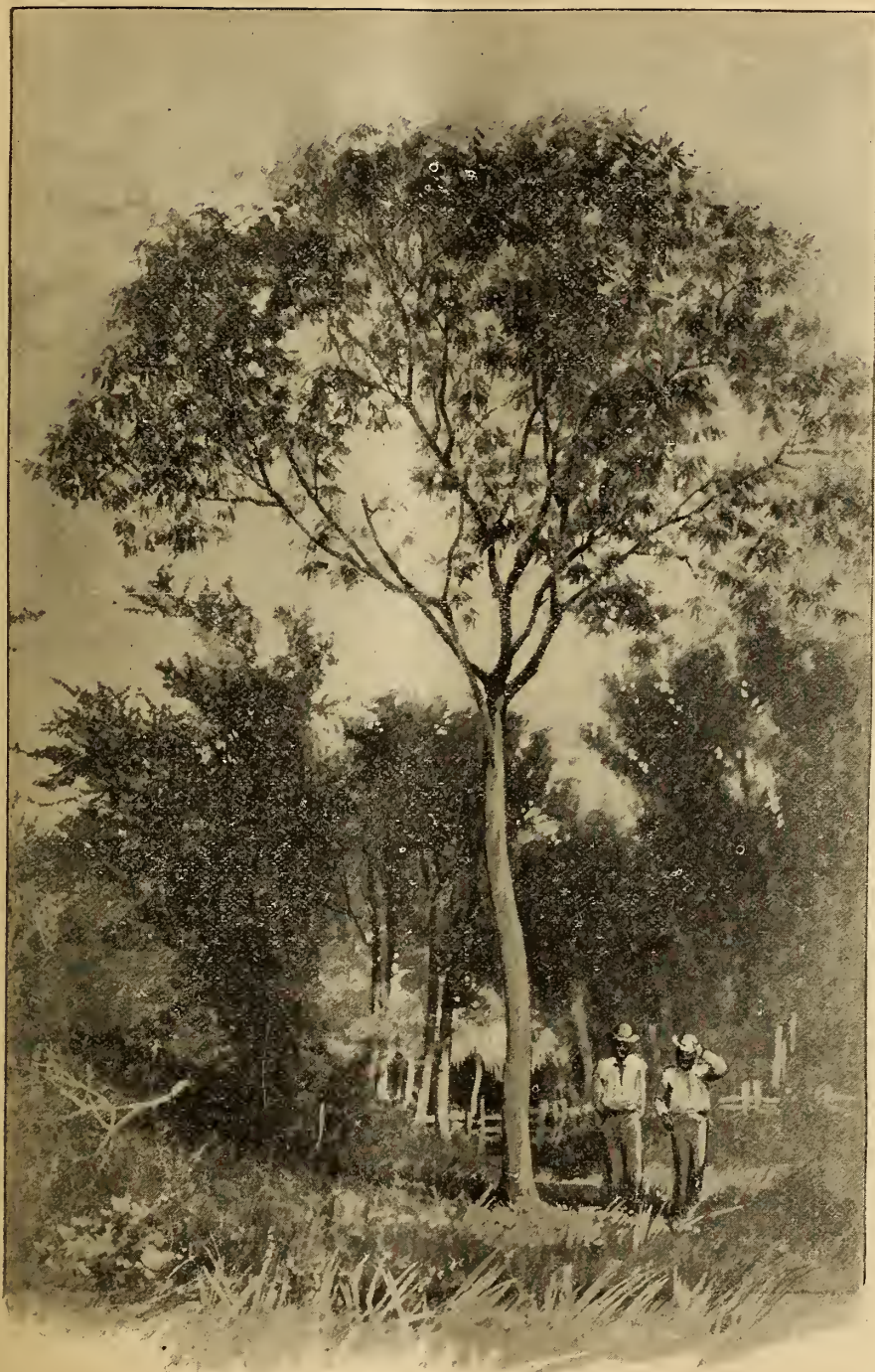


Fig. 122.—*Leucaena pulverulenta*.—See page 388.

Asia, and, could seed be procured from near the northern range of its distribution, plants could be raised which might prove hardy in the northern states.

It would be interesting to know if this handsome plant is cultivated anywhere successfully in the United States.

Foreign Correspondence.

London Letter.

THE great Rose tournament in honor of the Shah of Persia at the Crystal Palace was simply an ordinary Rose show magnified several times, and therefore needs no description. Your readers will be more interested in the new Roses, which, as a rule, are shown in full force, as the National Rose Society's gold medal for the best new Rose not in commerce is a much-coveted prize—is, in fact, the blue ribbon among rosarians. Mr. Bennett, the raiser of *Her Majesty* and other fine Roses, has done much to elevate the standard of excellence in new Roses, so that now a gold-medal Rose must be of superlative

merit. This year the fortunate medalist is Mr. Prince, of Oxford, who is undisputedly a prince of Tea-rose growers, and the sort that gained the honor is the *Souvenir de S. A. Prince*, a pure white sport from the old favorite, *Souvenir d'un Ami*. The flowers are large and full, of fine form, and deliciously fragrant. If it can be always grown as Mr. Prince shows, it will prove one of the best of white Teas. He grows it, as, indeed, he does all his Teas, on the seedling Brier, and few hereabouts can equal his blooms. I was much pleased to see how very prominent the lovely American Rose, *The Bride*, was at this show. It was in all the best collections, a proof that it has established itself in the good graces of critical rosarians. Of the new Roses already in commerce there was a goodly show, and the first prize for twelve trusses was taken by *Lady Alice*, a pale sport from *Lady Mary Fitzwilliam*, whose good qualities it possesses, but it was not so much admired as *The Bride*, which was second, while a good crimson hybrid perpetual, named by Paul, of Cheshunt, *Queen of Autumn*, was third. The collections of a dozen new Roses were fairly good, and among the winning twelve were *Grand Mogul*, *Her Majesty*, *The Bride*, *Primrose Dame*, *Silver Queen*, *Viscountess Folkestone*, *Miss Ethel Burnside*, *Duchess of Leeds*, *Earl of Dufferin*, and *M. Mat Baron*, all first-rate sorts. The prizes (silver medals) for the finest blooms in the whole show of hybrid perpetuals and Teas or Noisettes were won by Ulrich Brunner and *Comtesse de Nadaillac* among nurserymen, and among amateurs, *Marie Baumann* and *Comtesse de Nadaillac*, which says a great deal for the Tea-scented variety, which has been grandly shown this season everywhere. The classes for specified varieties are generally well represented, as the sorts are usually those most popular and grown on a large scale. Thus there were classes for a dozen blooms of *Lady Mary Fitzwilliam*, *Marie Baumann*, *Her Majesty*, *A. K. Williams*, *Marechal Niel*, and *Niphetos*, which are, probably, the most extensively grown sorts now. The classes for Roses of particular colors were interesting. *Prince Camille de Rohan* was the finest dark crimson, *Alfred Colomb* the best crimson, *Merveille de Lyon* the best white, and *Madame Caroline Kuster* the best yellow.

The last fortnightly meeting of the Royal Horticultural brought a few novelties to light, and some of sterling merit. Among the Orchids there was a lovely variety of *Cattleya Mendelii*, from the Blenheim collection, and named *Duchess of*

Marlborough. It was called a white variety, though it is not quite pure; but the delicate suffusion of mauve, which overlies the whole flower, renders it very charming, and the large size and fine form of the flower add to its beauty. It won a first-class certificate, as did also a wonderfully fine variety of *Oncidium crispum* called *Grandiflorum*. Its flowers are nearly twice the ordinary size and richly colored, while the spikes were a yard long and widely branched; in fact, it was, in this respect, more like the branching-spiked *O. Marshallianum* than the ordinary *O. crispum*. Other noteworthy Orchids were *Phajus Humboldtii*, one of the rare terrestrial Orchids from Madagascar, which one seldom sees in flower or even in good health; but it is not a remarkable beauty—not comparable with its companion, *P. tuberosus*. The magnificent *Laelia callistoglossa*, one of the hybrids from *L. purpurata*, was grandly shown. It resembles its parent in growth and in flower somewhat, but the labellum, the finest part of the flower, is larger and of a very rich amethystine purple. The beautiful, small, late-flowering variety of *Odontoglossum vexillarium*, named *Superbum*, was shown in fine flower. It is smaller than the ordinary form, and its blossoms are paler, but enriched with a large crimson

blotch in the centre. The new *O. Harryanum* seems to be common now, and has proved not difficult to manage, and one of the best forms of it was shown, which is far more beautiful than those one usually sees of it. Those interested in Orchids of botanical merit were pleased with the little *Phytosiphon Loddigesii*, which has leaves like a *Masdevallia*, and tiny nankeen-yellow flowers on slender spikes. A botanical certificate was unanimously voted to it.

The General Floral Committee awarded four first-class certificates. One was to a golden-hued conifer, *Retinospora filifera aurea*, shown by Messrs. Veitch, and which is considered a "good thing," but, as the ordinary green form of this conifer is not a first-rate hardy tree, the golden form of it can scarcely be expected to be so, except in a few localities. An enormous variety of *Iris Kämpferi*, named White Banner, received a unanimous award. The flowers measured no less than ten inches across, with petals four inches wide, and the whole almost pure white. In fact, it carried but a faint suggestion of a lilac tint. It is the finest *Iris* yet seen. A first-rate plant is *Rhodanthe maculata flore pleno*, which Messrs. Veitch showed. The flowers are very double, and perfectly globular, like an incurved *Chrysanthemum* in miniature. There were two forms, one with pure white flowers, the other a rich rosy-pink. It is said to come here from seed, and lasts much longer in perfection than ordinary single flowers. Mr. Ware won a certificate for his new variety of Panther Lily (*Lilium pardalinum luteum*), the flowers of which are a rich orange-yellow, copiously spotted with black. It differs from the variety Warei (also new), which, besides the absence of crimson in the flower, is spotless. Some awards of merit were voted to a pure white *Carnation*, a border variety, with large, smooth-petaled flowers, an improvement on *Gloire de Nancy*; to some exceptionally fine flowers of the Hose-in-hose *Canterbury Bells* (*Campanula Medium calycanthema*), with tints ranging from pure white through pinks to purples; to a neat little *Capsicum*, named Coral Red, with an abundance of small, bright-red fruits, and to a collection of *Auricula*-flowered Sweet Williams, a beautiful class of plants that of late years seem to have suffered neglect.

Among other noteworthy exhibits were some flowering shrubs from Messrs. Veitch, including the pretty *Notospartium Carmichaelæ*, a leguminous shrub from New Zealand; a variety of *Cupressus Nutkaensis*, with silvery-touched foliage; and *C. Goveniana*, a Californian species recalling the common *C. macrocarpa* in general aspect.

The Fruit Committee had a few good novelties to deal with, and they certificated a new Raspberry, named Hornet, from Messrs. Rivers; a new Pea, Consummate; a large-podded Marron Melon, Countess, white, very juicy and richly-flavored; and Lettuce la Grosse Paresseuse, a late Cabbage variety, of French origin, but shown by Messrs. Veitch. *W. Goldring.*

Cultural Department.

Planting Strawberries.

THE fall-planting of Strawberries is generally attended with the best results the more nearly it approaches summer-planting. July is as much better than August for this work as August is better than September. Those who claim that planting can be done as late as October and November, with success, probably mean that these plants will pass the winter safely; but the results of such late work will not compare with that following work done a month or two earlier. Even then all conditions should be favorable, and the plants should be merely moved from one portion of the grounds to another, and with as little disturbance of the roots as possible. In case of plants received from a distance, such late work, as a rule, is not very satisfactory, and is not to be commended. A partial crop of fruit is all the advocates of fall-planting can expect.

Plants set now, and well cared for, should give a full crop next season, a gain of a year over next spring's setting; but to insure this the plants should be handled with care, and have the benefit of good soil and generous treatment. The ground from which early Peas, Potatoes or Sweet Corn has been taken is a good place for the new Strawberry-bed. If the ground is not rich, it should be made so by well-decomposed stable-manure or commercial fertilizer, well worked in, and the plants carefully lifted, with sufficient soil attached to keep the roots intact and cause as little check as possible. Rows twenty inches apart, and plants set twelve to fifteen inches in the row, are very good distances. Care should be taken to get the crown of the plant even with, but never below, the surface of the ground. A deviation from this rule, simple as it is, often proves fatal to the plant. The advice to set trees a little deeper

than they stood in the nursery is good in some instances, but it should in no case be extended to Strawberries.

This excessively moist weather is extremely favorable for the successful establishment of new beds, and when the elements favor, is our opportunity. Plants that have been rooted in pots while still attached to the parent plant, have of late years become quite an important item in the trade, and for transporting long distances, if properly managed, they help to insure against losses, because when turned out of the pots, and the ball of earth, with every root entire, is wrapped in paper and well packed, they carry with perfect safety. But where one has plants of his own growing, or when he gets his stock near by, potted plants possess no advantage. If they have been potted so long as to become pot-bound, they are really inferior. With such plants it is best to break up the ball of earth and roots when planting, to give new roots a better chance to start. If plants are dry or wilted on arrival, they should be watered when set, and shaded from the sun a few days till they recover. The removal of one or two of the first leaves is also beneficial in either case, as there is less surface for evaporation. Where one can dig his plants with a lump of earth attached and the roots in their natural position, one has no occasion to use potted ones.

For the amateur there is no better way than to renew his beds every year, as above indicated. The ground can be kept in constant use, and Strawberries invariably produce the finest and best fruit at the first crop. It is often more expensive and troublesome to clean out an old bed than to plant and care for a new one. These new beds should be frequently hoed, to induce the greatest growth possible, and on the approach or advent of freezing weather, the entire bed should be lightly covered with leaves, salt hay, straw, or coarse manure. It is frequent freezing and thawing that injures Strawberry-plants by lifting and breaking the roots. Mulching is of more value in keeping the frost in than keeping it out, and should not be so thick as to smother the plants. In spring the crowns of the plants can be uncovered when danger of late frosts is over.

Among the newer sorts that seem to have made a record the past season over a wide extent of country, of sufficient promise to justify a general trial in a limited way, we may mention Pearl, Jessie, Bubach, Warfield and Haverland.

Montclair, N. J.

E. Williams.

Transplanting Herbaceous Perennials.

A GOOD portion of the hardy herbaceous perennials, if properly cared for, can be transplanted with better results in the latter part, or even the middle, of summer than late in autumn. Early-flowering plants, which start into growth as soon as the snow is off in spring, make their preparation for this the previous autumn. If we will examine closely our beds of such early plants as the Trilliums, Claytonias, Early Anemones, etc., just before winter, we will find the flower-buds for the coming year well formed, ready to start into growth the moment spring arrives. The middle or last of August is not too early to set such plants. It is much better to set them early, so that they can make their autumnal growth where they will remain through the winter, than to transplant them just before winter. There is always more or less loss of fibrous roots in lifting such plants, and, when the transplanting is done early, the plant can recover before winter. Such plants as the Trilliums, Erythroniums, early-flowering Anemones, Thalictrums, Violets, etc., will do better the next season if transplanted early. Indeed, this list, so far as hardy herbaceous plants are concerned, could be almost indefinitely extended. We have transplanted during their flowering season, with the best possible results, such kinds as the Lady Slippers, Golden Rods, Asters, *Senecio aureus*, *Pentstemon pubescens*, the Cone-Flowers, etc. Such varieties should be cut back almost, if not quite, to the roots.

It frequently happens that the driest part of the year comes at this time, and, if such is the case, sufficient moisture, which is very necessary, should be artificially supplied until the plants become well established.

Most of our bulbs for fall planting do better when set early. A new growth of fibrous roots is formed, which enables the plant to start sooner and stronger in the spring. We have had better success with Lilies which were planted early. In fact, we prefer wintering them in a cool cellar to late setting. Many plants, especially Lilies, are greatly reduced by seed-bearing. Plants of *L. Canadense*, taken up while in flower and the bulbs then replanted, will give better blooms the following year than if left to seed in their original location. The same may be said of others. As soon as the seed-vessels begin to form there is a great demand upon the bulb. Those who do not allow their

Lilies to go to seed will get more and better flowers the next season. The California Lilies are among the first to bloom here. We believe *L. Washingtonianum* and *L. Columbianum* are the earliest of these. *L. Humboldtii* is also an early species. These plants seem to require a good deal of time to establish themselves. We find that unless the bulbs are set very early they seldom flower before the second year. Last fall, just before winter, we planted some of the largest and finest bulbs of *L. Washingtonianum* we ever saw. Not one of them has flowered, and only a small fraction of them have come up at all.

Charlotte, Vt.

F. H. Horsford.

Root Cuttings.

THIS easy method of propagation may be used to advantage with a number of plants, and in many cases will be found superior to the usual system of cuttings of the top growth in producing more shapely plants, resembling seedlings in habit of growth. It will also be found that a larger number of

growers on the ground that the plants so produced prove more floriferous than those from cuttings of the roots. In the case of the double varieties, there is also some risk of reverting to the original form from which they have been derived when propagated from the roots. From an æsthetic point of view this would not be a misfortune, as the single-flowered form of either variety is undoubtedly far more beautiful than the double.

The preparation and planting of root-cuttings of the few species mentioned above are very simple operations, and but little experience is necessary to make them successful. In the first place strong roots should be selected and detached from the parent plant without being bruised or crushed, after which they should be cut into pieces about one and a half to two inches in length, and dibbled into the pots or pans prepared for them. These pots should be well supplied with drainage, about one-third the depth of the vessel being a good proportion, and on this a layer of light soil should be placed, and the filling concluded with a layer of clean sharp sand, in which the cuttings are to be placed at such a depth as to entirely



The House of Florence Nightingale at Lea Hurst.—See page 387.

young plants may be raised in a given time by means of root-cuttings than of top-cuttings among certain species, as, for instance, several varieties of *Aralia*, top-cuttings of which require a considerable time to root, and frequently refuse to start into growth for some time after rooting. Probably the most satisfactory varieties of *Aralia* for the amateur grower to experiment with in the matter of root-cuttings are *A. papyrifera* and *A. Sieboldii*, both of which are readily increased in this manner. Many of the *Clerodendrons* can also be propagated in quantity by the same plan, and, these plants being naturally vigorous in root, a supply of root-cuttings is very easy to procure, and seldom fails to give a crop of young plants. As to varieties, it may be added that *Clerodendron Thompsonii*, *C. splendens* and *C. speciosum* are easy to multiply in this way.

Some of the *Allamandas*, for example, *A. Hendersonii* and *A. Schottii*, may also be propagated in this way, and, being of rapid and easy growth, the young plants soon become large enough to flower. It is hardly necessary to call attention to the fact that many of the *Bouvardias* (*B. jasminoides* is not of that class) may be propagated in this manner, though the old method of soft-wood cuttings has been again adopted by many

cover them. The pots or pans should then be put in a house where they can receive some bottom heat (about 75° to 80° being sufficient), and watered enough to keep them damp. If these conditions are maintained, the young plants will most likely be pushing through the surface in from three to four weeks, and will soon be ready to pot off in the same manner as other cuttings.

This operation may be performed at any time of the year, but is usually most successful during the summer months, most of the plants mentioned above being in full growth at that season, and therefore the cuttings start away sooner, and give a greater percentage of plants than when put in during the winter. In the latter season, too, the cuttings are much more likely to damp off.

Holmesburg, Pa.

W. H. Taplin.

Diplarrhena Moræa, offered this year as a novelty by Mr. W. Bull, the English nurseryman, is not likely to be very popular, because its flowers are not of long duration (lasting only a day at most), and they are not numerous enough to satisfy the very large number of persons who want their plants to

bear a blaze of blossoms all the year round. Nevertheless, the plant is not without merit from a gardening point of view, for it is both beautiful and interesting. The three divisions of the flower which correspond to the "falls" of an Iris are broad except at the base, and bear an orange or yellow spot on a pure white ground. These divisions are nearly flat, but are bent slightly downward where the broad part begins. The three divisions which alternate with the falls are spoon-shaped, snow-white, and incline somewhat upward. The stigmas, shaped like those of an Iris, are light purple.

These flowers are about two inches in diameter, and are produced at intervals of a few days nearly all the year; the same stalk bearing them at the tip and increasing constantly in length though not in thickness, and, after flowering for years, producing a new plant at its extremity. A specimen in my possession, which has stood on a high shelf for six years, has sent a flower-stem down to, and along, the ground to a length of about ten feet, but of no greater thickness than an Oat-straw.

Some of the theorists of the present day believe that every prominent spot of color on the petals of a flower is placed there as an "indicator" to guide the bees, so that in getting the honey they may fertilize the blossom. The orange blotch on a snow-white ground would seem to be admirably adapted to this purpose, but, alas for theory, this plant, so conspicuously marked, is perfectly self-fertilizing. Theory often breaks down when put to the test.

Diplarrhena is one of the fibrous-rooted, evergreen genera of iridaceous plants, and contains only two species, natives of Tasmania. Seed of *D. Moraea* is sometimes offered under the name of *Vieusesxia alata*.

Canton, Mass.

W. E. Endicott.

Vanda Hookeriana.—This remarkably pretty species was first described in 1856 by Professor Reichenbach in Seemann's *Bonplandia* from a specimen seen in the herbarium of Sir William Jackson Hooker, who, at that time, was director of the Royal Gardens, Kew, and to whom this plant was then dedicated. Famous accounts of it were heard from travelers who had seen it growing in Borneo on the trunks of trees along the banks of rivers, and fully exposed both to the burning sun and heavy rains. For many years numerous attempts had been made to introduce it alive to England, but, though the plant grew so freely and strongly in its native home, it could not stand a long voyage, and, consequently, when the plants reached Europe they were either all dead or beyond recovery. In this way many hundreds of plants perished, until towards the close of the year 1873 several plants at last reached London alive, and were consigned to the collection of Lord Rothschild, of Tring Park. Here they remained until September, 1882—or about nine years—before one of them flowered. Before this event took place the plants excited little interest, as many believed them to be only slender forms of *Vanda teres*. But when the flowers appeared, great was the surprise and admiration of every one who saw them. Unfortunately, this species seems to be a shy bloomer. Mr. Hill, the gardener at Tring Park, first succeeded in flowering it, and still continues to do so every year. At the present time he has several fine specimens in flower, which present a magnificent sight.

When not in flower, this *Vanda* may be described as having the general appearance of *V. teres*, but may be readily distinguished from that species by its more slender, quill-shaped stems and leaves, the latter being sharper and glaucous green. The short peduncles, which are produced from the upper portion of the stem, usually bear two or three flowers. The upper sepal is erect, obovate, and undulate, pure white, faintly tinged with rose in the centre, and the elliptic-oblong, wavy, lateral sepals are similarly colored. The sub-rhomboidal petals, which are also white, but more heavily washed with rose than the sepals, make a half-twist forward at the base, thus bringing their back surface uppermost, and in a horizontal position. The projecting trilobed lip is quite two and a half inches across, pure white, washed with crimson at the base, and heavily blotched and spotted all over, but especially at the base, with deep crimson-purple. Two or three deep-purple lines run down the centre from two pinkish calli, below which are two obliquely triangular crests, with a very large ovate-falcate auricle on each side, of a very deep purple, becoming paler at the edges, and obscurely spotted. The short projecting column is slightly pubescent, deep crimson behind, and pinky white in front. The surface of the entire flower has a peculiar crystalline appearance, the minute particles, as it were, flashing in the sunlight.

In Borneo, *V. Hookeriana* is subject to great heat—the mean annual temperature there being about 82° Fahr.—and abundance of moisture. It, therefore, requires to be grown in a

warm and damp atmosphere, and may be fixed on rafts or blocks of wood, which should be placed in pots or pans, filled with corks and charcoal, covered with a layer of fresh sphagnum moss. During the summer months a liberal supply of water and frequent syringings must be given, and also a moderate amount of air, so as to ripen the growths and induce the flowers to appear. The plants require a lightsome position as possible, and much less water, for a month or more, after the flowers have been produced.

St. Albans, July 3d, 1889.

John Weathers.

Named Hollyhocks.—For two years past we have been growing and flowering all the named Hollyhocks it has been possible to obtain of the famous Chater strain, numbering, in all, some twenty-five sorts, all of which are distinct, and some for perfect form and rich color well deserving the epithet beautiful. For the guidance of those who wish to grow these fine, old-fashioned garden-flowers, I would recommend among white varieties *Virginalis* as the best, it being pure white and of good form. *Royal White* has a tinge of yellow in the centre; *Enchantress* is a pretty, delicate blush; *Lady Paxton* is pink, with a large flower and very wide guard-petals; *Constance* is pink, large, and very double; *Fairest of the Fair* is a bright rose, large, and very pure in color; *Fanny Chater* is a dark rose; *Reverend Dix* is crimson, and a first-rate kind; *George Eyles* is dark crimson; *Theresa* is crimson and pink, prettily fringed; *Warrior* is salmon-red; *Royal Scarlet* is orange-red; *Imperator* is dark-red; *Plurimus Dulcis*, a beautiful buff; *Joshua Clarke*, sulphur-yellow; *Gem of the Yellows*, an intensely bright yellow; *Royal Purple*, a dark purple, and a fine flower. Every one of those named is distinct and worthy of cultivation. If seeds are sown as soon as gathered, and the plants carefully potted off and protected during winter, most of them will flower during the following summer. Our plants were raised from seed sown early in spring and planted out in the open, where they flowered the following year. This is the best way to get strong, large, flowering stems; many of ours were eight feet high and flowered five feet of their length. We find it necessary here in New Jersey to protect the plants in winter when left in the open ground, and place a covering of leaves or salt hay around them just after the ground freezes and before snow. It would be better still to pot them and place in a cool house, or frame and plant out again early in spring. We do not anticipate any such evil results in this climate from the Hollyhock disease as have occurred in England, where the culture of this flower has been almost given up. Here, in wet seasons, we have had plants slightly affected, but they have invariably grown out of it and been none the worse. Hollyhocks may always be relied upon to come true from seed. Of the thousands we raised, not one showed signs of variation from the description given of them.

Viola pedata.—The pretty Bird's-foot Violet, when planted in quantity, is one of the finest of its genus for the decoration of the garden, not only on account of its unique form, both of flowers and foliage, but on account of its free flowering qualities. The varieties of this plant, *V. p. alba* and *V. p. bicolor* (the Pansy Violet), are prettier than the type. This Violet seems to vary considerably in size of flower and shape of leaves; the best that have ever come under my notice are a quantity received last spring from Tennessee. These were planted in a bed and have become thoroughly established, having flowered for some time, and, in spite of recent heavy rains, remain as bright as ever. Many of the blooms measure one and three-fourths inches in diameter, eclipsing any we have ever seen that were collected in the eastern states. Many are under the impression that this plant is difficult to cultivate, and our own experience was not satisfactory until we tried planting in sandy soil well enriched with decayed vegetable-mould, when the results proved all that could be desired. All the varieties of *V. pedata* come from true seed, but seed is very liable to be scattered by the plant itself, owing to the propelling power of the divisions of the capsule when ripening, so that these must be picked as soon as ever they show signs of maturity and the seed sown at once and allowed to freeze during winter; germination will then take place the following spring. *Viola pedata* should be taken up every third year, the crowns separated and replanted; and this is best done early in the fall, so that the spring crop of flowers may not be diminished, as would be the case if this operation were deferred until spring.

Passaic, N. J.

E. O. Orpet.

Insects and Manure.—Many kinds of insects breed in decaying organic matter, and the soil of land heavily enriched with animal excrement becomes the home for increasing myriads of these. It is not necessary to suppose that all of them prey

directly upon or are indirectly injurious to cultivated plants, but it is certain that few of them do good, and they are all by their burrowings likely to cause more or less harm to crops in their early stages of growth. Many of them are directly injurious, and the presence of such is one of the serious drawbacks to horticultural operations. The gardeners of the past all held it to be essential that manure for the garden should be "old and well rotted," and that it should be used in moderation. This practice has been much departed from, especially in market-gardening, and the result is often seen in the coarse character of the products of such gardens. One very important result of composting is to lessen the attraction of manure for insects when depositing their eggs, especially when the other rule of moderate applications has been observed. Chemical fertilizers do not directly have any attraction for insects, and insects increase in land manured entirely with them only as the organic matter, in the form of the unremoved roots and other portions of the crops, accumulates in the soil. These do not much attract flying insects, but earth-worms increase almost as rapidly in soil dressed with chemicals as in that enriched with barn-yard manure. When possible, it is best not to use land continuously, over long periods of time, for gardens. It is better, when the soil becomes foul with insect life, to throw it into grass for a number of years. But in gardens attached to buildings, and intended to be permanent, some other plan is needed, and none is better than that of the old gardeners, which may be supplemented by the judicious addition of chemical plant-foods. Every gardener of experience knows the incidental value of this method in the avoidance of the foul seeds introduced in crude organic manures. In common practice I have found the increase of soil-insects materially arrested by a moderate annual application of air-slaked lime and unleached wood ashes. A substratum of coal ashes, several inches in thickness, placed below spade depth, has also been found very beneficial. It helps the drainage, is repugnant to earth-worms, and is not in any way prejudicial to the plants.

Newport, Vt.

T. H. Hoskins.

Lettuce.—In spite of all that has been said about hot-weather Lettuces, I never found any fit to eat during our hot summers, and few people care for them at that time. But as autumn comes on, and Lettuce can be grown without so much development of the bitter principle, how to get it at its best becomes of interest. For Lettuce, to be headed in frames, so as to be protected from the early cold, and had in use up to Christmas, make a sowing of Boston Market Lettuce about the middle of August, and another the last of the month, in case the first sowing should get too far advanced early in the season. In the latitude of Virginia the first week in September is early enough. Late in September set the plants in a well-prepared cold frame, and cover with sashes when the nights become frosty, but keep open in day-time. The warmth with sashes closed will be enough for this early crop, which should all be headed before severe freezing weather, leaving the frames empty for the regular winter crops. No sowing of Lettuce for the winter and spring crops should be made, even at the North, before September.

Albemarle Co., Va.

M.

The Forest.

The Forest Vegetation of the Lower Rio Grande Valley.

THE Rio Grande of our southwestern boundary—the Rio Bravo del Norte of our Mexican neighbors—born of the snows and the thunder-clouds of the high mountains of Colorado and New Mexico, for eight hundred miles of its course, from the vicinity of Espinola down to Rio Grande City, flows through an arid and treeless region. Its turbid waters glide thin over yellow sands which fill its bed. Bluffs, which are the verge of high, brown plains, or of black, volcanic *mesas*, and rugged desert mountains—now purple-hued, now gray—crowd upon its narrow valley. Only by the river-side, on flood-washed belts of gravel or strips of alkaline meadows, is an arborescent vegetation possible. Here we see an almost uninterrupted line of Cotton-woods, standing irregular and scattered, and with them a few Black Willows. The roots of these trees drink of the river, and the trees attain to ample, if not lofty, proportions, and maintain, throughout the long, summer droughts, a luxuriant foliage. But in the thin and dry soil of the *mesas* and mountain-sides one can detect scarcely more than shrubs—Sage-brush, Grease-wood, Mimosas, etc.

For more than four hundred miles of its course through

this region our river receives scarcely an affluent to make good its loss of water by evaporation under burning skies and by absorption by a thirsty soil; but below Presidio the Conchos comes in from the North Mexican Cordilleras, the Pecos from the mountains of eastern New Mexico, and the Sabinas and San Juan from the Sierra Madre of Coahuila and Nuevo Leon; and then, with a strong and deep current, it flows out a few miles below Rio Grande City upon the lowland plain bordering the Gulf of Mexico.

From Rio Grande City to the river's mouth is about one hundred and twenty-five miles; but the meanderings of the river over the plain make the distance by water fully three times as great. On its way through this low country the river shifts its channel in some part or other with every annual inundation; hence, on either hand and at greater or less distance, we meet with numerous lagoons, narrow and tortuous, abandoned channels of the river, disused some of the more remote must be since early cycles of the land's history. The connection of these lagoons with the current of the river and with each other has been more or less completely broken by that process by which a lowland river builds up its banks above the level of the adjacent lands, the precipitation of its silt in the first still water of its overflow. Each great rise of the river, however, fills the lagoons, and they remain throughout the rest of the year shallow and slender lakes, winding through silent swamps or woodlands, richly stocked with aquatic plants, and the undisturbed haunts of numerous species of water-fowl.

This low country, with its deep and well-watered soil and with a large amount of humidity in its atmosphere, insured by its proximity to the sea, presents the conditions favorable to the growth of a forest; and to the numerous trees indigenous to the region it offers a choice of three diverse situations:—The raised, sandy banks of its present and former river-channels; the muddy soil of swamps lying without those banks and of filled-up lagoons; and the levels lying above the overflow. The character of the forest, covering nearly all of this region, seemed unique to one more familiar with upland and mountain growths. The larger growing species, excepting such as occupy, by preference, the banks of the river and lagoons, stand scattered, and form low heads which are borne on crooked, irregularly-branching trunks, and the intervening spaces are filled up with smaller species, and with thickets of interlacing shrubs, bound together by widely clambering vines.

It is along the rich banks already described that the tallest and densest forest growths are to be found. Here *Leucana pulverulenta* attains its fullest development, making a tall tree hardly overtopped by *Ulmus crassifolia*, associated with it. It grows with a straight and sound trunk clear of low branches. The largest specimen measured had a circumference of fifty-six inches at three feet from the ground. The species appears to be mainly confined to banks and not to be abundant; but it is esteemed the most valuable tree of the region for sawing.

Here, too, and only here, as far as observed, *Cordia Boissieri* (on higher ground a stiff shrub branching from the base) becomes a tree, large with respect to trunk-diameter at least, but crooked, ill-shapen and low-branching. The circumference of one specimen measured was forty-seven inches; but no trunk approaching such size, and sound and straight for five feet, could be found for the Jesup collection.

Condalia obovata showed its largest specimens on these banks, but its trunks illustrated the extreme of wretchedness of condition, being little better than lacerated shells of living and dead wood alternated. The trunk divides, moreover, from the base upwards into numerous erect stems. Its wood is chosen for fuel because it makes a fire of intensest heat.

Even in these situations *Pithecolobium brevifolium* makes but a slender, straggling tree, and a specimen exceeding five or six inches in diameter was scarcely seen. On higher land it grows in clumps as a mere shrub.

Coming, now, to the wetter, more open situations—most frequently the lagoons or ends of lagoons, which are nearly filled up with mud—we find these to be the favorite habitat of *Parkinsonia aculeata*, a pretty little tree with clean, green-barked stems, seldom more than six inches thick, branching at five or six feet, and bearing heads of fine, drooping foliage and abundant yellow bloom.

Associated with this as an undershrub, half its length submerged during much of the year, perhaps, is *Mimosa Berlandieri*, with conspicuous racemes of rose-colored flowers.

Leaning over the edges of these sloughs stand the ungainly forms of *Acacia Farnesiana*, with crooked, low-branched trunks, and broad, drooping heads.

On the plains, lying above the reach of high water, the tree most conspicuous by reason of its close and symmetrical heads of dark green foliage, and the one most valued, is *Acacia flexicaulis*, the Ebony of Texas. The height of the tree varies from twenty to thirty feet, and the diameter of its trunk from twenty to thirty inches. Its wood is much used for fuel; and, but for the fact that adult trees are invariably hollow at the heart, its reddish-black heart-wood, exceedingly hard and heavy, and capable of taking a fine polish, would make it of great value for cabinet work, etc.

Acacia Greggii, the Cat's-claw Mesquite, in this region and on these lands reaches its best dimensions—a diameter of ten to twelve inches. Its trunk is seldom erect, and its head is low and spreading.

Prosopis juliflora, the Mesquite, occurs here as a tree of somewhat larger size than the last, but of similar form. It contributes largely to the ties used by the railroad on the Mexican side of the river; but so crooked is its timber it requires much pains in hewing and laying to get the ties in line for the rails.

Parkinsonia Texana, the Texan Palo Verde, or Green tree—green as to its entire bark—is at home here as a small tree, with short, crooked stem, sinuous branches, inconspicuous leaves, and showy yellow flowers. Its wood is light, and little used, even for fuel.

Ehretica elliptica, with a trunk diameter of twelve to twenty inches, and a height of some twenty-five feet, is widely scattered throughout the valley, as are, also, in various situations, *Bumelia lanuginosa* and *Celtis occidentalis*, the Palo Blanco of the Mexicans, the *Bumelia* having a diameter of six to eight inches, and the last of one or two feet.

Diospyrus Texana, the Texan Persimmon, is a small tree, seldom a foot in diameter. Its fruits are fairly edible in a region where wild fruits are few. They are globular, one-half to three-fourths of an inch in diameter, black when ripe, and covered with a pubescent, leathery skin.

Kæberlinia spinosa here branches from its crown, but its divergent stems rise to a height of ten or fifteen feet, and may be found six inches or more thick.

The undescribed Palmetto, discovered by Berlandier below Brownsville and Matamoras more than fifty years ago, extends up the valley for a dozen miles or more above Brownsville. Aside from its uses in sub-tropical ornamentation, it is a most valuable plant. Its stems, twelve to eighteen inches thick, and as many feet in length, are used for posts and piles, because practicably indestructible by wet; and its leaves to make a clean and durable thatch.

A list of the shrubs of the region would include, principally, *Leucophyllum Texanum*, most striking of all, and surpassingly lovely, with profuse purplish bloom surmounting velvety white foliage; *Mimosa malacophylla*, a horribly hook-spined climber, which spreads over surrounding shrubs a sheet of white flowers; *Salvia ballotifolia*, a blue-flowered sage, five or six feet tall; *Lantana Camara*, of so extensive range, with orange-red flowers; *Forestiera angustifolia*, *Porlieria angustifolia*, *Celtis pallida*; *Karwinskia Humboldtiana*, with *Clematis Drummondii* and two species of *Vitis*, probably varieties of *V. cordifolia* and *V. æstivalis*, to bind together the stiff and spiny thickets formed by several of the last-mentioned, and masses of the white-flowered *Baccharis glutinosa*, and the pretty yellow-flowered *Nesaea salicifolia* by the water's edge.

Charlotte, VI.

C. G. Pringle.

Correspondence.

Palms from Seed.

To the Editor of GARDEN AND FOREST:

Sir.—The excellent article on Seedling Palms in GARDEN AND FOREST of July 3d, omits mention of one method which can be adopted successfully with some species which require a long time—often several years—for germination. This is to “stratify” the seeds in pots in a mixture of chopped sphagnum moss and pounded charcoal, which keeps the seeds sweet and fresh and allows many more to be housed in the same space, provided they are examined occasionally and the sprouted seeds removed and potted off. This economy of space is important where, as with all the species of *Acrocomia*, the seeds rarely germinate in less than four years under the most favorable circumstances, and often require six and eight years.

During the past five or six years I have endeavored to get a small quantity of the seeds of each Palm offered by European seedsmen in each year, excepting only the tenderest equatorial species. Usually I preserved a specimen seed of

each packet, and a review of the collection thus formed shows that it is rather the exception than the rule that the same species should be sent out twice under the same name by any dealer.

This, of course, does not apply to sorts like the so-called *Latania Borbonica* and a few others which are sold in vast quantities, but it does apply to nine-tenths of the species catalogued, and I often wonder whether the growing Palms offered by nurserymen at home and abroad must not be similarly mixed and untrue to name.

An illustration or two may not be out of place. I am just potting off the fourth species of *Phoenix* received as *P. Siamensis* from the same dealer within three years—one sort imported from Siam, the others said to be grown in southern Europe. Some of these lots of *P. Siamensis* seeds are more distinct from each other than are the seeds of any of the twenty-six other alleged distinct species of *Phoenix* that I have grown. I have had five species sent as *Cocos Bonneti*, and one of the most extensive and trustworthy dealers in Germany habitually sends out as *Borassus flabelliformis*, seeds which have but one-thousandth part of the bulk of the genuine, and probably belong to a species which never grew naturally nearer than six or eight thousand miles of the habitat of *Borassus*. Of course, the dealers not being experts in the determination of Palms, necessarily give the names as furnished them by collectors all over the world, but in discussing the hardness or other characters of any Palm which has been raised from such seed, it is well to bear in mind the great probability that the name by which the Palm goes is not the one which belongs to it.

Oviedo, Fla.

Theodore L. Mead.

Dig the Potatoes Early.

To the Editor of GARDEN AND FOREST:

Sir.—The Potatoes are rotting badly. An inspection of several large Potato-farms shows that the vines are prematurely dead, and the crop will not only be short, but of poor quality. This rotting is due to a well-known fungus, *Phytophthora infestans*, which usually makes its appearance upon the upper leaves, and afterward extends to the stems, finally reaching the tubers. One of the most favorable conditions for the growth of this mildew is a moist atmosphere. If to this is added a medium summer temperature, the Potato-field is quite apt to be “struck by the rot.” The succulence, dense shade, and nearness to the ground of the Potato “tops” in July all favor the rapid development of this mildew, which is a first cousin of the one that preys upon the Grape, and this is also abundant this season.

July has been a very wet month, as the disastrous floods in many valley-towns and cities do not permit us to quickly forget. In fact, the past four weeks have been of that peculiar character known as “close” or “muggy,” when moulds thrive in every possible place. With the Potato crop, since the advent of the rot fungus in 1840, the wet summers have been the seasons of decay of the tubers.

The question now is how to best save what crop there is. If moisture and medium temperature favor the rot, it is evident that it is wise to get the tubers out of the soil as soon as possible. The moist soil, warmed by the excessive sun since the rains, furnishes the best conditions for decay, and the longer the crop is left unharvested the poorer it will be. As a precaution against contaminating the exposed tubers, the vines should be raked into heaps and burned. This is an inexpensive task, and serves to destroy millions of spores of the rot fungus. After leaving the Potatoes upon the ground until the surface is thoroughly dried, they should be stored in a dry, cool, airy place. This may be in a barn or loft until cold weather comes, using shallow bins, or even shelves or the floor. Avoid large heaps, and frequently inspect the crop and discard any decayed tubers before they spread the rot to their neighbors. Air-slaked lime may be sprinkled, a handful to a bushel, upon the Potatoes as they are stored.

N. J. Exp. Station, Aug. 7th, 1889.

Byron D. Halstead.

Ribbon Grass.

To the Editor of GARDEN AND FOREST:

Sir.—At Nonquit, Buzzard's Bay, the Ribbon Grass (*Phalaris arundinacea*, var. *picta*) is found growing abundantly in a low plain adjoining the salt marsh, but in 1888 did not flower. Is this inaptitude to flower a characteristic of the variety? This form is spoken of by authors of the earlier period as occurring wild and as cultivated for ornament. It is figured

by Perra and Lobel in their "Adversaria," 1570, under the name of *Gramen sulcatum vel. striatum album*, as also by Dalechamps in 1587; by Lobel in 1591 and Tabernaemontanus, 1590; Gerarde, 1597 and 1636, and by J. Bauhin in 1650. It is described by Camerarius in 1588; Bauhin, 1596, 1623 and 1658; Parkinson, 1629; Ray, 1688; Morison, 1699; Tournefort, 1700; Scheuchzer, 1719; Boerhaave, 1727, in two varieties, and by Linnæus in 1737, in his "Hortus Cliffortianus." In 1742 Weinmann gives a colored figure. All these figures represent the grass in bloom, and nearly all our references speak of the plant as variegated with white, and some say white, greenish-white or of a purplish cast. Not one refers to the golden variegation which characterizes the Nonquit plant. The vernacular names given by Bauhin in 1658 are: German, Spanischgrass, Welschgrass, Strimechtiggrass; Belgian, Widthgheestreept Gras; English, Ladie Lace Grasse, or Painted Grasse; French, Aguilletes d'armes. Bauhin also says it is grown for ornament in Germany, England and Belgium; the seed first brought from Spain, although also wild in Savoy and neighboring France. Linnæus, in his "Species Plantarum," says it grows in Europe in moistish places along river-banks.

This grass is the *Arundo colorata*, Ait., *Digraphia arundinacea*, Trin. var., Striped Grass, or Ribbon Grass, Benth and Hooker. In my library I find no record of the golden variegation, nor of the name Ribbon Grass until quite recent times. Gray, in his "Manual," says, *Phalaris arundinacea*, L. var. *picta*, the leaves striped with white. The authors of *Flore Naturelle et Economique*, Paris, 1803, say "il y en a une variete a feuilles panachees, qu'on nomme chiendentruban."

Is this golden variegation common, or have I been mistaken in identifying the species not seen in bloom? This latter supposition does not seem probable, yet I think it is the fact. It has been suggested by some authors that this variegated form readily reverts or changes to the common form, and it is even said that it thus changes when removed from dry to humid soil. How far is this idea correct? One thing is indeed noteworthy—that the variety, both wild and cultivated, in its white form, has remained constant despite diverse climates, from 1520 to the present time. It would be interesting, also, if it were determined whether the many distributions have been from a common origin, or whether this diversity has appeared spontaneously in diverse regions. Who can throw light on this point? Gray notes the species as indigenous to this country, and the variety as introduced. Has any one noted the variety in sparsely settled regions, or in what may be called a wilderness? Does it occur along with the common form? I trust some observant reader of GARDEN AND FOREST can answer some of these queries.

South Framingham, Mass.

E. Lewis Sturtevant.

Insensibility to Odors.

To the Editor of GARDEN AND FOREST:

Sir.—The instances given by your correspondent "T. B. F." regarding insensibility to certain odors were quite interesting. I can add but one touching the sense of smell. Violets, whose fragrance is said to be delightful to most persons, and which to Perdita were "sweeter than the lids of Juno's eyes, or Cytharea's breath," have, to the writer, no other odor than that which the sister of "J. B. F." finds in the *Datura*, namely: "A certain earth-like smell proper to growing things in general."

With regard to the sense of taste, however, I recall the case of a prominent Chicago physician, who declared that he could detect no difference between the taste of Castor-oil and of Olive-oil. To test the question, his wife dressed a salad with *Ol. Ricin.*, which he partook of with great gusto, but not without enjoying afterward all the remedial benefits of the drug.

Santa Barbara, Cal.

Frank M. Gallaher.

[Perhaps the last instance cited is only another example of inability to detect certain odors. The peculiar "flavor" of castor-oil is conveyed through the olfactory nerves. Children are directed not to breathe through the nose while taking this medicine, and in this way they escape its disagreeable "taste." The subject has interested many readers. One writes: "it seems like an affectation to say that Mignonette has any odor. It has no more to me than a clean china plate." Another writes that the members of his family frequently praise the delightful fragrance of the flowers of a large vine of *Clematis crispa*, now in full bloom, while he has never yet been able to detect the slightest odor in these flowers.—Ed.]

Recent Publications.

The Garden's Story; or, Pleasures and Trials of an Amateur Gardener, by George H. Ellwanger. New York: D. Appleton & Co., pp. 345.

Under this somewhat fanciful title Mr. Ellwanger has written a little book in which are agreeably mingled the practice and poetry of hardy-flower gardening. Beyond all question a natural arrangement of hardy herbaceous plants and shrubs and climbers is the most effective and satisfactory way of adorning home grounds. Without doing any violence to its essential character, such a garden can be adjusted to the requirements of a village lot, the enclosure about a country farmhouse or the more pretentious surroundings of a suburban villa. It will unfold new charms every day, from the hour when the first Snow-drop shows its "vestal white and vernal green," until the last Monk's-hood is faded and frozen. Even the winter does not destroy such a garden, as it does one in which bedding-plants and ribbon-lines are the principal features, but simply enables it to rest for an awakening into fuller life. Next spring the Daffodils and *Spiræas* will be more abundant and beautiful than they were last spring; the vines will clothe rock and trunk and trellis with richer drapery; the shrub-border will show a nobler sky-line and deeper shadows with bolder headlands and more spacious bays, about and into which the greensward flows, and the whole design will have made a visible advance toward a more perfect expression of the thought of its creator. A garden of such universal adaptability, of such constant and varied beauty, and with a continuity of life which enables its owner to plan hopefully for coming years, can well be made an object of affectionate interest and wholesome recreation, and is by no means an unworthy subject for a writer like Mr. Ellwanger, whose taste is refined without being fastidious, whose love of nature is unaffected and catholic, and who can speak on matters of practice out of the stores of abundant experimental knowledge.

Mr. Ellwanger wisely refrains from laying down any specific garden-plans, for no two gardens worthy of the name were ever fashioned after the same pattern. He attempts no elaborate description even of his own garden. But, in a pleasing and instructive way, he writes from different points of view of the various elements and features of the garden and their changing phases as the seasons hasten on. The novice need not expect to find a garden already prepared for him on paper, with maps and specifications, but he will find, when he lays down the book, that his mind is furnished with a hundred delightful pictures, like that of tall red Lilies rising from a bed of Sensitive Fern, which will guide and restrain him when he comes to make a garden of his own as no mere formulas or precepts could. And those who already know what it is to enjoy gardens of their own will follow with sympathy this chronicle of a garden year in which their own trials and triumphs are so pleasantly revived. The book is not a formal treatise on garden art, nor a text-book of hardy plants, nor a manual of cultural instruction, and yet it contains a careful selection of herbaceous perennials, shrubs and vines, with admirable suggestions for arranging them, and practical counsel as to what is needed to make them take hold of the ground and grow. A chapter on the rock garden, as distinguished from the chaotic stone-heap, popularly known as "the rockery," and descriptions of the wild garden and wood garden, reveal a deeper feeling for those aspects of nature that are dainty and shy, or wild and wayward, than is usually expected of one who celebrates the trim graces of a more civilized garden. This appreciative love of nature will not permit Mr. Ellwanger to think of his garden as fenced in and complete in itself, but, as it makes its history with the revolving year, a chronicle of the wild flowers as they blossom runs beside it. The birds and butterflies, too, are named and welcomed in their order, and to this story of the interwoven lives of plant, and bird, and insect, are added many extracts from, and allusions to, the literature of flowers and seasons.

In matters of detail we should feel constrained occasionally to dissent from Mr. Ellwanger's judgment, as, for example, when he pronounces a well-grown *Lilium auratum*, with a stalk five or six feet high, supporting a dozen or more deliciously-scented blooms, as the "grandest of all hardy flowers." Such a specimen, if properly placed, might be made most effective in the garden, but we should hardly rank it the "grandest," even if the word is used in a restricted sense to mean the "stateliest," of flowers. The list of desirable plants is not meant to be exhaustive, and yet, when so much praise is given to the large-flowered garden forms of the *Clematis*, one can hardly understand the omission of such fine native species as *C. coccinea*, with its coral-colored flowers, *C.*

crispa, with its fragrant, bright purple flowers, and *C. Pitcheri*, rather coarser than the others, but, like them, blooming all summer long. Our common Virgin's Bower (*C. Virginiana*) would grace the more elaborately dressed portions of a lawn-border as becomingly as it would mingle with the untamed intricacies of the wild garden, and so would *C. Vitalba*, the Traveler's Joy, of Europe. And how could one be satisfied with his garden if he missed in it the beauty and fragrance of *C. flammula* in August? We should want *C. graveolens*, *C. integrifolia*, and several more—indeed, we could dispense with most of the Jackman class of hybrids with less sorrow than the loss of one or two of these species would bring. But these are questions of detail, and certainly no suspicion of narrowness or illiberality in selection will lie against a book in which the prim, old-fashioned flowers of the farm-garden, the tangle of Green-brier and Bitter-sweet in the wild garden, the Gold-thread and Prince's Pine and Beech-ferns of the shaded wood-garden, and the cool mosses and minute Alpine flora of the rock-garden, are all welcomed with sympathy and appreciation.

It is to be hoped that this dainty little volume will have many readers, for it can hardly fail to accomplish the worthy purpose of its author "to stimulate a love for amateur gardening that may be carried out by all who are willing to bestow upon it that meed of attention it so bountifully repays."

Notes.

The young city of Victoria, in British Columbia, has just voted \$15,000 to improve its public park.

Near Bethlehem, in Montgomery County, Tennessee, stands a Tulip-tree which is six feet and one inch in diameter, five feet from the ground, and apparently of the same size up to the first limb, which is seventy-five feet from the ground. The next limb is a hundred feet from the ground. The *Southern Lumberman* reports this tree as probably sound, and estimates that it contains more than fifteen thousand feet of lumber.

The agents of the California State Board of Horticulture are now raising the Australian ladybird in such numbers that colonies are furnished to all applicants whose trees are infested with the cottony cushion scale. These imported insects have proved effective destroyers of the scale, and there seems to be a reasonable ground for hope that this most serious enemy of the Orange, the Lemon, and other trees of that family can now be held in check.

Vaccinium hirsutum, of which an account was given in GARDEN AND FOREST for July 31st, has ripened fruit at the Arnold Arboretum. It is fully as large as the fruit of the common Huckleberry (*Gaylussacia resinosa*), and is of a shining black color, and has quite an agreeable flavor. As it appears in cultivation, the berry is not so densely hairy as it is represented in the figure, which was drawn from wild specimens sent from the native habitat of the plant.

Mr. F. L. Temple, of Shady Hill Nurseries, writes from London in regard to English Gooseberries, which he had been led to believe were far superior to any thing grown in America. But upon testing some of the sorts most highly praised he found them coarse or watery, or of low quality in some particular, and altogether disappointing except in size and appearance. No patriotic American will admit that the best of them are as finely flavored as our native varieties.

A year ago we published a note from M. Naudin (GARDEN AND FOREST, I, 289), who was trying for the third time to naturalize in Provence the Japan Clover (*Lespedeza striata*), which has proved so useful as a forage plant in our southern states. He was not very sanguine of success in that dry climate, but had sent seed to Brittany and other places with some hope. He now writes that the Clover will certainly not thrive in Europe. It has been moderately successful in Algeria, but even there the amount of forage yielded is insignificant.

Mr. William Falconer reports, in the *Rural New Yorker*, that he planted, in May, some Lima Beans, pushing them into the ground, eye down, and every seed grew. Seeds of a second lot were laid flat and covered loosely, and those of a third lot were laid the same way, but the soil was tamped firmly on top of the beans. All the last lot sprouted and grew as well as those planted with the eye down, but the loosely-covered ones nearly all rotted. Mr. Falconer has not found that pinching back the vines has hastened the maturing of the beans a day, and thinks that allowing the vines to climb on poles at will is the best and least troublesome practice.

Inasmuch as there is usually some basis of truth for any widespread popular belief, the inquiry was made in these columns

not long ago, whether there was any foundation in fact for the prevalent opinion that the Beech-tree is never struck by lightning. In a late number of *Science*, Dr. D. L. Phares gives an account of a remarkable flash out of an almost clear sky which struck a Beech-tree, killed one ox, and stunned all the others of a team of six which happened to be drawing a wagon under its branches. Two men in the wagon were stunned. Dr. Phares adds that this is not the only instance which has come under his observation where a Beech-tree has been struck.

Mr. A. H. Fewkes, of Newton Highlands, Massachusetts, who makes a point of testing all the new varieties of Sweet Peas, reports that the only one of this year's introduction which came up and showed enough flowers for comparison was *Blanche Ferry*, and this is apparently an improved *Painted Lady*. The two are much alike, but when seen together the new one seems to be brighter in color and to have a purer white keel. In habit it is very free. *Boreatton* and *Splendor* of last season are proving fully as good as they promised, and, with *Invincible Carmine*, *Princess Beatrice*, *Bronze Prince*, *Orange Prince* and *Adonis*, show a very decided improvement on the older varieties.

Professor Bailey has been making some experiments with seeds with a view to determine the influence of certain conditions upon germination. The most interesting of several conclusions reached was that drawn from tests with different quantities of water. Sprouting was proved to be decidedly more rapid and general where the seeds received less than the usual amounts of water given in green-houses. Seeds of Tomato, Cucumber, Pepper, Lima Bean, Carrot, Celery, Lettuce and *Cobaea scandens* were all tried, and almost without exception, of those planted in soil kept simply moist, a larger percentage sprouted, and sprouted more rapidly than of those in soil more profusely watered. Professor Bailey explains what the latter phrase means by the statement that the seed-pans were shallow and had more than ordinary drainage, so that no stagnant water could remain, and the water was rarely applied in such quantities as to cause any drip from the pans; that is, the so-called profusely-watered plants received no more water than is given in many houses.

The garden at Glen Eyre, Southampton, is one of the most interesting in England, owing to the experiments in growing exotic plants out of doors, which were made there some years ago by the late Mrs. Eyre Crabbe. "The house," says a recent description in the *Gardeners' Chronicle*, "looks east and stands right at the head of a deep, narrow valley or gorge. . . . A series of steep terraces, profusely planted and richly decorated with flowers . . . filling the beds, vases and baskets, gives to the garden a resemblance to some scene in Italy rather than in England. Away on the steep slopes on the sides of the valley there are numbers of very noble conifers . . . truly marvels of production considering that the slope" is in many places so steep that "it is difficult to stand erect upon it. Beyond and about these conifers are huge masses of Rhododendrons, Azaleas, Kalmias, etc., all exhibiting wonderful growth. Especially on the north side of the valley with its southern aspect there is a perfect forest of Rhododendrons, the huge heads standing up like miniature mountains and ablaze with tufts of flowers in vast quantities." But the most remarkable feature of Glen Eyre is its masses of Camellias which Mrs. Eyre, full of faith in the hardiness of the plant, set out by hundreds and which have justified her confidence by the most luxuriant growth. The gardener's house stands upon the north slope of the valley and between it and the mansion are a large number of fine Camellias growing with other plants in a border, many of them being ten feet in diameter. On the wall of the stableyard is trained a dark red Camellia ten feet in height and fifteen feet broad, and another twelve feet in height and eight feet in depth from the front to the wall, with companions of almost equal size. Everywhere else on the grounds Camellias are plentiful in many varieties, sometimes massed, sometimes standing singly. "The finest specimen, the lion of the collection, is a grand plant of the old double-striped which stands on the upper terrace, or house-level, in a very exposed windy spot, but looking south. This splendid fellow is some ten feet in height and forms almost a perfect square of thirteen feet each way, and blooms profusely every year." The success of the gardens at Glen Eyre is all the more remarkable because it is not very many years since they were started and the soil was "originally very poor, producing nothing but coarse Heather with some Scotch Fir. The skill and perseverance of the gardener have, however, transformed the unkind-looking wilderness into an earthly paradise."

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Design in the Surroundings of Houses.

A FEW months ago Mr. Charles Eliot, the well-known landscape-gardener, read before the Massachusetts Horticultural Society a most instructive paper with the above title. Assuming that every one desires to have his house and grounds beautiful as well as convenient, Mr. Eliot insisted (1) that the real beauty of what he aptly termed the "house-scene" is never derived from added decoration, but must spring directly from the scene itself; and (2) that this beauty can be attained only when the house and its surroundings are thought out together as one design and composition. These truths are fundamental, and yet the ordinary practice is to build houses without much reference to the land about them, and often with no thought of so essential a matter as the way of approach. After the building is complete some attention may be given to making the scene a pleasant one to look upon; and this is usually done by inserting flower-beds or specimen plants here and there, without reference to the nature of the ground.

Illustrations of the truth of both these propositions can be found in town and country, but it is our purpose now to present a portion of Mr. Eliot's paper which relates to the suburb—a district where roads and houses dominate the landscape. Generally the ground here is level, the boundaries straight, and the lots comparatively small. In such neighborhoods the architect's share in making the scene is predominant, and an error in the style of the house is fatal to the effect of the house-scene. A many-angled and many-gabled building on a smooth site, in a straight-bounded enclosure, is out of keeping, and so is a tangle of bushes and boulders, or a sharply-curved approach-road. This does not imply that the curve must be forbidden and the path made straight when the streets are curved or when the house-door is reached most easily by a curved line, but it does mean that purposeless curvature, such as prevails in many suburbs, should be shunned.

But we leave Mr. Eliot to speak in his own language:

"Awkward and breadth-destroying lines of approach are the rule in the suburbs, and the architect is often responsible for them, for he frequently places the house door in such a position that the path or road leading to it must necessarily cut

the ground before the house into lamentably small pieces; and he does this, too, when a little thought might perhaps have brought about that happiest of all arrangements in which a stretch of grass as long or longer than the building is brought without a break up to the house-wall itself. No subsequent planting can obliterate mistakes in these controlling elements of the suburban house-scene, the house and the approach; and no planting can accomplish what it otherwise might, if, by reason of unmindfulness of the effect of the house-scene as a whole, the framework of the scene is wrongly put together.

"It is seldom that a suburban lot, after the house and approaches are built, retains much of its former vegetation. A few large trees may survive the necessary gradings, but the natural ground covering is generally killed out. On the completion of the grading, grass is sown, and from the resulting sheet of green, the house-walls and the boundary walls or fences rise abruptly. It is surprising to see, as one may everywhere, well-designed houses, adorned within with much rich ornament, and probably inhabited by people who appreciate art and nature, standing thus naked in naked enclosures. The contrast between a handsome building and bare surroundings is sufficiently obvious in summer, but in winter in this New England climate it becomes positively startling, so that it is difficult to understand how educated people can fail to be impressed by it, and how they can longer refuse to comprehend that the house and the house-ground should be treated in the same spirit.

"From another point of view this nakedness is equally surprising. Here in the suburbs is an opportunity for adding to all the usual advantages and ornaments of city life the new and delightful pleasantness of verdure, fragrance, and bloom. As a matter of fact, it is an appreciation of this opportunity that causes the first plantings in most suburban grounds. Trees and shrubs, selected for their profuse flowering or their striking habit, are set out here and there, and brilliant beds of flowers are perhaps added. Desire for ornament of this sort grows by what it feeds on, and causes the pressing demand upon the nurseryman for plants of marked appearance. The effect upon house-grounds resulting from planting undertaken in this spirit is generally unfortunate. Specimens of many sorts planted promiscuously on a lawn compose an interesting, though ill-arranged museum, but not an appropriate setting for a house. They wholly destroy all that breadth of effect which is so difficult but so important to preserve in small grounds; if they grow large they interfere with the prospect and the aspect of the home, and, whatever their size, they give the scene the appearance of having been adorned to make a show, and remind one of the saying of the Greek sculptor, who charged his pupil with having richly ornamented a statue because he knew not how to make it beautiful.

"An ambition to possess a collection of handsome, curious and rare plants, like the similar passions for shells or minerals or precious stones, is entirely praiseworthy and honorable, and may well be indulged *ad libitum*, provided a place can be set apart and fittingly arranged for the purpose, as cabinets are prepared indoors for collections of curios of all sorts. Out of doors a flower-garden is such a cabinet, and there is no reason that tree and shrub gardens should not be similarly arranged by those who desire to grow many striking sorts. In formal and highly decorated pleasure-grounds, specimen trees are already used in this way, and with good effect. Before stately buildings and in connection with terraces and formal avenues, appropriate specimens are always in keeping; but in New England house-scenes not especially arranged to receive them, they destroy the last hope of good general effect.

"With what object, then, should the planting of the suburban house-ground be planned?

"I answer, with the object of helping the building, and the other controlling parts of the scene, to form an appropriate and pleasing whole. In the very smallest front yards one thing which should seldom or never be omitted can be accomplished just as well as it can be in grounds of larger area, that is, the connecting of the house-walls with the ground by means of some sort of massing of verdure. Shrubs planted near the base of the house-wall remove at once all appearance of isolation and nakedness, and nothing can help a building more than this. Here, if nowhere else, some evergreens should be used, and it is fortunate that in a climate in which hardy evergreens are few, the stiff sorts, like the box and arborvitæ and the junipers, are all entirely appropriate in close connection with a building. The more irregular the structure, the more varied in detail may be these wall-plantings, but if the house is of formal design, a hedge-like row of bushes may be best. The older houses in many New England villages often have bushes set out thus along their walls; and at the Longfellow

Place in Cambridge the same purpose is accomplished by a low-terrace balustrade, half covered by creepers.

"In grounds a little larger than the smallest, the securing of some breadth of effect by means of grass should be attended to next after the wall-plantings. If there is space enough to get this openness and, at the same time, have some bushes near the street line as well as next the house, so much the better. Plant nothing which will grow to a size disproportionate to the scene. Large trees on small lots are not only inappropriate, but they shade the ground excessively and make it difficult to grow the indispensable ground-covering of shrubs. Maintaining sufficient openness, plant shrubs also against the naked fences, or grow climbers on them if space does not permit of anything more. In large grounds give the house a setting or background of appropriate trees. Where, as in New England, climate keeps deciduous plants leafless half the year, plant for effect in winter as carefully as for the summer; use all possible broad-leaved evergreens and all the cheerful fruit-bearing and colored-stemmed shrubs, and for summer add various sorts of foliage and bloom, but keep the whole scene to its own appropriate style, admitting brilliant decoration only in detail, and conspicuous single objects only rarely if at all. If many flowers are desired, they should be grown in a garden or in formal beds close beside the formal building. The permanent scene can be helped only in its details by the temporary beauty of bulbs and herbs.

"To appreciate that a house-scene depends for real effectiveness upon its general design and not upon decoration, one need only look upon some such ground as that of the Longfellow Place, before mentioned, where the planting consists of two Elms supporting the sides of the house, creepers covering the balustrade at its base, and lilacs flanking the balustrade and forming a hedge along the street-wall. The open space of grass is well proportioned, and the whole scene is one which, in its formal symmetrical style, is not surpassed for effectiveness in all New England. Suitable general design is just as effective in any other conceivable style."

Among Oaks, Madrones and Redwoods.

I HAVE just returned to San Francisco after a visit to that portion of the Coast Range that lies between Austin Creek and Russian River, in Sonoma County. From Cazadero, on Austin Creek, eighty-nine miles north of San Francisco, I drove about twelve miles east, over a mountain road of wonderfully varied beauty, to Guerneville, on Russian River, and the Redwood forests there; thence southwest along the Russian to the mouth of Austin Creek, and up that stream to Cazadero again, a total round of about thirty miles, and, all in all, one of the most characteristic drives to be had anywhere in the California mountains.

The Azaleas were still in bloom in very large masses on Austin Creek, near Cazadero. The Bohemian Club of San Francisco have their summer camp here, in a grove of fine Redwoods, on a "flat" between the stream and the mountain. The twenty acres of timber are valued at \$20,000, and are a part of the Montgomery estate of over 1,200 acres, on which no Redwoods are to be cut for many years. Outside of this property the waste and the ravages of fires are frightful. In almost every side-gulch are the remains of old lumber-camps. A few men are working up the stumps for fuel for the railroad company. In places the forest fires have destroyed the soil and leaf-mould, leaving only the rocks, and even the hardy Redwood sprouts have not survived.

Ascending the mountain ridges east of the beautiful Redwood forests of Cazadero, the most striking features on the summits are the groups of Oaks, both White and Black, and of superb size and proportion. The way in which Oaks cluster on the vast rock-masses that rise out of the mountain-tops like ancient hill-forts is almost worth a separate paper. They seem to crown old castle ruins or fallen Cyclopean walls, and the form of the stratified rock-ledges adds to the illusion.

The Madrone is one of the great features of this mountain region. Hanging over a wild cañon was one whose trunk girthed nearly twenty feet, and in spread of boughs it was as large as a Valley Oak. Sometimes, for miles of travel through the woods here, the scarlet Madrone stems, gleaming under their broad green leaves, illuminate slope after slope, and height after height. Stems of from half an inch up to five or six inches in diameter stand in thickets with young Douglas Spruce and Tan-bark Oaks in blossom. The color of the Madrone, though a real scarlet at its brightest, begins in browns, greens and yellows, and has more chameleon shades in sun and shadow than any painter could hope to imitate. About the base there are dark browns, streaked with yellows and

dull scarlets when the thin husk of the outer bark falls apart in veins or breaks off in flakes, till one can gather a handful at the base of the tree. Below the beautiful crowns of leaves, as large and almost as dark as the leaves of *Magnolia grandiflora*, the new wood is light, clear-hued green, yellowing downward for several feet. Then comes the reign of a scarlet, so delicate, so rich and firm and healthy, that one half believes the remark of an old pioneer who was once lost at night on these mountains. He said he "had to see his way by the Mathrona stems; they kep' the light an hour longer'n anything else."

No one knows the beauty of the Broad-leaved Maples who has not seen them in the mountain woods. In the lowlands they are plain Maples, very fair and large, with brown trunks and large green leaves. On the mountains they have lovely white and gray stems, and grow tall and graceful in clumps of from ten to a hundred, at the heads of well-watered gulches. Indeed, the bark become at times so resplendent for color that I am tempted to say that these trees rival the New England White Birches, and to call them the California Birch-Maples of the Coast Range. The Buckeye shows much of the same gray-white mottling of the bark, but the Maple is far the finest in general effect.

There are one or two farms on the very top of the mountain, and hay-fields, orchards, and vineyards extend across the heads of the ravines, but there will never be any more tillage here than now. The mountains are too steep and rocky. It is chiefly deciduous growth on the heights, chiefly conifers in the gulches, and it is a natural forest-land for miles on miles. The more intelligent men in this region see and acknowledge the necessity for strict forest-laws before it is too late, and I am told that in the best forest-belts there is comparatively little pasturage, and few cattle or sheep are kept here. The mountains are too steep. If two hundred and fifty square miles of this region, extending north and south, could be put under a forestry commission, or some safe supervision, it would secure the permanence of all the streams that head here, and water a territory half as large as the State of Connecticut.

Guerneville is an old lumber camp, but it is situated on a broad, deep and beautiful river, one of the largest in the state, next to the San Joaquin and Sacramento, and it has an immense tributary country of valleys, lesser foothills, and "land for the fruit-grower." All about it are giant stumps of fire-swept Redwoods, with orchards and pastures among them. The original forest that stood here along the Russian River was a magnificent one, but there is hardly a tree left, nor any young growth. Men are beginning to saw the great stumps off close to the ground, and work up the wood for fuel and ornamental veneers, even down to the larger roots. I am told that the blackened stumps in this district are estimated to contain two million feet of valuable and marketable Redwood. They are dead beyond peradventure, and this is the best thing to do, of course. But it makes a man heart-sick to see how clean the sweep has been. Fifty of the largest trees left scattered over the valley would have glorified Guerneville for ages to come. In the very streets stand stumps of trees that were thirty and forty feet in girth and three hundred feet in height.

The Guerneville "basin" extends east. At the head of the little valley Col. J. B. Armstrong, a prominent Ohioan, who settled here after the war, owns 800 acres of as fine Redwood as exists in the state. The best 400 acres of this he will leave uncut, and dedicate it to public use in some educational and permanent way that will preserve it forever. I spent long enough in the heart of this primeval Redwood forest to feel its almost unique value. It has not been smitten by an axe, nor is it pastured. The forest shows every type of Redwood growth: single trees, clumps of twos, threes, fours, and so on, up to circles of ten or twelve, about the roots of some giant of an earlier generation; seemingly solid walls of green banked against a ravine; open lawns, where tall Laurels and Oaks grow, slender as the Redwoods themselves. The very side-sprouts that grow up beside the Redwoods are as large as the pines of many other countries. The largest tree I measured was forty-seven feet in girth, and three hundred and twenty-five feet high. If Col. Armstrong's plans are carried out, and this superb forest is preserved, it seems to me that it will prove in the future one of the most valuable of gifts that the people of any American state have received from a citizen. What form the gift will take, or how its permanent value will be maintained, I have not asked. Col. Armstrong loves his forest with a great and abiding love, and he can be depended upon to secure its perpetuity for future students, botanists, and lovers of trees.

Niles, Cal.

Charles H. Shinn.

The so-called "Grit" in Apple-twigs.

IF two Apple-twigs of equal size be cut with a budding-knife one may exhibit more of that quality which is known as "grit" than the other. Pear-twigs are more "gritty" than Apple-branches of the same size, while Cherry-twigs have less of this quality. With many horticulturists this grit, which is a resistance to the knife not easily defined, has been employed as a test for hardness, and, therefore, is a quality of much interest to the fruit-grower and nurseryman.

In determining what the substance in question is, we may note that a growing twig is not gritty, this quality being associated with maturity of the stem. Thus, if we cut the tip of a "water-sprout," and compare the resistance there met by the knife, with that experience when a mature twig is cut, the difference is very evident: Again, if a mature twig is cut through its well-formed terminal bud the knife meets with none of the grit, but when the twig is severed a short distance below the bud the grittiness is strikingly prominent. A better way to determine the location of the grit is to pass the knife down lengthwise through the tip of the twig. In this way the knife runs easily down for, perhaps, a half-inch or more, when it strikes the point where the resistance begins. If another twig of the same sort has the terminal bud stripped from it, along with the bark and the thin zone of wood, there will be left behind a cone of brittle pith. Instead of breaking this stiff cone apply the knife, and shave the pith when the peculiar sensation of cutting the grit will be felt. This cone of pith consists of small cells, which are about as long as broad, having their walls unusually thickened and the cavities closely packed with starch. As the lower end of the twig is approached, the central portion of the pith is found to be thin-walled, without starch, while the wood-zone is thicker and serves to support the twig. In other words, near the tip the wood-layer is so thin that the pith within it must take a very prominent part in holding the bud, and, from the nature of the cells, brittleness, instead of flexibility, must characterize the upper two or more inches of well-matured Apple or Pear twigs.

It still remains to consider the nature of the grit of older parts of the twigs as, for example, at those portions which are used for cions—that is, several inches below the extremity of a branch. As the bark of all Apple or Pear twigs is nearly the same and offers none of that peculiar resistance to the knife, it may be discarded in the present consideration. The grit is, therefore, either in the wood-zone or the pith, or both. It has been already stated that the pith diminishes in grittiness as the distance from the grit-cone near the terminal bud increases, and, therefore, if there is a considerable grit in an old twig it probably resides in the thick ring or zone of wood. The outer portion of the pith may have undergone the process of lignification, and the thick wall of the cells thus resulting possesses the grittiness; but there is in such twigs a system of radiating plates of pith-like cells known as the medullary rays or "silver grain," composed of cells in the thick walls, and in that respect agreeing with the cells of the outer portion of the pith. These rays are very numerous in the twigs of the Apple or Pear, and during the winter are repositories for starch. Besides these plates of cells stretching from the pith to the cambium, or growing layer just under the bark, there are other thick-walled, square-ended cells running at right angles to the "silver grain"; these, also, bear starch, while the wood fibres, between them and the ducts and vessels, are without this wood substance. The wood itself offers more or less resistance to the knife, but it is not of that kind caused by "grit." It is easy to see that making a section lengthwise of the grain is principally a splitting process after the knife is once set between the fibres, which are long and slender. In cutting through the pith, in whatever direction, owing to the nearly cubical shape of the cells, there can be no splitting, but, instead, the knife must pass through one hard lignified cell-wall only to encounter another just beyond—a condition of things that produces the sensation of grittiness.

The statement that the grit encountered in cutting twigs of our common fruit-trees is due to the presence of a deposit of sand in the wood is not borne out by microscopic examinations. The nature of the tissue composing a whole or part of the pith and of the "silver grain," which is only the pith pressed into plates by the growing wood, does not call for any such theory.

This lignification of the pith and medullary rays and their storage with starch is one of the best indications of the maturity of the twig, and that is as far as one dares to go in his deductions from these conditions. That it may be an indirect index of hardness is to be presumed, for it is undoubtedly

true that immature twigs are not hardy, and it has been shown that such do not present the quality of grittiness.

It is also an observed fact that the lignified pith cells are the only ones containing starch, and in freshly-gathered twigs in midwinter these thick-walled cells invariably contain starch. The grittiness, therefore, becomes a fair index of the amount of starch stored as a reserve-food material in the twig, and the presence of such a substance, other things remaining the same, becomes a possible criterion by which to judge of the adaptability of the plant to the conditions which surround it. In other words, of two varieties of apples the one having the greater grittiness would be the one which had stored up the larger amount of reserve-food substance in the form of starch, and from that fact it might be inferred that it was the healthier, had better prepared itself for the winter, and, therefore, for growth the succeeding spring. That it would live longer and bear more fruit than its less provident neighbor must be determined by orchard test, and not by microscopic investigation. The variety which matures its wood most thoroughly and stores the most starch may start into vigorous growth too early in the spring and be injured, perhaps, seriously thereby. Grittiness is, therefore, a good sign, but it does not become a perfect test for hardness.

Rutgers College, New Brunswick, N. J.

Byron D. Halstead.

Entomological.

The Asparagus Beetle.

THIS summer, Asparagus growers in eastern Massachusetts have been making complaints of injuries to their plants caused by the Asparagus beetle (*Crioceris asparagi*), generally indefinitely spoken of as a "fly," "slug," or "bug" by those making its acquaintance for the first time. In some gardens the plants have been completely defoliated, leaving only the bare, dry stalks and branches, much to the injury of the vitality of the roots and of the value of the next season's crop.

Remedies do not seem to have been generally known or used, and in some cases it is to be feared that more injury has been done to the plants in efforts to exterminate the pest than if they had been left undisturbed.

Late in July, upon finding the Asparagus badly eaten by the insects, some gardeners have cut down every living shoot that was above ground, and kept all cut back for some time in the hope of "starving out" the insect. By cutting away the tops so late in the season much injury is done to the roots, and, as many of the larvæ will have reached full growth, they are not starved but merely enter the ground or find some other suitable place to pupate or prepare a new lot of beetles to deposit eggs on fresh shoots when they appear. The first lot of beetles begin to deposit their eggs in the spring, at a time when the Asparagus is cut daily for market and table use, and if growers were careful to keep down all seedling or stray shoots, and destroy all those that have become wild, during this period, it would help to starve out the first brood at least, because the beetles would be forced to deposit their eggs on the shoots that were to be cut for use, and they would thus be destroyed before hatching out. If this practice is followed by all the growers in any district it will have the effect of materially lessening the numbers of the pests, so that later in the season they will not be so troublesome.

As soon as the young larvæ appear, after the marketing season is over and the Asparagus is allowed to grow naturally, the use of insecticides should be resorted to, and repeated during the summer whenever the insects recur in any number.

Fresh slacked lime dusted on the plants is found by many to be very effective, and one of the cheapest and most easily applied of remedies. It is efficient only against the larvæ, the beetles being unaffected by it. Arsenical poisons, such as Paris green or London purple, used in the same manner and proportions as for the potato beetle, are as effective against the Asparagus insect as they are in preserving the potatoes.

The Asparagus beetle is an importation from Europe, and its first appearance in this country was on Long Island, New York, thirty years ago. It soon became very destructive to the large plantations on the island, and a few years later it was doing much damage in New Jersey. Since then it has slowly spread over a large territory, estimated by some to be less than at the rate of twenty miles a year. The beetle averages about one-fourth of an inch long, and has the head, antennæ, legs and under side of the body black. The thorax is red with two long black spots on the top. The wing-covers are black with three large lemon-colored spots on each. The middle and the anterior spots are often joined, and appear as one irregularly-shaped long spot, and then the black has very much the

shape of a cross with a broad shaft. There is an orange band around the margin of the wing-covers. The dark brown eggs, which are deposited by the beetles on the stems, branches or leaves are set on end, and are a little over one-twentieth of an inch long. These eggs hatch in about a week or a little more, and produce larvæ which grow rapidly and attain full size in ten or twelve days. They are then about three-tenths of an inch long, fleshy and slug-like, with the body much larger towards the hinder part than towards the head. The color of the body is a dull ashy-gray, and the head and legs are black and shining.

The time necessary for the insect to go through all its stages, from the egg to the imago, or perfect beetle, is about thirty days.

To-day (August 5th) the beetles and eggs are very abundant in many gardens about Boston, and fully-grown larvæ are also quite plentiful.

Another species of Asparagus-beetle, known as *Crioceris 12-punctata*, also an importation from Europe, made its appearance near Baltimore some years ago, and is said to be very injurious if neglected. As yet, however, it is not reported as having come very far north.

Jamaica Plain.

J. G. Jack.

Notes Upon Some North American Trees.—VI.

ACACIA FARNESIANA, Willd.—This plant is now so widely distributed through the tropical and sub-tropical regions of the world, having been long cultivated for the fragrance of its flowers, that its native country is not easily determined. Mr. Bentham (*Trans. Linn. Soc.*, London, xxx., 502) was of the opinion that it was indigenous to western America from northern Chili to Texas, as well as to northern and north-eastern Australia, and perhaps to south tropical Africa. It is one of the most commonly cultivated trees in all the towns on both sides of our Mexican boundary, and I have found it growing spontaneously on the Texas desert between San Antonio and the Rio Grande, in situations where it does not seem possible that it could have been introduced. It seems desirable, therefore, for these reasons, to include this beautiful species among the trees of our territory.

ACACIA FLEXICAULIS, Benth.—This species must be included also among the Texas trees. It is the largest and, after *A. Farnesiana*, the most beautiful of the Acacias, growing naturally within the limits of the United States. It is found abundantly on the dry plains, which rise from either bank of the lower Rio Grande, forming a round-headed evergreen tree attaining a height of twenty-five or thirty feet, with a short, stout trunk, sometimes twelve to fifteen inches in diameter. It is known locally as "Mexican Ebony," from its very hard, compact and beautiful, dark wood, which is greatly prized by cabinet-makers, and for posts (as it is almost indestructible when placed in contact with the ground) and for fuel. The pale-yellow flowers are delicately fragrant. The large seeds of this species are sometimes boiled by the Mexicans while they are green and are said to be palatable and nutritious; or, when fully ripe, they are toasted and used as a substitute for coffee. The illustration upon page 401 of this issue, from a photograph made by Mr. Pringle last year on the lower Rio Grande, shows the habit and the general appearance of this tree, but does not display, of course, the beauty of its bright and lustrous foliage.

99. **ACACIA BERLANDIERI**, Benth.—This plant, so far as I have been able to see it in Texas and in Mexico, or to learn about it from others, is never more than a shrub, and it may be dropped, therefore, from the list of our trees.

PITHECOLOBIUM BREVIFOLIUM, Benth.—I have found this species growing as a slender tree, twenty-five to thirty feet high, on both banks of the lower Rio Grande, although more common and of larger size south of the river. It should properly find a place, therefore, in the North American Silva.

109. **PRUNUS CAPULI**, Cav.—This name for the widely-distributed Cherry-tree of Mexico and the Pacific coast of Central and South America, appears to have been published first by Sprengel in his "Systema Vegetabilium," ii., 477 (1825); and Mr. Watson has pointed out

(*Proc. Am. Acad.*, new ser., xxii., 411) that an earlier published name is *P. salicifolia*, HBK., "Nov. Gen. et Sp.," vi., 241, t. 563 (1823), although, as Mr. Watson suggests, the name *Capuli*, always credited to Cavanilles, may have been published by him before it was taken up by Sprengel (*l. c.*).

113. **PRUNUS ILICIFOLIA**.—An interesting variety of this tree, with nearly entire adult leaves, was first noticed by Mr. W. S. Lyon on Santa Catalina Island, off the California coast. He referred it (*Botanical Gazette*, xi., 202, 396) to *Prunus occidentalis* of Nuttall—a name which Nuttall seems never to have used for any western American plant, and which had already been appropriated long ago by Swartz for a West Indian tree. Mr. Edward L. Greene found this plant upon Santa Cruz Island, and notes (*Bull. California Acad.*, ii., 7, 385) the resemblance to the mainland *P. ilicifolia*, and the fact that the smaller spinose-toothed leaves of this last are identical with those on young seedlings found on the island. Mr. Brandegee examined the trees on Santa Cruz and Santa Rosa Islands last summer, and in his "Flora of the Santa Barbara Islands" (*Proc. California Acad.*, 2 ser., i., 2, 209) it appears as *Prunus ilicifolia* var. *occidentalis*, and this name should, therefore, be retained by those authors who consider the insular tree as a more robust, entire-leaved variety merely of *Prunus ilicifolia*, although the name, in view of the West Indian species, is not a fortunate one. The island tree, according to Mr. Greene (*l. c.*), rises to a height of twenty-five feet, with a stout trunk covered with rough dark bark, and a compact, well-rounded head. The leaves are evergreen, ovate-acute, three to four inches long, entire, or sometimes remotely denticulate, or rarely spinose-serrate. The fruit is larger, but not otherwise different from that of the mainland tree. According to Mr. Greene (*l. c.*), "the thin pulp is sweet, with also a bitter-almond flavor, but no acidity or astringency." On Santa Rosa Mr. Brandegee found "it confined to the bottoms of the cañons—much larger and more tree-like than in Santa Cruz." He notes that in the Santa Inez mountains, near Santa Barbara, the leaves of *P. ilicifolia* sometimes have entire margins.

114. **VAUQUELINIA TORREYI**, Watson.—This Arizona tree was first described by Dr. Torrey (Emory's Rep., 140) as *Spiræa Californica*. Mr. Watson, in referring it to its right genus (*Proc. Am. Acad.*, xi., 147), dropped the specific name under which it was first described (for the reason, no doubt, that this tree has not been found within the actual limits of the State of California), and substituted for it the name of the first describer. Instances are not wanting in the annals of American botany of geographical specific names having been improperly applied; and unless all such names are to be corrected, it would be better to retain the earliest specific name for this plant, which would thus become *Vauquelinia Californica*.

122. **CRATÆGUS RIVULARIS**, Nutt.—This species, founded on specimens collected "in the interior of Oregon" by Douglas, I am unable to distinguish specifically from *C. Douglasii*. The leaves on the original specimen are narrowly lanceolate and simply serrate, as are those of the common form found in the Wasatch Mountains of Utah, where this plant is not rare. But this narrow-leaved form passes gradually in northern Montana, where the black-fruited Thorn abounds along the margins of mountain meadows and streams, into that with broad, doubly serrate, and often incisely cut and lobed leaves. The two forms mingle in the coast region of Oregon and Washington even, and vigorous shoots of the Utah plant are apt to display the cut leaves which have been largely depended on to separate the two species. The stipules (always an unreliable character in *Cratægus*) and the calyx-lobes, which are described as "usually glandular," cannot be depended on to distinguish these two forms. The spines, which are rather more abundant on the coast plant than on that of the interior, are the same, as are the fruit and its stones. The flowers of the latter are somewhat smaller. I should propose, therefore, to call the narrow-leaved black-fruited

Thorn of the dry interior region west of the Rocky Mountains, which is a stout branching shrub rather than a tree. *Crategeus Douglasii*, var. *rivularis*.* C. S. Sargent.

New or Little Known Plants.

Uniola Palmeri.†

IN 1885 Dr. Edward Palmer collected, near the mouth of the Colorado River, some specimens of a grass from which he said the Cocopa Indians obtained the seeds in large quantities and used them as food. At the time he was there the grass was out of flower; he found only a few disconnected spikelets, and the botanical characters could not well be determined. In April of the present year Dr. Palmer, being employed by the Department of Agriculture to make botanical investigations,

that genus. Its general appearance and habit is that of *Distichlis*, from which it differs in having four of the lower glumes (instead of two only) in each spikelet empty, *i. e.*, without palea or flower, and in the disarticulation of the rachis between the spikelets of both sexes—that is, the spikelets break apart between the several flowers when mature. This disarticulation occurs also to some extent in the fertile spikes of *Distichlis*, but not in the male or infertile ones. On the other hand it differs from *Uniola* in its dioecious character, and here agrees with *Distichlis*. It seems, in fact, to connect these two genera, but so long as the two are kept distinct it must stand as *Uniola*. Specifically it is new, and I have given it the name of *U. Palmeri*.

The following notes I collect from Dr. Palmer's letter:

The specimens were collected at the Horseshoe Bend of



Fig. 123.—*Acacia flexicaulis*.—See page 400.

made another visit to the locality and obtained in that region specimens in good condition, enabling me to locate the plant botanically. As the genus *Uniola* is defined by Benthams & Hooker, our grass must be considered as of

**CRATEGEUS DOUGLASHII*, var. *RIVULARIS*, frutex glaber, 10–15 pedalis, foliis ovatis, lanceolatis, obtusis vel acutis, argute serratis, inciso-serratisve, stipulis acutis inciso-glandulosis.

†*UNIOLA PALMERI*, Vasey.—Culms wiry and rigid, sometimes cane-like, two to four feet high, from subterranean root-stocks, often much branched, and many culms from one root, leafy to the top. Leaves distichous (sometimes less than an inch apart, sometimes two to four inches apart), smooth, rigid, erect, involute, with long, pungent apex, the lower two to four inches, the upper four to eight inches long and exceeding the panicle. Ligule nearly obsolete, with a light woolly tuft at the angles. Raceme of the staminate plants six to nine inches long, narrow, the branches mostly in twos and threes, the lower ones one to three inches long, erect, compound below; spikelets eight to ten lines long and about two lines wide, 7–9 flowered. Racemes of the fertile plant shorter, thicker and more condensed, being four to six inches long, and the branches sessile or short-stalked; spikelets usually one to one and a half inches long, 7–9 flowered, the two lower pairs of glumes empty; outer pair of empty glumes five to six lines long, the flowering glumes six to seven lines long, lanceolate and acuminate, with a stiff, pungent point, smooth, obscurely many- (about 20-) nerved; palea one-fourth shorter than its glume, with about three nerves on each side of the strong, deep keel; grain linear-oblong, three lines long, not including the thickened, more or less united style.

the Colorado River, thirty-five miles south of Lerdo by the river, and twelve to fifteen miles from its mouth. This is the most extensive locality of the grass, thence extending down to the mouth of the river. It covers a space of from one to twenty miles wide, and occurs on both sides of the river. It is estimated that there are from forty to fifty thousand acres covered with this grass. It grows from two to four feet high, from strong, deep root-stocks, frequently many culms from the same root. The stems are covered to the top with the sharp, stiff leaves. The sterile plant grows more or less mixed with the other, but at times in masses entirely by itself. Dr. Palmer noticed several forms. One of these is more slender, with the leaves shorter, more numerous and more finely pointed. This, he says, grows on land that has but little overflow. Where, by changes in the river, any patches are left above tide-water, they soon die.

The Indians come together here at the proper season,

in April, and gather this, to them, important article of food. As its quantity depends on the overflow of the tides, and the tides are sure to occur, they have an assured crop without any other labor than gathering and caring for the grain. The gatherers enter the fields as soon as the tides have entirely run off, where the soil is an adhesive clay so soft that the Indians often sink nearly to their knees in gathering the grass, and as soon as the tide begins to flow they return with the result of their labor to their camps. It is quite difficult to pull up the plant by the roots, as these are often two to four feet long, but the stems are brittle and easily break off above the root. The Indians, in harvesting, use any old knife, or, if they have none, they take a flat piece of wood and form an edge on each side, and with this they sever the stems, the left hand grasping the tops, which are then thrown into a basket. The rigid, spiny-pointed leaves make the process a painful one. The grain has to be cut when a little green, because of the easy separation of the spikelets. In order to dry the heads as quickly as possible, large fires are made, and the heads are piled around so that the flames penetrate between them. When they have been sufficiently exposed to the fire a stick is used to thrash the heads, which breaks up the spikelets, but does not separate the chaff or glumes from the grain. The dried and dissevered spikelets are then taken to a piece of ground prepared for the purpose, and the Indians tread upon and rub the grain between their feet until the seeds are shelled out.

This process is more easily accomplished after the grain has been exposed a while to the sun, but in any case it is pretty trying to the feet because of the sharp, stiff points of the chaff. The action of the tide knocks off and carries away considerable of the grain, but this is left in rows at the edge of the contiguous dry land, and the Indians gather much of it and rub it out. They have to be expeditious in their harvest, as wind storms are liable to arise and destroy or injure the product of their labors.

Dr. Palmer was accompanied on his trip by two gentlemen connected with the United States Fish Commission, who took photographs of the grain-field, and of the thrashing and treading out of the seed from the chaff.

It is not yet ascertained how far up the river this grass extends, but probably to the limit of tide-water, and in this case it will yet be found within our boundaries. The related *Distichlis maritima* grows not only on the sea-coast, but in nearly all saline and alkaline grounds in the interior of the country, but we cannot infer from that fact that this species might be cultivated outside of the reach of the tides.

Washington, D. C.

George Vasey.

Foreign Correspondence.

London Letter.

THIS being the jubilee year of the Royal Botanic Society, it was thought desirable to celebrate the event by a floral carnival in Rose time. It has been a commendable attempt to introduce the pretty, if frivolous, customs of the flowery Riviera, so familiar to the sojourners at Nice in early spring, when the hills and valleys teem with blossom. The custom may migrate northward and take root, now that "society" has set its seal of approval upon it, but, to our sober minds, some of the items in the schedule seemed to be absurdly extravagant. The flower-bedecked horses and carriages were, however, not so absurd as the "triumphal canopies," "May-poles," "bridesmaids' arches," and "wreaths on poles," which only served to illustrate how insipid flowers become when maltreated in a way that cannot by courtesy be termed artistic or tasteful. The most tastefully decorated Victoria carriage and pair of horses was quite a flower-garden. The whole body of the carriage, from the wheels to the pole-end, was glowing with flowers, prettily arranged in harmonious colors; while the horses were caparisoned with emerald-green harness and trappings and roses. I heard that this was the work of a professional floral decorator from Nice, and that no less than £20 worth of ribbon was used on the horses. It won the highest gold medal besides a prize from the Princess of Wales, who was present to distribute the prizes. Some of the pony cars were extremely pretty, especially the first-prize one, which was

smothered with roses, paneled in different colors, the predominant variety being the pink La France. One pony was wreathed with the long, slender flower-stems of *Tropæolum speciosum*, with scarlet flowers; in another, the trappings were all of roses. The decorated riding-horses were not remarkable, but the children's carriages and sedan-chairs, loaded with live babies almost hidden by flowers, were, perhaps, as popular as any part of the show. The arches, May-poles and canopies were not worthy of favorable comment, neither were the decorated boats on the lake, which were absurdly wreathed with tender tropical flowers, and the sterns crammed with pot-plants such as Crotons, Ferns, and Palms, which seemed quite out of place. Simplicity should have been the aim of the decorator, and it would have been an easy matter to have adorned the boats with bright, hardy flowers, which would not have withered so quickly. Besides, flower-bedecked boats seem quite out of character in our climate under leaden skies and drenching rains.

The display of Roses, or "Feast of Roses," in the exhibition tent was a much-admired feature, for some of the leading Rose-nurserymen contributed large and full collections, the most extensive being that from the great house of W. Paul & Son, of Waltham Cross, who worthily won the chief gold medal with their display. This firm made a commendable attempt to break through the orthodox style of exhibiting cut Roses, by arranging their blooms in masses of distinct and contrasting or harmonizing colors, marked out by geometrical yet graceful lines, and relieving the flatness by groups of pot Roses, Ivies, and other shrubs. The flowers lose nothing, but gain much, in being set out in this way, and the flower-loving public evidently appreciate the innovation, judging by the admiration it bestowed upon this Waltham Cross gathering. The "feast" was not exclusively of Roses, many other classes of plants being shown by the leading houses in the trade, and, perhaps, none were so remarkable as the magnificent group of Begonias, from the celebrated raisers and growers of these popular flowers, the Messrs. Laing. In their large and representative group one could see all types of Begonia and the various styles of growing them, from the prim staked-up "specimen" plant to the graceful drooping plants in suspended baskets. It is very evident that this modern race of Begonias has taken quite a hold upon the public. Even ladies of the most refined taste in colors admire the great flowers of the most fiery scarlets and reds, perhaps because these colors glow in flowers of exquisite form and substance. This season's crop of new varieties is unusually large, but as most of them are still under trial and nameless I must reserve comment upon them for the present. They are obviously all improvements on the older sorts, and, taken altogether, they serve to illustrate more forcibly than ever the praiseworthy efforts of this firm (which has identified itself with Begonias) to bring this valuable race of green-house flowers every successive year to a still higher state of perfection. Begonias, as open-air flowers, have not made much headway with us, though now and then one sees examples of exceptional success in this direction; and on the Continent, where they enjoy more sun and heat than here, they seem to be supplanting the Pelargonium. I shall not soon forget the spectacle I saw last August in one of the parks at Zurich, in Switzerland, where there was a large mass of Begonias thriving and flowering in great luxuriance. The varieties were of the small-flowered class, not many removes from the typical *B. Boliviana*, and they seemed much more suited to "bedding out" than the large-flowered sorts, which are more liable to be damaged by rains and winds.

Although this is the "off season" for Orchid bloom, there was quite a fine show of them at the "feast," and especially that from Messrs. Low, who had in their large collection some very choice kinds. Most interesting to me, because it was the first time I had seen it, was the new *Cypripedium Rothschildianum*, introduced a year or two ago by Messrs. Sander. I was somewhat disappointed with it, perhaps because I had heard so much laudation of it. But it is not one of those plants that "take your breath away" at first sight. It looks to be a near ally of *C. laevigatum* (now called *C. Philippinense*), the flowers being about the same size. The slipper is like that of *C. Stonei* in shape and color, the dorsal or upper sepal is shaped and striped like that of *C. laevigatum*, but the long lateral sepals which stretch out at right angles are pointed and copiously spotted, and unlike those in any other species. A much prettier and probably a more really valuable Lady-slipper is *C. bellatulum*, with which Messrs. Low seem to be plentifully stocked, as they showed the flowers of it on trays like Pansies. Everybody admires the wax-like flowers so quaintly blotched with black-crimson, and on the plant they



Fig. 124.—*Uniola Palmeri*.—Two-thirds of natural size.—See page 401.

1. A male plant; 2. A female plant; 3. A male plant with small, close leaves; A. A spikelet of the male plant; B. Empty glumes of same; C. Flowering glumes of same; D. Palet of same; a. Female spikelet; b. A pair of empty glumes of same; c. A flowering glume of same; d. Palet of same; d'. A transverse section of the palet; e. Young fruit with the styles united; f. Older, ripe fruit, with the styles separate. The dissections are magnified three diameters, excepting "f," which is magnified four diameters.

are set prettily amidst the handsomely marked foliage, and last for weeks in perfection. Though the present is the lowest ebb of the Orchid-flower season, there is much activity among Orchidists on account of the numerous novelties, genuine and otherwise, that appear at the auction-rooms. *Cypripedium* seems to produce most novelties, and this week there are to be sold the "new and beautiful *C. Savageanum*,"

the new *C. Seegerianum*, *C. Pageanum*, *C. Buchanianum*, *C. Godseffianum*, *C. Winnianum*, *C. regale*, *C. pavoninum* and *C. Javanico-superbiens*. Here is a list for the specialists in *Cypripedia*, who probably are the only people who will be able to define and appreciate the subtle differences between them and well-known species. As to the names of these so-called new Orchids, it seems as if we are getting from bad to worse. Every one assumes that he has a right to christen Orchids, now that they cannot be sent to Reichenbach, and the result is that they are making confusion worse confounded. Instead of one competent man describing new Orchids, we have two or three, and their descriptions of the same plant do not agree, and, in some instances, old species have been described and named as new. The work could be done very well at Kew if the cultivators and importers would only be loyal to the recognized headquarters of botany in this country. Let us hope that no other large family of plants will suffer from such excessive popularity as Orchids. Among the list of the newest novelties I see a pure white variety of our old favorite, *Dendrobium nobile*, and if this does really come up to description we shall have indeed a valuable addition to winter flowers. How many have sighed for it, and how often have collectors been instructed to be on the look-out for it at home and abroad. It will be interesting to see what figure such a rarity will be sold for. It must be white and nothing but white to be of value, but this has to be proved. A pure, colorless variety of *D. nobile* is what florists want for winter work, but it will be many years probably before they will get it. When I was in India I was continually on the look-out for it, but no one had seen or even heard of it.

W. Goldring.

Cultural Department.

A Few Summer Pears.

I AM asked to name a list of Pears for family use by one who is fitting up his garden in a newly-acquired home, and having but little room, and getting well on toward the meridian of life, he wants trees that will be likely to yield fruit as quickly as possible, and of quality fit for table use. As a rule, the actual popular knowledge of Pears is limited to the Bartlett and Seckel, and, perhaps, a few old-timers, which, in the childhood of people, like our enquirer, were voted excellent. People of this class have usually given some study to the books and the catalogues of some eminent nurserymen. They have probably made a list after much thought, only to have some acquaintance or tree agent advise an entirely different one. Such persons should be told at the outset that all Pears do not succeed equally well in all localities. Besides this, individual tastes differ widely. One will prefer a sweet Pear to an acid one, and another the reverse, so that if these, and other characteristics, are fairly stated, they can make the most satisfactory selection themselves.

Pears do best generally on a stiff, heavy, rich, well-drained soil, such as a clay loam. The earliest Pear I have ever grown is the Summer Doyenne. It usually ripens here from the 15th to the 20th of July, and lasts about a week. It is small, about the size of a Seckel, good specimens measuring about one and a half inches in diameter, nearly round, sweet, with a handsome red cheek. Altogether it is a very agreeable and welcome fruit so early in the season. The tree is healthy, a good grower, and an early bearer. It is sometimes called a summer Seckel.

The Madeleine comes in at the same time, is nearly, or quite

twice the size of the preceding, and of an entirely different character, light-green, juicy, and slightly acid, and more refreshing in character on this account, but its season is very short. It decays at the core so quickly that it is gone before one is aware of it. The tree is a good grower and an early bearer.

The Bloodgood is another of the small summer Pears, and is better in quality than either of the foregoing, but my tree has never done well. The fruit is yellow, sweet, and of excellent flavor. Were I to plant again simply for family use, I would group these three, if not more, on one tree, by grafting. This at ten or fifteen years old would yield enough to answer the purpose of an early desert fruit and at the same time give a variety.

Following these comes Giffard, a larger, better Pear, of short duration. The tree is a slender grower, and succeeds best when top-grafted on a more vigorous variety. The next to ripen with me is Clapp's Favorite, a handsome Pear, fully as large as the Bartlett, and in its prime now (August 12th); not a rich or high-flavored Pear, but juicy and agreeable. The tree is a strong grower and an abundant bearer. It is in season about a week, and like all Pears must be gathered while hard, and house-ripened to get at its real merits, and when fit to eat it must be eaten. When Pears reach maturity no days of grace are added. After ripeness comes sudden "heart-failure." No one ever enjoys a perfect Pear who waits for it to ripen on the tree.

My next Pear is the Tyson, a sweet, rich, juicy Pear, about half as large as the Giffard, but better in quality and in keeping. The tree is a good grower, and is generally tardy in coming into bearing, but when it commences business it attends to it, yielding abundantly in alternate seasons, and seldom missing a fair crop on the off year. A city friend asked my advice about grafting over a tree of this variety a few years ago. He said it never bore anything, and he was tired of waiting. I suggested that it might reward him in time, and advised him to confine his grafts to a few limbs. This might tend to induce earlier fruitfulness in the tree, and then he could judge better as to the probable advantage of further changes. Last year the tree commenced declaring dividends, and this season it is loaded, and so well is the owner pleased with it that he has decided to spare it, and if any limbs are cut it will be the grafted ones.

Ott comes next, a seedling of the Seckel, a very sweet, good Pear of about the same size. The tree is healthy, a good bearer, and very much like the Seckel in growth.

I mention the Rostiezer because nearly all authorities do, but it is not a favorite of mine, and it does not deserve, in my opinion, the commendations often bestowed on it. The tree is a healthy, sprawling grower, and bears well. The fruit is small, hardly averaging as large as Madeleine, with a coarse, gritty flesh, covered with a dark thick skin, often with a ruddy cheek, sweet, and in good specimens tolerably high-flavored. These, however, are the exception; they usually rot before presenting any appearance of ripeness. With me they seldom present such an appearance, and are altogether unattractive.

I might mention also the Rousselet Stuttgart, a very good Pear, with a peculiar spicy flavor, and generally much admired. It is of far better quality than the Rostiezer, but it has the same fault of most of our summer Pears—soon ripe, soon rotten. The tree, however, is healthy and productive.

Next comes Boussock, a large, handsome yellow Pear of good quality, with flesh a little coarse, but juicy. The tree bears abundantly of fruit that is generally fair.

Now comes the Bartlett, the universal favorite, so well known that a description is unnecessary. Some seasons it develops a musky flavor, not agreeable in a dessert fruit to many palates; but it is the universal favorite for canning, and so firmly has its name and reputation become fixed in the minds of the people that they will call for it out of season, and unscrupulous venders will not hesitate to palm off on those who know no better not only other Pears, but other trees, too, when opportunity offers. It is really an autumn fruit here, ripening in September.

Then there is the Souvenir du Congrès, an early, handsome Pear, and larger than any I have named, but quite inferior for dessert purposes. It answers for cooking, and I occasionally sell Pears of this variety, hoping, however, that purchasers will not try to eat them.

And what about the Comet-Lawson? Well, it is said to be early, and as pretty as a Pink. But my grafts have all died; and there are Pears in the above list that will answer every purpose better.

Manning's Elizabeth is a Pear which, according to a recent authority, is the best early Pear. I have failed, however, to find

any merit in it that would justify me in keeping a tree of it, and have grafted over the only one I have. It is not as early as the above-named, and about as poor an apology for a Pear on my ground as can be conceived. Perhaps it would do better on light soils. I might add notes on Washington, Catherine Sterling, Miller's Early, and many more, not omitting the Summer Bell (Windsor), an excellent old-time favorite for cooking, and still as good as ever for that purpose; but the list is sufficiently long for the summer kinds. Pears for autumn will be spoken of in another paper.

Montclair, N. J.

E. Williams.

Memoranda from a Northern Garden.

THE cool, wet season, especially at the north, while unfriendly to the Potato-crop, has been very favorable to the true root-crops. In no recent year have Beets, Turnips, Carrots and Parsnips made a finer growth.

The lessons of this season are many, and those who have lost by their crops may, in some degree, make it up by the teachings of experience. Rust and blight of the Potato are fungoid diseases; but the fungi are destructive in proportion as a favorable nidus, as well as a favorable season, attends them. Early-planted Potatoes of early kinds, well fed with fertilizers, on light land, sloping enough to prevent water from standing, are yielding excellent and well-ripened crops, where, just in proportion as these conditions fail, the crop fails, too.

Long-rooted Parsnips, Carrots and Beets are getting yearly more out of favor, apparently quite as much with buyers as with growers. Still, they make a good appearance at vegetable-shows; and there is some sale for them, in spite of their inconveniences. To get the finest specimens, the soil should be evenly and deeply dug, and enriched with fine manure or fertilizer. I have found the best specimens where the rows crossed the spots at which roots had been pitted the winter before. They went to the bottom of the excavation—large, straight and with a perfect taper.

The advent and increase of many foreign insects, as well as some hitherto localized native species, like the Potato-beetle, have added greatly to the burden of garden-work. Where any advantage is seen, it has been for the benefit of commercial growers, at the expense of private gardeners, a large number of whom have given up the culture of fruits and vegetables so attacked. In small village gardens, Currants and Gooseberries, Onions, Cabbages, Turnips, Radishes and Potatoes have been in many cases abandoned; and the interest in this sort of gardening is greatly cooled by the troubles incident to insect-fighting.

Amateur gardeners, engaged in a contest with insects, commonly fail in not applying the remedies promptly at their first appearance. The Currant and Gooseberry worm must be met with the hellebore douche at the first hatching of the eggs, which is contemporary with the first bloom. As for the various root-worms of the anthomyia race that attack all the cruciferous and alliaceous vegetables, no practical methods suited to small gardens seem to answer, though lime-water, freely applied, or weak lye of wood-ashes, can sometimes be made to succeed.

Undoubtedly a rapid growth, secured by ample and deep fertilization, and aided by irrigation, enables the market-grower to get pretty good crops of Cabbages, Turnips, etc.; but even these are glad, when they can, to get hold of spots of fresh ground, or a new "burn," where they can take a few crops before the enemy has found them out. It seems a pity that crops once so easily and cheaply grown, should now have become costly, far beyond their intrinsic value to the buyer, on account of these difficulties.

The worst of these insects are imported, and most of them did not reach our shores until after the advent of the trans-Atlantic steam service. They were brought over in the steward's stores, the waste from which was thrown out at landing. In this way we got the Currant-worm and the Cabbage-worm, by the way of Quebec. Both of these have reached northern New England, and spread southward within the last twenty years, while, unfortunately, the parasites that keep them down in their old home did not come with them.

We have heard a good deal about importing these parasites, and it does seem as if it might be successfully done at no great expense, considering the ravages now made in our gardens by the unchecked enemies. English readers of this journal, or European entomologists, at least, should be able to give some practical information on this subject, which, so far, seems to have been inefficiently and unintelligently met on this continent.

Newport, Vt.

T. H. Hoskins.

Aquatics in Small Gardens.

HAVING made an experiment in the culture of water plants in my small garden (part of a city lot), with very satisfactory results, I should like to call the attention of other amateurs, especially growers of hardy plants, to some of the possibilities of the water-garden and its surroundings—and especially of the surroundings—for this feature has been somewhat neglected by the numerous writers on the subject. Owners of the smallest gardens, if sunny, will find a water-garden an attractive and useful feature and a very slight trouble; if there are any difficulties in cultivation I have yet to find them. The catalogues of dealers in these plants give full particulars as to construction of tanks, etc., but, in a primitive way, barrels or casks cut in two answer very well, though rather cramped quarters laterally for vigorous plants. There is an æsthetic objection to them, too, since their rims break up the water surface and reduce its apparent "breadth." It is well to sink the tubs several inches below the ground-level and slope the ground towards them.

A tank may be cheaply constructed of Portland cement alone in heavy soil, or with cement and bricks in a light porous one. Four to six inches of good fibrous loam with one-third well-rotted manure should be firmed in the tubs and covered with an inch of clean sand, to prevent the manure from rising; in this compost the plants are to be fixed carefully and firmly and tubs are then filled with water, after which water is only added as may be made necessary by evaporation, for the temperature should not be reduced unnecessarily. A pair of goldfish in each cask and a frog or two will keep the water sweet and clear, add life to the picture and interest the young members of the family.

Rare varieties of Water Lilies, etc., are held at high prices, but a visit to the nearest pond and swamp will furnish abundance of interesting material and enable one to study closely some of our attractive native plants. Our native Pond Lily may, of course, be had in many sections for the gathering. But it is in the surroundings of such a garden that I have been specially interested, as such a station is the place for many things, large and small, which are more or less unhappy in an ordinary dry border and flourish in moist earth and, perhaps, a somewhat humid atmosphere. Every grower of alpine will appreciate such a locality in his garden. It will be well to vary the height of the surrounding ground so that stations more or less dry may be had for various plants according to their requirements.

In the background may be grown bold groups of Cannas, Eucalyptus, some of the Irises, Spiræas, Caladiums, Bamboos, and the large grasses. The low and intermediate places will be havens for some of the Saxifrages, Primulas (*P. obconica* is a treasure there), Ferns, Lobelias and a host of little things. Peat-beds should be made near the borders in which to grow terrestrial Orchids and various peat-loving plants, which are so interesting and so difficult to care for in the borders. The clumps of peat will be sure to send up some interesting wildings. Of course, in planting out, it will be necessary to arrange that shade shall be provided over some of the shade-loving plants. If tubs are used their margins may be hidden by some of the vigorous creepers. My "lake" consists of four half-casks, three in a row, with rims touching, and the fourth in the angle between the second and third, to give some irregularity of outline. Three varieties of *Nymphæa* are blooming here with Water Poppies, *Pontederias*, and many more. Just now, under the shadow of some *Caladium* leaves, *Shortia* and *Galax* are both thriving in the peat and among the Ferns. Any amateur who is fond of other than routine work will be sure to find the water-garden and its borders, arranged as hinted above, a decided and, perhaps, novel pleasure, and he will be surprised, too, at the number and variety of beautiful plants that can be successfully grown and effectively grouped in the water and about its borders.

Elizabeth, N. J.

J. N. Gerard.

Crotons as Bedding Plants.

AFTER a period of comparative neglect, this very handsome class of variegated-leaved plants seems to be gradually regaining a place in popular favor, though on a very different ground from that which they once occupied. Formerly they were only known and treated as stove-plants. And while splendid specimens have been produced for exhibition in this way, the plants so grown were, nevertheless, of little value for any other purpose, and in some cases the foliage was so soft from high cultivation that an exposure to the atmosphere of an exhibition-hall for three or four days was enough to ruin them for the remainder of the season.

We must admit the beauty of specimens four to six feet in height and almost as much in diameter, for such have frequently been shown in the past, but the knowledge of the method by which they were grown has, no doubt, caused a feeling of distrust in the minds of amateur cultivators in regard to the value of Crotons for their use, and the popularity of these noble plants has, therefore, seemed to diminish until recent years, when it has been abundantly proved that another field for usefulness and distinction lay open for them. That is, it has been shown that they possess great decorative capabilities when used as bedding plants out-doors. A notable instance of this was seen in the large Croton beds near Horticultural Hall, Fairmount Park, Philadelphia, where their beauty excited much favorable comment from visitors last season.

But when Crotons are used in this way it should be remembered that strong, healthy plants only should be chosen. Disappointment almost certainly awaits the planter who puts out small, weak plants in the hope that they may be improved thereby. And, again, the plants should be prepared for the change by removing them from the stove in which they may have been grown, and placing them in a light, airy house for some weeks before planting, for it is hardly reasonable to suppose that a plant grown in the close, moist atmosphere of a tropical house will be able to withstand the very variable conditions of a summer in this latitude without a hardening process in preparation for the change.

The plants should be well established in four-inch to six-inch pots, or even in larger ones, since they can be so arranged in the bed that the sizes will not interfere, and they should also be planted moderately close together, so as to give an immediate effect. The beds should be thoroughly prepared, and, if the ground is low, should be well drained and filled with a light, rich loam, or suitable mixture. As regards location, they should have plenty of sunlight, as this tends to bring out the rich colorings of the foliage and encourages stronger growth, and it may be added that if the season be dry it may be found necessary to give the bed a thorough watering at intervals.

As is quite natural from the native habitat of these plants (the South Sea Islands), they are quite susceptible to cold, and consequently should not be planted out too early in the season—from the 10th to the 15th of June being quite early enough in an ordinary season—and, since it usually is desirable to preserve them for use another year, it will be found best to lift them at the first sign of frost, so that they will need no nursing to restore them to their previous vigor.

When lifted in the fall they should be cut back quite hard, potted into as small pots as possible, placed in a warm, moist house, where they should have frequent light syringings to induce them to break into new growth, after which they may be potted on, as it becomes necessary, and treated as usual. Among the multitude of fine varieties of Crotons now in cultivation it is somewhat difficult to pick out a short list of sorts to be used for bedding-out, and the taste of the individual grower must be consulted in the selection of varieties, bearing in mind that the better plan is to select those of strong growth, distinct form and rich coloring. Almost any variety possessing these marked characteristics is likely to give satisfaction.

The following list may serve as a basis to work from—all the varieties are easily procured, distinct and reliable: *Croton Evansianum*, *C. majesticum*, *C. Mortii*, *C. Veitchii*, *C. Youngii*, *C. interruptum*, *C. longifolium*, *C. Challenger*, *C. princeps* and *C. pictum*—these giving enough variety to experiment with. Additions may easily be made to this list as required.

Holmesburg, Pa.

W. H. Taplin.

Filling In About Trees.—It became necessary to raise the level of the ground two or three feet in a small garden, last spring, where a dozen young Pear-trees stood. It was not deemed worth while to transplant the trees, which were some fifteen feet high, and just commencing to bear, and therefore it was decided to fill in about their trunks and let them take their chances. The precaution was taken, however, of placing around them broken stones for a space of about three feet in diameter, a little earth only being spread over the top. The thought was that the stones might allow the air to reach the roots, and that the trees would thrive. When fall came all the trees were growing as well as ever, with one exception, a Bartlett, which showed a perceptible yellow color of foliage. Surrounding this tree, apart from the stones near its trunk, the soil was largely clay, while the others stood in loam, and this was thought to cause the difference. This season all the trees flowered profusely and bore immense crops of fruit. Ten per cent. of all that set was cut out, leaving still a large crop. The trees are doing well. The foliage is healthy, and,

with one exception, I see no difference in their usual behavior. This difference is that all the varieties seem to be perfecting their fruit earlier than usual. Clapp's Favorite, for instance, I have been accustomed to gather about August 10th, ripening them about the 15th. This year there was not an un-ripened fruit by the 5th of the month. Brandywine behaved in the same way. The Bartletts on the tree spoken of are changing color perceptibly, and Howells, an October Pear here, is in much more forward condition than usual, while Sheldon, Beurre Superfin, Lawrence and Kieffer are all ripening in their fruit with similar speed. Of course this early ripening shows the trees to be less healthy than they should be, but no other symptom of any lack of vigor is manifest. Fruit and foliage are perfect, so that I hardly fear any serious or permanent evil to the trees from the earth about their base.

Planting Deciduous Trees in September.—I read with interest Mr. W. C. Strong's article on transplanting evergreens in August. It is undoubtedly one of the best months in the year for the purpose, and, let me add, that deciduous trees can be planted to advantage much earlier than they usually are in autumn. There is no need of waiting for the fall of the leaf. If transplanted in September such trees would not only do well, but, in very many cases, they would do better than if removed later. A transplanted tree bears some analogy to a cutting. The propagator, in a green-house, knows, when he puts in a cutting, that the sand in which he inserts it should be warmer than the air, and so he gives bottom heat. When a deciduous tree is transplanted in September, the earth and air are in much the same relative condition as is desired for the green-house cuttings. The warm ground forces out fibres at once, and when cold weather sets in the tree is well established, having an abundance of roots to help it through the winter. This is not a matter of conjecture, but something that I have tested many times. If any reader, for experiment's sake, will transplant a small tree in early September, and dig it up again in October, the number of new fibres which have been formed will probably surprise him. If trees are planted before the leaves have fallen, these should be pulled or cut off.

Germantown, Pa.

Joseph Meehan.

Fruits and Vegetables for Forcing.—Peach-trees in pots or boxes, intended for early forcing, should now be in a good sunny position out-of-doors, and where the growth is completed and the fruit-buds have plumped up, water should be gradually withheld, but not so long at a time as to allow the leaves to wilt so that the wood will shrivel. If the growth is weakly and not matured, give a few applications of liquid manure for a week or ten days. The best varieties for very early forcing are Alexander, Amsden, Hale's Early, and John Haas, the last a very finely-colored, good-flavored, new Peach. Tomatoes for winter-fruited will now need strict attention. They should be in five-inch pots, and each plant must stand free and have room to strengthen. As to varieties, the Lorillard, Livingston's Perfection and Volunteer are all good. I had great success last year with cuttings taken from Volunteer as late as the first week in September. These cuttings were from plants that had set fruit very freely in the open ground. They were fully six inches long, and were put separately in thumb-pots placed in a shady green-house. They were rooted in a few days, and were then shifted into five-inch pots and treated the same as those raised from seed.

Preparing for Flowers.—Good Primulas, Cyclamens, Cinerarias and Calceolarias are very satisfactory, but when inferior, this is a group of plants which one does not care to see. It is at this season when all these plants must have attention. Seedling Primulas and Cinerarias should now be nicely established in two-and-a-half-inch pots, and kept in a frame shaded from the hot sun during the day, with the sashes removed entirely at night when the weather is fine. A syringing twice a week with weak tobacco-water prevents the white thrip from destroying or crippling the young growths. Calceolarias should be pricked out as soon as large enough in pots or pans half an inch apart, in soil that is shallow, sandy and friable, and when large enough they must be potted singly. All these plants should be grown quickly and never checked, and then they will prove among the most beautiful of our winter and spring flowers.

Pearl River, N. Y.

John Thorpe.

Kale is one of two or three vegetables I always sow broadcast. I prepare the ground first as for sowing Flat Turnips, by putting a heavy coat of manure on a freshly-plowed surface and harrowing it in lightly. The seed is then sown much more thickly than Turnip-seed, using about six pounds of good seed per acre. The green curled Scotch is the best in

quality and comes in use earlier in spring, but it becomes worthless much sooner than the Siberian, and a sowing of both should be made soon.

Crozet, Va.

Correspondence.

Forests and Civilization. V.—The North Woods.

To the Editor of GARDEN AND FOREST:

Sir.—The Adirondack region, as a place of resort for summer rest and recreation for those who love the wildness and freedom of the woods, is coming to an end. Not many persons see this now. Many never perceive that anything is coming till a good while after it has come. I know a man who is still lecturing against slavery, and especially against the sin of the churches in upholding the peculiar institution. He complained to me a few months ago that the great mass of our people are still indifferent in regard to this gigantic wrong. He has not learned that slavery is dead. If he had been a soldier on either side in the Civil War he might have found it out. The time is coming when the people who live in, by, and from the North Woods will awaken and find that their occupation is gone. Not many will believe this now. Some are even glad of the changes that put great tracts of the forest here into the hands of rich men, clubs, syndicates, and corporations, glad that, "if the state will do nothing, the woods will still be saved by private owners."

But a few of the great hotel men of the Wilderness begin to have a sense of something in the air which bodes no good to them. The effect of maintaining forest conditions over large tracts will, of course, be equally salutary in the retention and distribution of the water which falls upon them, whether the land is owned by the state, by individual citizens, or by clubs and corporations. This function of mountain forests, as natural storage reservoirs for water, is, perhaps, the most important of all their uses. But the Adirondack forest is valuable to the people of the state and of the country in several different ways. It should have been forever the source of inestimable benefits as a mountain summer resort, a region of infinite sylvan variety, beauty, and peace.

Let us use a little analysis here. In the early times of our country's history, when we had but a sparse population, which nearly all lived on farms or in small towns, summer vacations and excursions for rest, recreation, and the restoration of wasted energies were not needed as they are now. But, as our country has filled up, and millions of our people have crowded into cities to live, there has arisen an absolute necessity for a change of conditions and methods of life in the hot season of the year for a great proportion of our whole population. People must get out of doors. They must lay aside business and put off the burden of daily care. It is a most practical matter, a matter of the wisest and most necessary economy—of the economy of life itself and of its highest forces.

Without such a pause in work, such a period of contact with nature and the out-of-door world, as a means for the restoration of exhausted vitality, neither physical nor mental health can long be maintained. Life will not continue to be sane and efficient without an occasional visit to the sources of healing and strength in Nature's great sanitarium—the open air. It is true that there are multitudes of persons, especially of women, in our country who never have such a vacation, for whom there never arrives "a lull in the hot race," to use Mr. Arnold's expressive phrase, but they need it all the same, and it is a calamity, not only to them but to all who are near them, that the hard conditions of their lives forbid their ever yielding to the imperative need for out-of-door rest and enjoyment.

Now, the people who have been coming year after year to this great interior country of woods and lakes and shaded, winding waterways, may as well take down their maps and mark this region of their unrestrained wandering and delight all over with big black letters, "No trespassing here." This woodland heritage of the people is passing from them. No matter who has owned these forest lands hitherto, everybody has been free to wander over them. A man could go where he pleased, and this freedom to go where he pleases is one of the chief sources of enjoyment in the woods for a man with a healthy nature. It is the wandering, the exploring, the going on to "fresh woods and pastures new" which inspires the "vital feelings of delight" in a true lover of the woods. Wordsworth's wonderful expression describes perfectly the experience of many thousands of weary men and women in these abodes of beauty and freedom and peace in former days.

"No trespassing here." Everywhere, as I pass through the country, I am told that the land is passing into the hands of capitalists, clubs, and companies. They have a perfect right

to buy all the land they can pay for, and to fence it in and put a sign across every woodland path and mountain brook with the inscriptions "Keep out," "No hunting or fishing here," "Trespassing forbidden under penalty of the law," but their acquisition of whole townships of mountain woods and lakes and streams will not make the region more attractive to tourists or lovers of the wilds. The people of the woods tell me everywhere that "the clubs are getting lots of land," and I could give the names of rich men and companies who are each acquiring territory enough for a principedom. One estate owns a township not far from Racquet Lake, in Hamilton County. A well-known capitalist and his friends "have the option" on 53,000 acres. That is more than eighty square miles. They can have the tract if they want it. A club of New York city men holds about 35,000 acres. These three blocks run up together, and stretch across the map for nearly thirty miles. The club has three-fourths of a mile of coast on Racquet Lake, a large part of Big Forked Lake, and all of Little Forked Lake. Brandreth Lake, with its tributaries, belongs to one family. The 53,000-acre block includes part of the shores of Tupper Lake and nearly all the coast-line of Smith Lake, which is one of the finest lakes in the North Woods. The state owns just a little of the outlet of Smith Lake.

This is to be the character of the next great period in the history of the Adirondack region: the gathering of many small holdings into a few large ones; the utilization, protection and enjoyment of these vast tracts by their owners; and the consequent and necessary exclusion of the people from the woods. The multitudes of visitors will go elsewhere; the state will lose the revenue which they have hitherto brought into it; the great hotels will be lonely places, and the innumerable summer camps will be broken up. If the state owned the land, its people could enjoy the freedom and peace of the wilds forever.

Now, a note relating to another feature of the general situation, and to arrangements for a Forestry exhibit at the International Exposition in New York City in 1892. I think we should arrange to set up a papier-mâché model of the Adirondack region, showing the extent and location of the devastations which have already been made, the tracts of denuded rock-surfaces, and those of burned-out, blasted land. Perhaps the Chamber of Commerce of New York City may feel an interest in this suggestion.

Star Lake, N. Y.

J. B. Harrison,
Cor. Sec. American Forestry Congress.

Orchids in Flower in Brooklyn.

To the Editor of GARDEN AND FOREST:

Sir.—Even at seasons when Orchid bloom is scarce, a visitor to the collection of Mr. Frederick Scholes will invariably find a rich display among the contents of five large span-roofed structures devoted to these plants. Each house has narrow side-stages and broad centre-stages, the former containing Cypripediums, Lycastes and *Odontoglossum grande* by the hundred, the latter being well filled with Eucharis, Palms, Ferns, and *Phajus grandifolius* in great numbers standing in a bed of Selaginella, Panicum, and Tradescantia, and forming a perfect mass of green. On a recent visit I found the roof of each house entirely hidden by the hundreds of wire baskets and wooden boxes containing Cattleyas, Lælias, Aerides, Vandas, Oncidiums, Phalænopsis, and many others whose long aerial roots enjoy the humidity rising from the dense bed of foliage below. Among the Cattleyas several specimens of *C. Dowiana* were showing enormous blossoms with unusually broad labellums, finely fringed, the rich golden veins running through the dark-purple ground in pleasing contrast, and the yellow in the sepals and petals unusually bright. Next to these the beautiful *C. maxima*, a pale but very pretty variety, bore fine flowers of a light-rose color, with conspicuous purple lines on the lip. *C. Harrisonia*, always admired for its soft color, was represented by at least a dozen specimens, well bloomed, among which were one or two highly-colored varieties. On a block, and suspended near the glass, was a splendid variety of *C. Schilleriana* bearing on a stem three well-developed, finely-colored blossoms, the sepals and petals a very deep rose, and the color of the lip unusually vivid. Here, also, in perfect health, were two plants of *C. Acklandia* in full bloom, and both in more vigorous condition than this species usually shows. It occupies a place here with such varieties as *C. guttata*, *C. intermedia*, *C. Harrisonia*, and produces its large green and dark-purple flowers annually. A plant of the pretty scarlet-flowered *Broughtonia sanguinea* was attached to a block near the glass. *Batemannia Burtii* was also yielding its odd reddish-brown and yellow flowers from

a strong plant grown on the stage where ample moisture surrounded it during active growth.

Oncidiums are grown extensively in this collection, and among the most notable in bloom were several plants of *O. leucochilum*, yielding stout, many-branched spikes, bearing the white and brown spotted flowers in great abundance. One remarkable specimen carried no less than 180 flowers on two stems. Some fifty plants of *O. Jonesianum* hanging in a sunny position were also promising flower, some with two and three spikes, and several already in bloom. The flowers of this variety are exceedingly pretty; the lip is broad and white, more or less spotted with rich purple, the sepals and petals being spotted with dark brown on a greenish-yellow ground. The Bee Orchid, *O. dasytyle*, was also in full bloom having three strong spikes of cream-yellow flowers, each with a blackish-purple centre, greatly resembling a Bee in shape. Stanhopeas could be counted by the score in great variety, many having four, five and six spikes each, and a fine group of *Odontoglossum Schleiperianum* were well flowered and very rich in color. The Phalænopsis, although not very numerous here, are probably the largest in the country. The individual plants are wonderful examples of cultivation. They are grown in wire baskets, and suspended about two and a half feet from the glass in a temperature much cooler than we usually find them. During the past winter this group, consisting of *P. Schilleriana*, *P. amabilis*, *P. Stuartiana*, *P. grandiflora* and *P. Sanderiana*, produced a magnificent display of bloom; no less than a thousand flowers were fully expanded at one time, easily the first among them being a remarkable specimen, *P. Schilleriana*, which carried 131 blossoms. At the time of my visit this plant had three growths, and eighteen sound leaves, many of which measured fifteen inches in length, and appeared well prepared for another display next season. *P. Esmeralda* was represented by a specimen with twelve spikes just showing for flower. It has six growths, and like all the other species mentioned is in vigorous condition, with stout, thick foliage and strong roots. All lovers of this beautiful genus will find the owner of this remarkable group of plants, or his skilful grower, Mr. F. Gardiner, ever ready to explain how such marvelous results have been achieved with one of the most beautiful Orchids ever introduced.

Summit, N. J.

A. Dimmock.

Diseases of Ampelopsis.

To the Editor of GARDEN AND FOREST:

Sir.—Will you please examine the leaves of Virginia Creeper enclosed and inform me whether there is an available remedy for this disease, and whether it can be communicated to the Grape-vine?

Orange, N. J.

E. H. C.

[This letter was referred to Professor Halsted, of Rutgers College, who replies that the whitish orbicular spots upon the leaves of the Virginia Creeper (*Ampelopsis quinquefolia*) are caused by a microscopic fungus which bears the name *Phyllosticta Ampelopsidis*. This minute fungus consists of very small threads or filaments, which run in all directions through the substance of the leaf and rob the leaf-cells of their vital fluids. Soon after the spot begins to be apparent from the dying of the leaf-tissue in the infested part, small spherical bodies appear which, after attaining full size, look like black specks upon the brown or sometimes nearly white spot. These dark bodies bear within a multitude of spores. These spores serve for the fungus the same purpose as do seeds among higher plants. It is, therefore, by these spores, which can only be seen with the high power of the microscope, that the leaf-spot fungus is propagated from year to year. With this fact in mind it is evident that, in order to destroy the fungus, all infested leaves should be burned.

The fungus is deep-seated and, therefore, does not make its presence in a leaf known until after a large part of its sapping and mining has been accomplished, consequently, it is not easy, as it is in some other mildews, to apply a remedy that will remove the fungus and save the part attacked. There is a leaf-spot of the Grape which is put in the same genus (*Phyllosticta*) with the one upon Ampelopsis. They are so much alike that it is not impossible that the plants upon which they grow are responsible for the difference. Professor Halsted is not sure that this disease can be communicated from the Virginia Creeper to the

vine, but he has recently seen it upon leaves of the "Boston Ivy"—*Ampelopsis tricuspidata* (A. Veitchi). Upon the same plant he has also observed the dreaded mildew of the Grape (*Peronospora viticola*). It is to be hoped that this useful Japanese creeper, which has hitherto been remarkably free from these pests, will not fall a prey to the many fungous diseases which now infest our native species.—Ed.]

Ribbon Grass.

To the Editor of GARDEN AND FOREST :

The "Ribbon Grass" (GARDEN AND FOREST, ii., 394) is common in most old gardens about Germantown. I enclose a specimen from an old farm-garden on my property, which was there when I bought it nearly twenty years ago. It does not often flower, but when it does, the upper portion of the culm bearing the flowers produce the green leaves of the normal form of the species. Upon the specimen the remains of the inflorescence, the green leaves and the lower striped leaves on the same culm can be plainly seen. "Gardeners' Garters" is a very common "common name" for this plant.

Germantown, Aug. 15th, 1889.

Thomas Meehan.

Notes.

Masses of *Pontederia azurea*, of an acre or two in extent, are found floating in the river Parana.

Kœlreuterias are blooming for the second time, and many of the panicles are as large as those of the first flowering.

Owing to the cool, damp weather, blooms of such Roses as *Perle des Jardins*, *Papa Gontier*, *The Bride* and *Niphetos*, now in market, are as large and full as they usually are in the middle of September.

Mr. W. Watson, assistant curator of the Royal Gardens, Kew, assisted by Mr. Bean, the foreman of the Orchid department, has commenced the publication, in monthly parts, of a treatise on Orchids, for the use of amateurs.

Some remarkably fine Lotus flowers from the pond in New Jersey, where they are naturalized (see GARDEN AND FOREST for April 10th), were lately sent to this office. The expanded flowers measured thirteen inches across.

Messrs. Siebrecht & Wadley have issued a catalogue of more than 200 pages, in which, for the convenience of amateurs, the plants are grouped into classes, according to their cultural requirements and adaptability to various special purposes.

Among the small trees now in bloom *Rhus semialata*, var. *Osbecki*, is conspicuous, being covered with white flowers in spikes fifteen inches long and six or eight inches in diameter. The rich, tropical-looking foliage is a glossy green, changing to bright colors in autumn.

The large white flower-clusters of *Hydrangea paniculata grandiflora* are now very freely cut and sold for decorative purposes. Not only do they remain without wilting for a week or ten days in a warm room, but they will dry on the stems and retain their cream-white color all winter. Half a dozen of these panicles on long stems in a large vase, with spikes of *Gladiolus* of some positive color, make a very effective group.

The Governor of New Hampshire has appointed Messrs. John J. Bell and John D. Lyman, both of Exeter, to represent the state at the annual meeting of the American Forestry Congress, in Philadelphia, October 15th to 18th, and the Governor of Tennessee has appointed the following gentlemen: J. M. Coulter, Dyer Station; John P. Buchanan, Murfreesboro; Tomlinson Fort, Chattanooga; Lucius Polk, Columbia, and P. C. Isbell, Manchester.

The city trade in such plants as Mignonette, Sweet Peas, China Asters, Sunflowers, and, lately, single and double Dahlias has been good all summer long. Many people who have no country seats at Lenox or by the sea buy flowers, not because it is the fashion, but because they love them, and they buy them more abundantly in summer because they are cheaper. When spikes of *Gladiolus* are selling at twenty-five cents a dozen they are quite as beautiful as when they cost seventy-five cents each.

A White Oak tree was cut near Scottsburg, Indiana, not long ago which measured, according to the *St. Louis Lumberman*, twenty-seven feet in circumference. The tree was ripped up by means of a cross-cut saw, and the owners got out one board

that was ten inches thick, five feet two and a half inches wide at the butt and four feet six and a half inches at the top, and thirty-two feet long. This board was loaded upon a broad-tread wagon, to which two yoke of oxen and eight horses were hitched, and it took one whole day to remove it one and a half miles.

Nymphæa Marliacea chromatella is a hybrid from *N. flava*, the Yellow Water Lily of Florida, the other parent being, as English authorities say, *N. tuberosa*. However that may be, the plant is now blooming with Mr. E. D. Sturtevant at Bordentown, New Jersey, and it seems to be an acquisition. The flower is yellow, considerably larger than that of the Florida plant, and a trifle larger than the northern pond Lily, *N. odorata*. Its odor is pleasant, but not powerful; it continues to bloom from June until late autumn, is more floriferous than *N. flava*, and, what is of greater importance, it is perfectly hardy in this latitude.

The New York Florists' Club have selected Mr. John Thorpe as the representative of their interests in the management of the World's Fair to be held in this city in 1892. Already the nurserymen and florists of the Old World, who have a rapidly-growing trade in this country, are inquiring as to their probable opportunities for a display, and if anything like a characteristic, complete and continually fresh exhibition in the line of floriculture is to be made the work of organizing it should not be deferred much longer. No man in the country is better fitted for such a place by natural aptitude and experience than Mr. Thorpe.

Colonel Pearson has visited the famous vineyards on the shores of Lake Keuka and of Seneca Lake, under instructions from the Department of Agriculture, and he reports that the Black Rot, as well as Anthracnose, and both the "downy" and "powdery" Mildews have at last attacked the vines in this region, where these diseases have been hitherto practically unknown. Discouraging reports of the Black Rot also comes from the Hudson River Valley. Of course, it is now too late to use remedies with any success, but the Grape-growers are eagerly studying the matter and preparing, as well as they can, to use preventive measures another season.

Rev. M. J. Berkeley, who was the first botanist in England, and for many years almost the only one, to give systematic attention to the diseases of plants, died on the 30th of July, at Sibbertoft, of which place he had been vicar for twenty years. He had a wide knowledge of almost every department of botany and natural history, although he was especially eminent in the field of cryptogamic botany, and it was through his discriminative knowledge of Fungi and their effects upon plants that he rendered most signal service to horticulture. Mr. Berkeley was a man of striking and dignified appearance and of straight-forward and manly character. He was eighty-six years old.

The dwarf trees which the Japanese horticulturists are showing at the Paris Exhibition are attracting much attention. Pines, Thujas and Cedars, said to be 100 or 150 years old, are only eighteen inches high, and with such specimens it would be easy to have a coniferous forest on a balcony. These arboreal deformities are produced by great labor, and, if the truth is told about their ages, this work of arresting the tree's development and forcing it into contorted forms must be persisted in by several generations of foresters. All this painstaking is hardly paid for by the beauty of the resulting abortions, but, as has been suggested, a look at these trees will explain where the fantastic forms come from which serve as models for the plants we see on the lacquered trays, bronzes and embroideries which come from Japan.

Next to the Yellow or Long-leaf Pine, the Cypress is the most important timber tree in Florida. Aside from the manufacture of shingles, for which it is so largely used, there is a large demand for this timber for boat-building and bridge-construction. Cypress is preferred for window sashes and outside doors, for inside work of brick houses, for water-tanks, cisterns, barrels, buckets, tubs and water conductors. It furnishes a good body for veneered furniture, and veneer itself made from Cypress burls is often of extraordinary beauty. For railroad ties this timber is unexcelled, and likewise for paving blocks. As there is much waste in sawing Cypress, and it is difficult to dispose of this waste, even by burning, the *Florida Times-Union* suggests that the manufacture of these blocks might be made most profitable in connection with a Cypress mill near some city like Jacksonville. Cypress blocks have proved very satisfactory for paving in that city. In Galveston, where no sap-wood is used, the sawed blocks of heart-wood show very little wear.

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Problems in Horticulture.

THE letter from Rev. Lyman Phelps, on another page of this issue, gives some facts which confirm his belief in the immediate influence of foreign pollen on the constitution and quality of the Orange. The fruit on other trees in groves where certain strains of the Navel and Blood Oranges are growing is changed, according to his observation, in general appearance, form and flavor, partaking of the qualities of the two varieties named. Of course, it is not demonstrated that the change does not come from variation in the bud; but no one is prepared to say, with certainty, that changes in a fruit are never due to the influence of pollen from another plant. Practical cultivators believe that, with fruits, as a rule, no such change need be expected. Some varieties of our native Plums, when planted by themselves, bear sparingly, because, as it is assumed, their ovules are imperfectly fertilized. When, however, these trees are planted near others which yield abundant pollen, a larger amount of fruit is set. It is supposed that this is due to the fact that pollen from surrounding trees is conveyed to the stigmas of the flowers of the native Plums. But no one expects to find any change in the fruit. The Wild Goose Plum remains the same, no matter where the pollen comes from. Certain varieties of Grapes are also more productive when planted near vines which yield abundant pollen, but the fruit remains identical with that from self-fertilized flowers. Elaborate experiments have been made by Mr. A. A. Crozier and others in crossing Apples, Grapes, Pears, Plums and Squashes, and in no instance did the influence of the foreign cross appear the first season, and yet, in the absence of direct proof, we must admit that here is a problem which is not completely solved.

For several months an energetic discussion has been carried on in English horticultural journals as to certain alleged evils arising from the practice of grafting. The positions taken on either side of the controversy show how widely at variance are the views of practical propagators on matters which may be of vital importance in the history of the plant treated. Incidentally, many related questions are suggested. At what age does a tree furnish buds or cions which will prove the most healthy, long-

lived and productive? Will there be any difference in the result if buds or cions are taken from different parts of the same tree? Or, do buds taken from the leader of a nursery tree develop into trees which differ in productiveness or vigor from those originating in buds from side branches? Is there any difference, for grafting purposes, between the terminal bud and buds lower down; and how near the end of the shoot should we look for the buds which will make the healthiest tree? Questions like these are of practical moment. It seems to be admitted that improper selection of stock and cion will cause a deterioration of the plant, but many propagators have an opinion that buds and cions can be chosen and set so as to perpetuate the qualities we wish to retain. Can more than this be accomplished? In a late number of this journal, Professor Goff pointed out the fact that the Wilson Strawberry has improved under a system of propagation from offsets. In an address before the Pomological Society in Florida last winter, he also called attention to experiments at Geneva which seemed to show that potatoes can be improved by a certain method of selection. In view of these facts, it is not impossible that by some system of budding or grafting certain desirable qualities in plants can be actually increased.

But if it is assumed that the only hope of improvement in plants lies in the production of seedlings, a thousand other questions at once obtrude themselves upon us. If a seed which results from hybridizing or cross-fertilization is sown, what qualities are most likely to be transmitted from the pollen-parent and what ones from the mother plant? It has been suggested that a cross might be produced between *Prunus Simoni* and some of our varieties of the Peach with the possibility of securing a fruit of good quality that could be grown in more northern latitudes. In the same way, a cross between the Japanese Persimmon and our native *Diospyrus* might possibly yield a fruit approaching in size and quality the Japanese product, and equaling our native fruit in hardiness: In either case, which kind should we select as the pollen-parent with the greatest hope of success? Certain varieties of the Peach and Plum will come true from the planted pit; to what extent is it possible to secure the same result with Apple seeds, for example, from blossoms in which self-fertilization has been made certain? Some experiments by Dr. Sturtevant seem to indicate that Raspberry seedlings produce a better average quality of fruit when they originate from few-seeded berries than they do when they originate from many-seeded berries, and this suggests the advisability of making similar tests in other fields.

But there is no need of multiplying questions of this sort. What we desire to call attention to is that our knowledge of the principles which underlie ordinary horticultural practice is limited in every direction. Considering the nature of the subject, and the mystery which envelops all the processes of life, it is not surprising that we know so little, but it will be surprising if the spirit of awakened inquiry does not prompt students to more thorough and systematic investigation in this field than have been hitherto undertaken. There certainly is no lack of opportunity for our experiment stations to prove that they can be of practical benefit to all who have gardens and orchards.

How to Mask the Foundations of a Country House.—IV.

IT has been said that the color of their foliage, as well as their form, should be considered in grouping shrubs about the base of a house. The flowers which they bear likewise demand attention. A succession of bloom throughout the season should be secured, while the more common practice is to select only such plants as flower in early spring. Some favorite shrub, with very conspicuous flowers, like a Forsythia, is often repeatedly introduced in scattered positions, producing a restless, patchy effect of color that could be obviated by a little massing. It should be remembered, too, that a plant with pink or lilac blossoms will not often look well next

to one with yellow blossoms, while a white-flowering plant will harmonize with either.

Too much stress should not be laid, however, upon the flowering qualities of the shrubs as a whole. Qualities of foliage are more important, because more persistent, and because, after all, green is the color we chiefly want close to the house. A few evergreens are always desirable, but there should not be too many of them. If so, the summer-effect of the plantation will be sacrificed to the winter-effect; during the summer months it will have too stolid and heavy and gloomy a look. And even in winter this look is given by an over-use of evergreens. Leafless shrubs are beautiful, as well as those in leaf, and almost or quite alone can clothe foundation-walls to a degree that suffices when Nature at large is bare. Many deciduous shrubs have a peculiar charm in winter, while they do not fall behind their rivals at other seasons—Golden-twigged Willows, for instance, Red-twigged Dogwoods, and a multitude which carry their bright berries well through the inclement season. If some of these are selected, and evergreens are sparingly introduced, the effect of the winter shrubbery may be made extremely beautiful. Care should be taken, however, to mass the evergreens a little, so that when they are thrown into full relief by the fall of deciduous leaves they will not look as though spotted about at random; and a station quite near the walls is, for this reason, usually the best. If deciduous plants, with bright-hued leaves, are, as a general rule, to be avoided, so, too, in an even greater degree, are golden evergreens. It is especially desirable that whatever foliage we have in winter should be green; and a bright-yellow shrub has an even more distinctly spotty and obtrusive look in winter than in summer. The bright color of the twigs and berries on the deciduous shrubs just named is not open to the same objection, for the hue is then so delicate and airy that it cannot offend the eye.

The hardest task of all is to plant well around a house which is square in shape and encircled by piazzas. The absence of angles and recesses makes the grouping of plants very difficult, and it is difficult, too, to vary their upper outline agreeably when they cannot rise against a background of solid wall. Many suburban houses are built in this way, and are usually encircled by a line of flower-beds with annual creepers—Nasturtiums for choice—trained against the piazza-lattice and posts. A better device would be to plant hardy creepers against the posts, and very low-growing hardy shrubs elsewhere, grouping them with higher ones when an angle does offer, and carrying them out to meet higher plantations, if such can be placed a little to one side of the house. As very low-growing deciduous shrubs are so inconspicuous in winter, a freer use of evergreens may be recommended in cases of this sort. There are many kinds of Japanese Retinosporas, for instance, which grow from a foot to two feet in height, and are admirably adapted for the purpose. Anything hardy and anything green, however, is better than a flower-bed, which is too formal and too gaudy in summer, and which vanishes in winter, leaving that ugliest of all objects, a stretch of naked earth. Much pains and money are often expended, to very poor effect, in planting such beds. For example, we saw last May a large house flanked with piazzas, one side of which was bordered with, first, a thick line of bright Golden Elders, then a wide band of Iris in blossom, and then a broad bed, with a curving outline, filled with showy spring annuals. The first cost must have been considerable, and it was evident that more money and labor would soon be needed to replace the spring-flowers with others, and that when winter came there would be a wide, unattractive line of naked earth. And, meanwhile, the spring-effect itself was hideous in its formality and its gaudy, ill-arranged colors; and, far from uniting the house with its surroundings, the planting actually separated the two with a bolder, more conspicuous division than had there been nothing but green grass. Unity in color and variety in line were needed, but what was supplied was monotony alone and a crude diversity in color.

Naturally, however, a few flowers of certain sorts may sometimes be introduced with excellent effect on the edge of a shrubbery which encircles a house, or close to the house, between the masses of shrubs. Certain flowers of an architectural character, so to say, like Hollyhocks and Dahlias, Sun-flowers and Gladioli, never look better than when growing against a wall, only there should not be many of them, and their places, as well as their colors, should be carefully chosen. Accents of color will be welcome, but the look of a flower-border should be avoided.

In selecting shrubs for the purpose now in question, one other consideration should be borne in mind. This is the natural character of the site. The foundations of a suburban

villa on a flat piece of ground, which should rightly be treated as a carefully-tended little garden-landscape, and those of a cottage, we will say, on a rocky stretch of New England shore, should not be planted in the same way. In the one case, garden-shrubs will be appropriate; in the other, those native products of our woods and swamps, which are quite as beautiful, and almost as numerous. It would be undesirable to surround a villa with picturesque clumps of Mountain Laurel, Blueberry and Clethra, suggestive of really rural scenes; but such plants as these are just the ones to group about a picturesque cottage standing on a rocky site, and with Pines or other native trees in its vicinity. Of course, efforts are sometimes made to treat the whole extent of a place like this in the conventional, gardenesque way; and if the grounds, as a whole, are thus inappropriately managed, it matters little, perhaps, what is done with the house-foundations. But the tide of taste has turned. There is a growing desire to preserve the essential characteristics of a site, and to value them all the more if they are distinctly different from the regulation suburban type. And when this desire is felt, there is nothing more important than that, in clothing the foundations of the house, native local shrubs should be chosen instead of those appropriate to more conventional pleasure-grounds.

Miles Joseph Berkeley.

THE news of the death of Rev. M. J. Berkeley, the distinguished English mycologist, will be received with deep regret, not only by those specially occupied with the branch of botany in which he was pre-eminent, but also by all who are interested in the progress of horticulture and vegetable pathology, to which he constantly contributed during his long and busy life. He was born April 1st, 1803, at Biggin, in the parish of Oundle, Northampton, and, after a preparatory course at Rugby, entered Christ's College, Cambridge, where he graduated in 1825. Although destined for the church, he was much attached to the study of natural history while at the university. At first curate at Margate, in 1833 he assumed charge of two small parishes near Wansford, Northamptonshire, and was also rural dean of Oundle and Weldon. In 1868 he was transferred to the vicarage of Sibbertoft, a small village near Market Harborough, in which quiet and retired parish he passed the remainder of his life. During his later years he was a great sufferer from gout, and for some time had hardly been able to leave his house, or even his chamber. His death occurred on July 30th, at the ripe age of eighty-six years.

Berkeley's first work in natural history is said to have been on Mollusca, but his reputation rests on his wide knowledge of Fungi, in which he far excelled all his British contemporaries, and was a worthy rival of the distinguished Elias Fries, often called the father of mycology. His botanical work, however, was not confined to Fungi. In 1833 appeared his "Gleanings of British Algæ," a supplement to the English Botany, which is still regarded a classic work, and thirty years later he published a "Hand-book of British Mosses." His writings on Fungi were very numerous; a few of them in book form, but the greater part papers in botanical journals and the proceedings of learned societies. They were devoted especially to the descriptions of species from all parts of the world, for, such was his reputation as a systematist, that collections were sent to him for study from both continents—from the Arctic to Antarctic regions. The new species described by him must number several thousands. Of his books the admirable volume on Fungi in Hooker's British Flora, 1836, seems to us especially excellent. "The Outlines of British Fungology," 1860, was an attempt at a revision of the earlier volume with descriptions of the larger species and an enumeration of the smaller species. The "Introduction to Cryptogamic Botany," 1857, was the first general treatise on the subject in the English language, and contained a large number of original observations, especially with regard to Fungi.

Berkeley was for many years a frequent contributor to the *Gardeners' Chronicle* and the journal of the Royal Horticultural Society, to whose pages he gave many important original notes on plant diseases, besides many critical reviews of the work of others on this important subject. His contributions to these journals were often in a semi-popular form, and did much to extend the knowledge of a then much-neglected branch of botany.

The name of Berkeley is held in hardly less reverence by American botanists than by his own countrymen. For a period of nearly forty years after the death of Schweinitz, the first American mycologist, in 1834, scarcely anything was published on North American Fungi, except what came from the pen of Berkeley, who found a zealous correspondent and

fellow-worker in the late Rev. M. A. Curtis, of North Carolina. Not less than twenty-five papers, including these published conjointly by Berkeley and Curtis, contain notices of North American Fungi; the "Notices of North American Fungi" in *Grevillea*, 1872-76, alone having descriptions of over one thousand species, almost all of them new.

Berkeley was a man of a singularly sweet and frank nature, and, although, with advancing years and increasing bodily infirmity, he was forced to live in retirement, he was still the leader of British mycologists, beloved and respected by all. Those who knew him in his prime, or even in his declining years when unable to associate freely with scientific men, as was his wont, recall his unvarying courtesy, his constant readiness to aid others in their studies, his simple and cordial manner. With a large family, forced to depend on the modest income of a remote parish, we are compelled to admire the courage and energy which enabled him to accomplish so much for science, and only regret that he had not been placed early in life in some position where he could have devoted his whole activity to the pursuit of his favorite science.

Berkeley's personal appearance was very striking. His large frame, his dignified and intellectual face, admirably set off by his full, white beard and flowing hair, commanded at once the respect, which an acquaintance with his elevated character and unselfish disposition served only to deepen.

W. G. F.

The Fairbanks House at Dedham.

OUR picture on page 415 shows a house in the town of Dedham, near Boston, Massachusetts. It is one of the oldest houses in this country which is still intact and habitable, and undoubtedly the very oldest in which descendants of its builder live to-day. The builder of this house was Jonathan Fairbanks, a native of the West Riding of Yorkshire. He landed in America in the year 1633, lived for three years in Boston, and then built the house we illustrate in the year when the town of Dedham was incorporated. At his death, in 1668, he left it to his eldest son, John, and his offspring in the male line have since uninterruptedly inhabited it. The seventh generation now dwells within its venerable walls, and the care and good taste they display in its preservation are exceptional in this land of little respect for ancient relics and too-frequent desire for showy surroundings rather than for those which are harmonious and therefore beautiful.

The original house has never been altered, but now forms the central portion of the picturesque little group of walls and roofs. The wings were added about one hundred and fifty years ago, and although, perhaps, no conscious desire for good, architectural effect guided their designing, their presence greatly increases, instead of injuring, the charm of the simple first building. The shingled roofs, of course, have been repaired from time to time, but only as necessity compelled, and without disturbance of the weather-stains and lichens, which give a beautiful greenish tone that contrasts delightfully with the soft, unpainted gray of the walls. The house stands a short way back from the road, raised on a gentle little hill. This is covered with good turf, kept sufficiently neat, but not rolled and tended as a lawn might be about a more pretentious residence. A number of great Elm-trees overshadow the slope and the house itself, disposed in an irregular way, which under the circumstances could hardly be improved upon. They must be nearly if not quite as old as the house itself. The simple dignity of effect produced by this use of a single kind of tree, especially well adapted to its purpose, may teach a useful lesson to the owners of the villa and cottage of to-day. Now it is the custom to plant a variety of trees even when the grounds are as small as these of the Fairbanks house, and little thought is usually given to their grouping. Consequently we most often see a huddled, inharmonious result, in which the beauty of the individual trees disappears, and the place as a whole is deprived of character as well as of unity. But even when most carefully grouped it is a question whether the association of different trees in a very small place could be quite as beautiful—quite as simple, dignified, and harmonious—as is this company of wide-spreading Elms, so thoroughly expressive of shelter and of shadow, and each so admirably developed.

But perhaps the most noteworthy point in the attractive picture presented by this house and its surroundings is the way in which the shrubberies grow about it. Lilacs and other old-fashioned shrubs were planted long ago close to the foundations, and have been allowed to develop freely while kept from undue raggedness. Now, as will be seen, they overtop the humble walls in many places and group with the sloping roofs

in a fashion which must strongly attract the eye of every wandering landscape-painter. In summer, tall Hollyhocks and Dahlias grow in clumps close to the house, giving just the notes of brilliant color needed to complete the pretty picture it makes; but no formal beds or flaunting, "new-fashioned" flowers are allowed to introduce a discordant accent. No old English cottage seems a more integral part of its natural surroundings than does this little New England home, and none is more picturesque than this despite its characteristically American shape and material. Time, we see, can sanctify and beautify even a wooden house of the humblest proportions, if only the hand of man gives it a little aid in the way of tastefully planted trees and shrubs, and then does not interfere with its work. Here no inharmonious element has been introduced—each feature and detail suits all the others, and the general effect, although it is simply that of a small, unpretentious farm-house, lacks neither refinement nor true beauty. A single bed of *Coleus*, a single attempt to prune the luxuriant shrubs into a more "orderly" form, a single touch of crude paint on the house itself, a single architectural "improvement" of modern fashion, would ruin it all. Fortunately, nothing of the sort has ever been attempted; and it is to be hoped that, even when descendants of Jonathan Fairbanks no longer dwell beneath his roof-tree, he into whose possession it may come will prove himself possessed of as much reverence and good taste as they. So scarce and precious, indeed, are relics such as this in America that the town-fathers of Dedham might well desire to take it under their own protection, to assure preservation for as many centuries as its sturdy timbers can still endure.

The photograph from which our illustration is reproduced was made by Miss A. L. Rotch, to whom we are indebted for its use.

Notes Upon Some North American Trees.—VII.

125. *CRATÆGUS ARBORESCENS*, Ell.—This name was published by Elliott (Sketch of the Botany of South Carolina and Georgia, i., 550) in 1821. Linnæus' herbarium, however, shows that he knew this plant, and that it is his *Cratægus viridis* (Species Plantarum, 476). The specimen is in flower. It has no thorns, and exactly represents the common glabrous form of this now well-known plant. An almost identical specimen is found in the herbarium of the "Hortus Cliffortianus" preserved in the British Museum. Professor Gray, who examined the Linnæan herbarium in 1839, wrote in pencil on the sheet of *C. viridis* "certainly a distinct species, A. Gray," having reference to the fact that *C. viridis* has been referred by American botanists to *C. coccinea*. The fact, however, of its identity with Elliott's plant, at that time very little known, seems to have escaped his notice. It is not clear from whom Linnæus derived his specimen. The species is credited in the "Species Plantarum" to Virginia, but this tree is not known to grow now anywhere north of the valley of the Savannah River. Dr. John Garden, who lived in Charleston in the middle of the last century, was the only correspondent of Linnæus who resided anywhere near the locality where it is now known; and there is nothing to show that the specimens were sent by him. It is not altogether improbable, although rather unlikely, that the plant which has been called *Cratægus arborescens*, but to which I propose to restore in the *Silva* the Linnæan name, may extend as far north as the coast-region of Virginia, and that it was really from Virginia that the specimens upon which Linnæus founded the species were sent.

127. *CRATÆGUS COCCINEA*, L.—The Scarlet Thorn is the most variable, within certain limits, and the most widely distributed of the North American species. Two or three extreme forms appear at first sight to represent as many different species; but these pass, however, one into the other, and it is not always easy to distinguish them. Certain characters, however, are constant; and the brown bark of the young branches, the long, stout, and usually abundant chestnut-brown spines, the prominent glands on the serratures of the stipules and leaves, on the peduncles and acuminate calyx-lobes, and the bright scarlet fruit, always pendulous at maturity, are common to all the forms, and serve to distinguish *Cratægus coccinea* from *C. tomentosa* with which it has often been confounded. The stipules are

lanceolate and narrowly acuminate but on vigorous shoots often become broadly ovate and cordate. The number of styles varies from two to five, but the fruit except in shape and size, and in the number of seeds, which are strongly ribbed on the back with two deep grooves, is very much alike in all the forms of this species.

The principal forms may be arranged as follows :

1. Var. *TYPICA*, with rather small sharply serrate, or somewhat cut-lobed leaves, cuneate at the base and pubescent on the lower surface especially on the mid-rib and primary veins; few-flowered, pubescent corymbs of small flowers (half an inch across) with pubescent calyx, and round or sometimes pear-shaped fruit rarely more than half an inch in diameter.

2. Var. *POPULIFOLIA*, with more slender spines, thin, glabrous, sharply serrate, somewhat incised leaves, often truncate or slightly cordate at the base, borne on slender petioles, and small glabrous, or occasionally hairy three to five-flowered, small, narrow corymbs.

3. Var. *MACRACANTHA*, with very long, stout spines, thicker leaves, cuneate at the base and tapering into a stout petiole, sharply serrate, and incised above the middle, slightly pubescent on the lower surface when young or quite glabrous or with a few scattered hairs on the mid-rib and primary veins; broad many-flowered, pubescent cymes, and rather larger flowers and fruit than in number one.

4. Var. *MOLLIS*, with densely pubescent shoots, large-broad leaves, usually incisely cut into acute, narrow angulate lobes, cuneate, truncate or heart-shaped at the base, often somewhat scabrous on the upper surface, the lower more or less densely covered with pubescence, broad pubescent cymes, with large flowers (one inch across) and large spherical or pear-shaped, sometimes punctate fruit covered with a white bloom.

What I consider the typical form, that is the plant, which, as shown by his herbarium, Linnæus had before him when he established the species (*Species Plantarum*, 476), is common, from Newfoundland to Florida, and extends west to Minnesota, Missouri and Texas. It is the common Thorn in the valleys of the southern Alleghany Mountains and is not rare in the Gulf States. The leaves are sometimes quite glabrous. This is usually a stout, tall, or even a small shrub with intricate branches, or more rarely a small tree.

Var. *POPULIFOLIA*, Torr & Gray, Fl. i., 465 (*C. populifolia*, Ell. Sk., i., 553), appears to be confined to the south Atlantic States, although forms intermediate between this and No. 1 are found everywhere. It was described by Elliott as a shrub with slender branches, but I have never seen it growing; and I am not acquainted with the fruit. I have flowering specimens collected by the late Dr. Ravenel at Augusta, Georgia; and Curtiss' *C. coccinea*, No. 807, collected in Alachua County, Florida, belongs here.

Var. *MACRACANTHA*, Dudley, "Cayuga Flora," 33 (*C. glandulosa* ? Willd.), is widely distributed from the valley of the St. Lawrence to Manitoba, Colorado, and the western slopes of the Cascade Mountains in Washington. I have not seen it anywhere south of New York and Missouri. It is a small tree or shrub, with long, straggling branches, thickly armed with sharp spines often four to five inches long, and in the west, with thick almost coriaceous leaves. It is confounded in the eastern States, especially in New England, with *C. tomentosa* to which have been referred generally the red-fruited Thorns of the western Mountains, which all belong here.

Var. *MOLLIS*, Torrey & Gray, Fl. i., 465 (*C. subvillosa*, Schrader), is found from eastern Massachusetts, through western New York to Missouri and middle Tennessee, and south-westward through Arkansas and Texas to the Sierra Madre Mountains of northern Mexico. It seems to be wanting from the South Atlantic and Gulf States east of the Mississippi, and from the whole Alleghany region. This is the largest of our northern Thorns, and one of the largest of the genus, often reaching a height of thirty feet, with a clean, straight trunk and a wide, round head. The leaves vary greatly in the amount of their pubescence, being at the east sometimes nearly glabrous, while the amount and density increase in proportion as the climate

of the region in which the individual has grown, is deprived of moisture. This variety flowers fully a week earlier than the other forms of the species, and the fruit which falls as soon as it is ripe is several weeks earlier. The eastern, or less densely-pubescent form, is very well figured in Emerson's "Trees and Shrubs of Massachusetts" 2 ed., as *C. tomentosa*. Nos. 1, 3 and 4 may be seen growing together in the space of an acre, close to the north shore of Massachusetts Bay, in the town of Revere, and their different habit and appearance, contrasted. At this place the three forms are well marked and show no tendency to vary among themselves. In Berkshire County, on the contrary, where all three grow in great abundance, they have so inter-bred that it is almost hopeless to try to separate them.

C. S. Sargent.

New or Little Known Plants.

Tigridia buccifera.*

OF the discoveries made by Mr. Pringle last year in the mountains of Mexico there has already been figured in the GARDEN AND FOREST (Vol. I., Fig. 61) a new species of *Tigridia* belonging to the typical *T. pavonia* group. We now offer one of the *Beatonia* section, which are distinguished by smaller and more or less purple instead of orange flowers, and by minute terminal stigmas. From *Nemastylis*, which the species greatly resemble in habit, they differ in the inequality and dissimilarity in form of the outer and inner segments of the flower, and in the position of the styles, which are here opposite to the anthers, instead of alternate with them.

In the present species the flower is nearly two inches broad, with the saucer-shaped base, formed by the broad concave bases of the segments, of a pale, greenish-yellow, dotted uniformly with purple. The obovate blade of the outer segments is a clear light purple. The shorter inner segments are very peculiar in shape, being folded together in such a manner as to form a sunken longitudinal tube down the centre, the dilated sides at the outer end of the tube approaching each other in the form of two cheek-like prominences. These are colored white, purple and yellow, while the small, rounded, terminal blade is a deep purple. The anthers are erect and nearly sessile upon very short united filaments, the cells of each anther separated by a broad connective, as in some species of *Nemastylis*. The styles are closely united nearly as high as the top of the stamens, where the conical branches suddenly diverge, and are exerted in pairs between the anthers.

The flowers, as is frequently the case with plants of this order, are quite fugacious, lasting at the longest only for a single day. But while they last they are remarkably pretty, and a succession from the several spathes of one or two flowers each day is assured for several days. The drawing is a very faithful representation of a plant which bloomed in Cambridge in July of this year from bulbs collected by Mr. Pringle, in 1888, in the mountains of Jalisco, Mexico, and received from Mr. F. H. Horsford of Charlotte, Vermont.

S. W.

Foreign Correspondence.

London Letter.

THERE were very few Orchids sent to the Committee of the Royal Horticultural Society at its last meeting, and the only one certificated was a lovely variety of the rare *Sobralia xantholeuca*, which has been named *Alba*, although it is not pure white. In the original the flowers are pale yellow with a deeper colored lip, and sometimes flushed with lilac. In this new variety the sepals and petals are very faintly tinted with

**TIGRIDIA BUCCIFERA*.—Stem a foot high, from a small bulb, branching, glaucous; radical leaves nearly as tall, plicate, three lines broad, the cauline bracts (three) more or less foliaceous; spathes of two unequal bracts one and a half to two inches long; perianth two inches broad, with purple-dotted, greenish-yellow base, the blade of the outer segments obovate, purple; inner segments tubular-folded in the centre, the dilated sides below the small, concave-rounded, deep-purple blade approximate in two cheek-like prominences; anthers nearly sessile, with broad connectives; styles as long, the conical branches widely divergent, exuded between the anthers.

sulphur-yellow, but the lip is primrose-yellow. The large size of the flower, equalling that of the common *S. macrantha*, and the graceful evergreen foliage render this one of the finest Orchids in cultivation. Two very pretty forms of *Cattleya Eldorado* were noteworthy. One named Painted Lady, from Sir Trevor Lawrence, had the sepals and petals snow-white, the labellum deep orange-yellow in the throat, and adorned with a small crimson-magenta blotch at the lip. The other form was named *Albo-splendens*, in which the lip was more highly colored. The variety named Wallisii, which is quite white with the exception of a yellow throat, was also shown. These *Eldorado* *Cattleyas* are particularly valuable, as they always flower at this season when Orchid bloom is scarce. *Dendrobium revolutum*, a small inconspicuous flowered species, but interesting botanically, was awarded a botanical certificate, as was also *Maxillaria fuscata* with reddish-brown flowers not unattractive.

One of the most important certificated plants was the new *Spiraea gigantea*, a hardy herbaceous plant from Kamtschatka, and said to be a form of *S. Kamtschatica*. It is a noble plant, rising with a stout erect stem fully eight feet high, clothed with large vine-like leaves nearly a foot across, and terminated by a long plume-like cluster of white blossoms after the manner of *S. venusta* or *S. Ulmaria*. It will be a grand addition to our list of plants that thrive on damp soil, by the margin of a stream or lake, and no doubt it will prove quite hardy with you. It was shown by Messrs. Paul, of Chess-hunt. Another first rate new hardy plant was Späth's variety of the Siberian Dogwood (*Cornus siberica Späthii*), shown by Messrs. Veitch. It is one of the most striking variegated shrubs I have seen, the leaves being of a bright yellow, broadly margined and marked with various shades of pale green. It showed no traces of sun burning in the foliage, so common among bright-leaved shrubs. In view of the hardiness and vigor of the Siberian Dogwood, this variety will most likely prove as valuable for

ornamental planting as any variegated shrub we have, and will be hardy, no doubt, in America. A good addition to single Bouvardias we have in the new sort, Mrs. Robert Green, shown by Mr. May, one of the leading market florists about London. It is a sport from the President Cleveland variety and pos-

sesses all the good points of that popular sort. It is dwarf and vigorous and produces large and abundant trusses of salmon-pink flowers—a tint different from that of old sorts. It will be a good plant both for market-grower and general gardener. Two exceptionally handsome new ferns worthily won certificates. One was a pendulous form of the common *Pteris serrulata*, named Plumosa. It has long fronds, crested or tasselled at the extremities, which hang in a graceful way on all sides of the pot, which is quite hidden by them. It is sure to become popular both for pots and hanging baskets. Mr. Coleman, of Tunbridge Wells, exhibited it. The other fern was *Cyrtomium falcatum Fensomii*, a handsome form of a well-known green-house fern, having bold, deep green, shining fronds. All the above were novelties, but a certificate was also voted to the old *Bigonia Cherere*, from Guinea, so as to emphasise the merits of a green-house climber, which was formerly more commonly grown than now. It is a strong climber with large foliage, and produces, at this time of the year, huge clusters of long trumpet-shaped flowers of a deep maroon crimson. The specimens came from Sir George Mackay's garden, one of the most beautiful in Surrey, teeming, as it does, with a wealth of beautiful plants out of the ordinary run. The lovely *Bigonia (Tecoma) jasminoides*, also a green-house climber with large clusters of trumpet flowers, white, with carmine

centres, was also shown in perfection from the same garden. An important exhibit was that from Mr. Anthony Waterer, of Knap Hill, consisting of about a score of seedling varieties of *Lilium auratum*, all different from the original form, and varying in color from a rich crimson to pure white minutely



Fig. 125.—*Tigridia buccifera*.—See page 412.

spotted with crimson. The finest forms were those much like the magnificent *L. Parkmanni*, raised in America about twenty years ago by Mr. Francis Parkman, and whose stock passed into the hands of Waterer. It has not, unfortunately, been put into commerce yet, so that lovers of Lilies have a treasure in store for them. A few of the seedlings now exhibited so much resemble Parkman's that they would pass for them, and perhaps they have the same parentage which is *L. auratum* crossed with a deep crimson form of *L. speciosum*. From these Parkmanni types of seedlings, all having petals tinted and spotted with deep crimson and edged with white, there was every gradation to the forms with white petals thinly spotted and not possessing the characteristic golden band of *L. auratum*. One was similar to, if not identical with, the variety *Rubro-vittatum*, which is still a rarity. Every one of the seedlings was beautiful, and we must look forward to the time when Mr. Waterer will be able to put them, together with Parkman's Lily, into commerce. Some of the seedlings would undoubtedly have been certificated by the committee if the regulation number of flowers (three) had been shown instead of one.

A group of ornamental trees and shrubs from Messrs. Veitch's Coombe Wood nursery included the following noteworthy kinds: A variety of the Hemlock Spruce (*Tsuga Canadensis*), named *Argentea*, with the tips of the branches of a silvery hue, though not so pronounced as in other conifers with variegated foliage. A more effective conifer was a golden form of *Retinospora pisifera*, in which the whole of the foliage, both old and new, is of a rich yellow tint. It is a favorite plant among those who have a special liking for gold and silver conifers. The golden variety of *Ulmus Dampieri* was shown in bright condition and displayed well the peculiar erect growth of this Elm. A much admired shrub was the cut leaved, scarlet-berried Elder (*Sambucus racemosa serratifolia*), which, as yet, is not generally known. The elegantly cut leaves, combined with the clusters of brilliant red berries, make it a most beautiful shrub, and, on account of its hardiness and vigor, it may be planted in any locality. But it is to be regretted that this beautiful plant does not produce berries in the south as freely as it does in the cool and moist parts of Scotland, and I imagine that your hot and dry summers are detrimental to the fruiting of this shrub in America also. Among other good things shown by Messrs. Veitch, were *Ceanothus azureus albicans*, with feathery clusters of whitish blossoms as plentiful as in the blue Gloire de Versailles; *Veronica ligustrifolia*, a narrow-leaved New Zealand shrubby Veronica; *Clematis coccinea* and *C. crispa*, the latter with flowers larger than those of *C. coccinea*, and of a pale purple; *Cytisus nigricans*, one of the best of midsummer dwarf shrubs, having long, slender spikes of yellow flowers; a dark-leaved variety of *Spiraea callosa*, called also *Sanguinea*, and *Philesia buxifolia*, a beautiful little Chilean shrub with flowers like a miniature *Lapageria*, which is almost hardy in the south of England.

Some of our florists are doing their utmost to anticipate autumn by showing us autumn flowers at midsummer. One showed a new early flowering Chrysanthemum with large lemon-yellow flowers named *Mdlle. Leonie Lassali*, and another exhibited a large gathering of Cactus-flowered and single Dahlias. Among the best Cactus sorts that flower early are *Panthea*, bright orange-scarlet; *Zulu*, blackish-crimson, and *Mrs. Hawkins*, yellow, flushed with pink. The single Dahlias represented some of the new picotee-edged sorts which were much admired last year. Among the best shown by Messrs. Cheal were *Duchess of Albany*, with fawn-colored petals, edged with mauve; *Victoria*, white, edged with scarlet, and *James Scobie*, yellow and scarlet. These new combinations of colors may revive the waning popularity of single-flowered Dahlias.

W. Goldring.

Cultural Department.

Some August-Flowering Shrubs.

THE Japanese *Hydrangea paniculata* in this latitude blooms for nearly a month from the middle of July. It has few sterile, showy flowers, but its large panicles of perfect blossoms with their stamens are much more pleasing when closely examined than the great paniced variety (*H. paniculata grandiflora*) of which it is the parent. The flowers of the *Grandiflora* variety, which are nearly all sterile, begin to turn white as *H. paniculata* is about done flowering, and from the middle of August until well into September it is the most conspicuous feature of many modern New England gardens and country places. As they become old the large, dense panicles assume a pinkish hue, and they are often collected

and carefully dried for winter adornment of the house. These plants like care and good cultivation, as they degenerate and become straggling if planted in poor soil and not cared for, or if early spring pruning is neglected.

The many varieties of the Althea, or Rose of Sharon (*Hibiscus Syriacus*), are popular August and September-flowering shrubs. They are shrubs which seem to thrive very well in small yards of city dwellings as well as in more open gardens. They are, as a rule, remarkably free from insect pests or disfigurement by fungus diseases, and they retain their smooth, shining, dark green leaves until late autumn. It would be almost useless to name varieties here, as the names and descriptions given in catalogues are so conflicting, but varieties with single or double white, purple, red, pink and variegated flowers are offered, and of these the single-flowered varieties are the most beautiful. The blossoms are odorless. In the climate of Boston the plants are not hardy if planted on low or wet ground, where growth is continued too late in the season and the wood does not get thoroughly ripened before severe frosts occur. If planted on dry ground, growth will not be so rapid, but success and hardiness may be assured. For fragrance as well as beauty, the terminal white racemes of flowers of the Sweet Pepper Bush (*Clethra alnifolia*) are the most prized at this season. Plants growing in moist, shady woods often continue blooming freely in September. *Clethra acuminata* from the mountains in the Southern States is hardy, and blossoms with our native species, but is not as attractive. Although seldom seen in gardens, both species are easily cultivated, and will do well in those regions where plants of the same class grow spontaneously.

While some species and varieties open their first flowers earlier in the summer, the low-growing Heaths are also reliable bloomers in August. Double, white, red and other varieties of the common Heath or Ling (*Calluna vulgaris*) are now cultivated, but they are almost unknown in American gardens. In this latitude they require a slight covering of leaves, coarse hay, or evergreen branches to protect them from the direct rays of the sun and the consequent alternate freezing and thawing which is so fatal to so many plants. Among other species of the family in full bloom the best are *Erica vagans*, *E. stricta* and *Daboecia polifolia*. These are more tender than *Calluna vulgaris*, but generally do very well when given the same protection. The story is often told by immigrants, or those who loved their native "moors" in the "old country," of their efforts to introduce the Scotch Heather or the Heath about their new homes, and the instances are rare when their treasures have grown and thrived. A limestone region, or a clay soil and limy water is often the cause of failure, for most plants of this family, *Droseras*, *Saracenias* and some others, rarely flourish in districts where there is much lime.

There are two types of Tamarisk which bloom freely in Boston and vicinity, although they are by no means common in gardens. There is much confusion in their nomenclature. Plants of the first type pass under the names of *Tamarix Africana*, *T. Gallica*, *T. Anglica*, *T. tetrandra*, *T. elegans* and *T. parviflora*, and all flower at about the same time, in the latter part of May and in June. If they have specific differences, they are so slight or inconspicuous to the general observer as to be unnoticed in the garden.

The second type is the most desirable. It comes into full bloom about mid-August, and then the masses of delicate, tiny, pink buds and blossoms among the fine foliage are very beautiful, and, when well grown, the whole aspect of the plant is unsurpassed in gracefulness by any other shrub at this season. This is the *T. Indica* of some writers, but, among other names, it is often found in commercial catalogues under the name of *T. Chinensis*. In the climate of Boston it is hardy where not too much exposed, and thrives best in a porous soil, especially in the vicinity of water. It will grow fifteen or twenty feet high, and, if cut back occasionally, it becomes wide-spreading and bushy. When planted in masses it gives a soft, pleasing effect, even when not in bloom.

On account of their minute leaves and pliant branches and stems, the Tamarisks are well adapted to withstand severe storms, and, for this reason, they are much planted along banks and sea-coasts in southern England, where they may be called evergreen. They are also much planted on the Bermuda Islands, where the fine, dense foliage is said to form a perfect shelter against the strong winter gales. They are among the best sea-side shrubs in this country. The Tamarisks are propagated more easily than Willows, and cuttings readily take root in any ordinary moist soil.

The shrubby *Potentilla* (*P. fruticosa*), with its yellow blossoms averaging nearly an inch across, has the merit of giving

very few of its flowers during June and July, and of making a more extensive show in August. It is at home all over the temperate parts of the northern hemisphere, and, although it is not a plant of great value in small gardens, it is very useful and ornamental as an undershrub in larger places, or in parks and woodlands.

Jamaica Plain, Mass.

J. G. Jack.

Native and Japan Plums.

SINCE the introduction of the Wild Goose Plum there have been many attempts to improve it, and other American varieties, but as a market fruit nothing has yet been produced to supersede it. If the Mariana ripened its fruit as early as it was represented to do, while being disseminated, it, no doubt, would be more profitable; but such is not the case, for while scattered specimens color up a little in advance of the Wild Goose, it spreads its time of ripening over a greater period, the main bulk of its fruit coming in at the same season. Nor is its quality as good, and it therefore brings a lower price. The tree is much better in form and habit, though, and, in my

are the only two that have proven satisfactory and profitable here. The trees of all the other varieties of this type on my grounds go down under our hot suns, blighting in the same way that Pear-trees do. There are some cross-breeds—neither true Chicasa or Americana in type, such as Wayland, Golden Beauty, Moseman, Miner, Forest Garden, Forest Rose, Reed and Indian Chief—that are perfectly hardy in tree and produce abundantly of fruit, varying in size, color and quality; but the season of their ripening tends to render them much less profitable than the Wild Goose, since they come some time after that variety, when Peaches are plenty in the market. To the grower there is a world of difference between four cents a quart and fourteen cents a quart, which last-named figure my Wild Goose Plums, in ten-pound baskets, readily brought in Baltimore market this season.

There are but three of the Japan varieties fruiting with me yet. Ogon is first to ripen; color, yellow; size, medium to large; quality, fair; not productive. Botan ripens with Wild Goose; large, red; quality, very good; very productive, trees bear quite young. This variety promises to be profitable. I



The Fairbanks House at Dedham.—See page 411.

judgment, the chance for improvement, by crossing this with other desirable varieties, is better than it is with the other. The Mariana is valuable as a stock on which to work other varieties, being almost entirely free from the annoying habit of suckering from the roots. This is especially valuable in districts infested with the Peach yellows (assuming that such a disease exists), because Plums are often worked on Peach stocks. Cuttings of the Mariana grow about as readily as those of the Orange Quince.

Lone Star, a Texas variety, ripens about with the Wild Goose, and when fully matured is nearly as good in quality, but as a market Plum is less desirable. Robinson, another Chickasaw Plum, ripens immediately after Wild Goose, but is smaller, and much inferior every way, except in productiveness. It is extremely prolific. The Newman, an older variety—also Chickasaw—approaches the Wild Goose nearest in all respects—except in time of ripening—of any other variety. It is a week or ten days later, a heavy yielder of fine-sized, bright-red fruit, which places it second in value as an orchard variety with me. Among the Chickasaws that have little or no value, commercially, I would name Cadd, Chief, Early Red, Yellow Transparent, Hattie, Arkansas Lombard, African, Coletta and Jennie Lucas.

Of the Americana type, Purple Yosemite and Deep Creek

am strongly of the opinion that it has been sold under the name of "Abundance," in New Jersey. For the honor of the trade, let us hope that the deception was unintentional. Kelsey is full of fruit for the first time, and at present looks as though Peaches would be pretty well out of market before it gets in. The trees go through our winters here unharmed, not even the terminals of small branches being injured.

Denton, Md.

J. W. Kerr.

Asparagus from Seed.

I LIVE in a locality not specially favorable to the growth of Asparagus, though much attention is given to planting new beds in sheltered spots in hopes to secure early cuttings. During the past forty years there have been changes in the method of its culture, and growers are still looking for improved methods. The first beds were planted here by dropping seeds in holes six inches deep, about one foot apart each way. Such a bed of three acres, now forty-two years old, is still in bearing.

The uplands are not sending Asparagus to market; it seems to flourish best in sandy loam near the river, where water can be reached from twelve to twenty feet below the surface. This would seem to indicate the necessity of water. The best stalks

I have seen I have discovered in such localities. Last season six or eight such sprouts I saw in a square foot of ground, self-sown, no doubt; and in the fence-row, which had been undisturbed by plow for many years and without manure in that time, I never saw so many fine sprouts grouped together. These things point to the conclusion that what *Asparagus* needs is not deep culture, salt or manure, so much as a comparatively undisturbed growth, both of sprout and root, with mulching. Whether fertilizers will supply the drain on the plant by the removal of sprouts repeatedly in spring cuttings is still a problem.

In watching the results of all present methods that are practiced in the culture of *Asparagus*, this course of nature has been followed imperfectly, if at all. *Asparagus* is found near the salt water, not for the salt, but for the water and for undisturbed root-growth. Secure this in the garden and the conditions will be perfect; and this is what I have set out to accomplish. In my newer plantings, seed is drilled thinly in rows one foot apart; the rows being in pair four feet apart; these double rows are covered with straw horse-manure in summer after cutting is done; this is to remain on the row as a mulch during the winter, and in the early spring is covered up on the rows with dirt thrown up from the spaces with a plow. After cutting is over, the dirt is again brought back into the spaces with a hoe, the rows are again mulched, and the rotation is complete. By this method of cultivation the crowns are undisturbed, and the roots, which run deep, are not injured by plowing in the spaces; the plant is mulched with fertilizing material eleven months in the year. In the summer months the weeds are kept down by the same means, and in the spring the rotted mulch is again returned to the spaces to enrich the soil after doing duty over the crowns at the time of cutting. The *Asparagus* is thus cultivated in a compact row, and the crowding of shoots does not of necessity mean small ones, as has been shown by its growth in the uncultivated state and in my experience.

I have seen two beds ruined by using a plow or cultivator over them to kill out grass and weeds, and these beds had been planted deeply with this in view. But the crowns were cut off, and the beds become thin and cuttings small and unprofitable. By the method here described, the seed is planted where the plants are to grow; there is no transplanting. The spaces between rows can be cropped for the first two years, and cutting may begin in the third year, after which the spaces should not be cropped. For the location of such a bed choose a spot now that is as free as possible from weeds, manure heavily this fall and again in the spring, plowing no deeper than usual. This is all the preparatory work needed.

West Springfield, Mass.

W. H. Bull.

Notes on Wild Flowers.

Pogonia pendula, now nearly out of flower, is a delicate little Orchid, growing only three to six inches high, from a small bulbous root, and bearing several small white or pale pink drooping flowers. The plant is not a showy one, but the flowers are very delicate and pretty. It is one of our rarest species, and, as its natural location is on high ground, it may be easily grown in loamy soil in the shade.

Zephyranthes longifolia, one of the Mexican Amaryllises, is now in flower. The plant comes from a small bulb half an inch or more in diameter, and usually grows from six to ten inches high, bearing, on short stems, a light yellow flower. The leaf is long and grass-like, and the flowers are not very large. The bulbs are easily wintered in dry earth in the cellar.

Allium scaposum, a plant of the Onion family now in flower, is about one foot high, bearing an ample umbel of light pink or white flowers, which are quite pretty. The bulbs are, probably, tender, and should be wintered in a cellar.

Habenaria psycodes, one of the purple-fringed Orchids, is now blooming. The usual height of this plant is about two feet, but it varies much according to its location. In the shade it is taller, more slender, and the flowers much paler than in the open sunlight. The spike of pinkish-purple flowers is often ten inches long, fragrant and very showy. It comes late in the season, when most other northern Orchids are past flower, and the flowers are quite durable. It likes moist soil and, though not strictly a bog-plant, it will thrive on the borders of bogs, and also on higher ground that is moist. When planting it on upland soil, unless quite wet and springy, plenty of peat or leaf-mould is needed about its roots, and also a mulch, or else it should be placed in the shade.

The Dwarf Cornel or Bunch Berry (*Cornus Canadensis*) is a pretty little plant, seldom more than six inches high, bearing in June a head of small flowers. These heads are surrounded

by a sort of involucre, which is white or slightly pinkish and resembles the petals of a flower, so that the heads appear as one flower nearly an inch wide. The plant is quite pretty in flower, but much more attractive at this season, when the bright red berries are ripe. These are in dense heads, and are very showy. The plant spreads from subterranean creeping stems, and when established in a moist but well-drained loamy soil soon forms dense beds.

One of the most conspicuous of our wild flowers at this season is the Great Willow-Herb (*Epilobium angustifolium*), which is quite common in many localities. The plant generally attains a height of two and a half feet, but in some places, where the soil is rich, it is over six feet high. The flowers are in long spikes, one to several on a plant, of a pinkish-purple color and very showy. In localities where the timber has been burned off this plant often seems to take complete possession of the soil, and, when in flower, displays wide spaces of color. There is little difficulty in establishing it in any ordinary soil.

Eupatorium aquatoides (White Snakeroot) and *E. purpureum* (Joe-Pye weed or Trumpet-weed) are both in flower. The former grows from two to four feet high, bearing numerous heads of pretty white flowers. The plant seems to thrive in any moist soil. *E. purpureum* is a variable plant so far as size is concerned, sometimes attaining a height of ten feet, but usually not more than three or four. The flowers are in dense compound heads, purple or flesh-colored, and quite pretty. The plant is common in low, wet ground, but may be easily grown in any ordinary soil.

Of the many Golden Rods now coming into flower, *Solidago juncea* is the first, and is one of the prettiest. The stalks are about three and a half feet high, bearing dense heads of bright yellow flowers. The plant is one of the easiest perennials to grow, and will thrive in any ordinary soil. Another Golden Rod, which flowers a little later, is *S. nemoralis*, a smaller species, usually one to two feet high, with a dense, somewhat recurved panicle of rich yellow flowers. It grows in dry, sterile soil. All things considered, we think this the most desirable species for cultivation.

Helianthus decapetalus, one of the perennial Sunflowers which bloom at this season, is a very showy plant when it attains its maximum size. The stems are branching, often six feet high when in rich soil, and bear numerous large, showy yellow flowers two or more inches wide. *H. strumosus* is a smaller plant, two to four feet high, but with flowers much like the former, except that they are smaller. Both plants are desirable for cultivation and may be grown in any loamy soil.

Charlotte, Vt., August 13th.

F. H. Horsford.

Orchid Notes.

Dendrobium rhodostoma.—This is an attractive bright-flowered hybrid, between *D. Huttonii* and *D. sanguinolentum*, very much resembling the latter in its growth. The stems or pseudo-bulbs are very slender, from two to three feet long, and from near the top of these the little bunches of flowers are produced. The flowers, which are about two inches across and well expanded, are white, with all the segments heavily tipped with rosy purple. Unfortunately, these do not last many days in perfection, but the plant is seldom out of bloom, for the old stems continue to produce racemes for many years. This plant grows very freely with liberal treatment, and is best suited to pot culture.

Cynoches ventricosum, popularly known as the Swan's-neck Orchid, is now flowering freely, and, though not a showy kind, is the most attractive of the genus and well worth growing, not only for the quaint form, but also for the pleasing perfume of the flowers. The growth consists of stout, fleshy bulbs about one foot long, terminated by several thin, lanceolate, light green leaves. The large greenish-yellow and white flowers are borne on drooping racemes which spring from near the top of the bulbs, and last about three weeks in good order. This Orchid, as well as its congeners, will give satisfaction when grown in rich, open soil, in well-drained pots, supplied with abundance of water, in the warmest house; a little liquid manure will also be beneficial. As soon as growth is finished the plants should be removed to a cooler house, with plenty of air and sunlight. Water should be gradually withheld until all the leaves have dropped, and after this no water need be given, except to prevent shriveling, until the new growths appear, when the plants may be shaken out and repotted in new soil.

Saccolabium caeleste.—This is a comparatively new species and proves a great acquisition, adding another to the all too small list of so-called Blue Orchids. The habit of the plant somewhat resembles *S. curvifolium*, but is much stronger. The leaves being broader and thicker, and of a deep green.

It appears to bloom very freely, producing dense-flowered, erect racemes about eight inches long. The flowers are white with all the segments heavily tipped with light blue, though some varieties are much deeper colored than others. It is an attractive Orchid, a robust and free grower, and rapidly establishes itself with the usual treatment accorded this class of plants.

Trichopilia (Pilumna) nobilis.—This Orchid can hardly be called a distinct species, as it is nothing more than a larger and better form of the well-known *T. fragrans*, nevertheless it is a choice Orchid, and by no means common. It is a native of Peru, and grows very freely with the *Odontoglossums*, and, like them, requires abundance of water, though a little less may be given after growth is finished. The habit of the plant is clustered, with oblong, compressed bulbs, terminated by a large, broadly oblong, acute leaf. The radical scapes bear four to five large, pure white flowers, excepting for a dash of orange in the throat. These are very fragrant.

Kenwood, N. Y.

F. Goldring.

The Hardy Flower-garden.—The garden looks especially gay just now with the Phloxes, Tritomas, Lilies, Gladiolus and many more all at their best. The double kinds of Delphinium, too, are remarkably fine. The named French ones are very double, and many are of good color, but they always seem to lack constitution, never living long, nurse them as we will. We are trying the plan of raising our own, and so far the results are good, fully ninety per cent. of the plants raised from the seed of double kinds producing double flowers, many of them equal to the best named kinds, and the plants are much more vigorous and produce longer and stouter spikes than imported ones. When selecting varieties for seed, it is best to pick off all the side branches and let the main stem remain. This will give it additional vigor, and the laterals usually produce flowers less double than those of the main stem. Our seed saved last year was sown in February, and the plants have now spikes of bloom two feet long. This success is, doubtless, due to sowing seed early and potting the plants off as soon as large enough to handle, and planting in their permanent places as soon as the weather becomes warm enough.

Of the Tritomas, John Benary, one of Lemoine's new ones, is always the first to flower with us. It has an immense flower of a bright crimson. The next best is *T. corallina*, with the most compact flower of all and the freest bloomer. The spikes are not so large as those of *T. uvaria*, but they are much more useful and effective for cut-flower work. The Hyacinth Lily, *Galtonia candicans*, is a valuable summer-flowering bulb; its tall spikes of pure white, pendent, bell-shaped flowers, make it a very conspicuous plant. We find it perfectly hardy; in fact the bulbs winter better in the open ground, provided it is well drained, than in the cellar. This is a plant readily increased from seed, and the bulbs reach flowering size the second year. Good bulbs produce as many as four spikes during the season, if the old ones are cut off as soon as they show signs of seeding, so that there is a continual show until frost puts an end to all out-door displays. One of the best things of recent introduction is *Platycodon Mariessi*, a dwarf form of the old *P. grandiflorum*; its distinctive qualities are that the flowers are as large again as in the old one, and that it does not exceed six inches in height. It is really a most useful plant. The great objection to the original form was that it was liable to produce flowers from the top only. This variety produces its blooms in abundance even on young plants; we measured some blooms which were two and a half inches in diameter.

Passaic, N. J.

O.

The Dwarf Cannas raised by French hybridists are rapidly gaining favor here. It is only a year or two ago that they were first seen here at the exhibitions, but now they are largely grown at all the best nurseries, and are becoming widely known throughout the country. For several weeks past they have been a great attraction in the conservatory at Kew, where many visitors make their first acquaintance with them. Their noble foliage is always handsome, and, when this is accompanied by the tall spikes of large and richly-colored blossoms, as curious in shape as any Orchid, they are extremely attractive; in fact I do not know any Orchid so brilliant in color as some of these Cannas. They can, moreover, be grown by everyone who owns a green-house. [In this country they grow perfectly well out of doors.—ED.] They require no attention in winter, as they die down to their fleshy tubers or rhizomes, and when in full growth do not occupy much space on account of their dwarfness which is one of their chief merits. In one of our leading nurseries I

made the following selections of sorts the other day after comparing them one with the other. One of the most striking kinds was *Capricieux*, flowers large, sepals broad, bright, orange-scarlet, margined with yellow; Admiral Courbet, citron-yellow spotted with scarlet, very showy; Louis Thibaud, brilliant vermillion; Victor Hugo, scarlet; Antonin Crozy, bright crimson; Geoffroy St. Hilaire, foliage stained with vinous purple, flowers vivid scarlet; Francisque Morel, crimson-red, and Madame Just, flowers, rich orange-yellow. There were several other sorts, but these, I thought, were the finest. All were vigorous in growth, and carried an abundance of bloom on spikes well overtopping the foliage.

Kew.

G.

Dwarf Herbaceous Phloxes.—There is a race of French herbaceous Phloxes little grown in gardens, but which deserve wider cultivation. The one great fault of the herbaceous Phlox is its tall, ungainly and untidy habit, but in this newer race we have a dense, bushy, spreading growth, the plants rising but about two feet in height, and, in a few varieties, so densely smothered with flowers as to hide the abundant rich-green foliage. We made notes of a few good kinds in the Broxbourne Nursery, among them *Bacille*, flowers large, mauve-lilac in color, and the plant not more than two feet high; M. H. Jacotot, white shaded magenta towards the centre; La Ville de l'Air, white, with a clear purple eye; Mars, bright red; Colibri, pink shaded rose; and Foutcheau (whatever that may mean), pink with a carmine eye. The last-mentioned is a good flower spoilt by a foolish name. Such a race should become common in gardens. One clump was clothed to the ground-line with foliage, and spreading out on every side more like a shrub than a hardy, herbaceous perennial.—*The Garden*.

Correspondence.

Conifers for Planting on the Plains.

To the Editor of GARDEN AND FOREST:

Sir.—I use the time between the arrival and departure of my freight-train to send a few notes made while passing through Nebraska, stopping here and there. My object on this trip has been to note the progress and promise of timber-claim planting, and by the way to observe what coniferous growth may be expected to do on these plains and prairies when real timber-planting—not simply tree-planting for ornament, shelter or shade, or for land speculation—shall begin.

Men of broad views, and with no tree-seedlings to sell, either nursery-grown or pulled at the river-side, begin to appreciate that re-foresting the plains must become a national or state affair; at least that it cannot be done by private enterprise within this generation, and certainly not in such a systematic manner as is necessary to insure the best results in climatic amelioration. Co-operation and concentrated efforts alone will accomplish that.

But these questions of more general nature are too fruitful of argument to be discussed in a letter. Which conifers promise well in this region can more briefly be treated, since our experience, so far, is only very meagre.

When I started from Washington I was almost ready, unconditionally, to urge American trees only for American planting. In fact, I had advocated, on theoretical grounds, the introduction into the plains of Rocky Mountain conifers, especially *Pinus ponderosa* and *Pseudotsuga Douglasii*, which thrive naturally under climatic conditions not dissimilar to those prevailing here, and had not expected to speak of the Scotch Pine again in connection with American forestry; but I am compelled to say that at the first place where I had an opportunity to observe it side by side with eastern and western forms, which was in Crete, seventy-five miles west of the Missouri River, the Scotch Pine was decidedly the most promising tree, and next to it the Austrian Pine. There were in nurseries, four to five years planted, besides these two, *Pinus Strobus*, *Picea Engelmanni*, *Abies concolor* and *Pseudotsuga Douglasi*. The Europeans were thrifty, while all the Rocky Mountain tribe had lost their leaders; their terminal buds had been killed not this year only, but every year since they were transplanted, giving the trees an unsightly, ragged appearance. Only a few *Picea pungens*, which had been specially cared for and coaxed under shelter, had developed fairly. In the same town are found many Pines of older growth, planted in 1873. The Scotch and Austrian are perfect, with annual shoots of two to three feet, as straight and well-proportioned as the best in their native land, without a flaw, and it would be difficult to tell which of the two to choose as regards thriftiness. There was also one White Pine, grown in the shelter of

the other Pines, which seemed to be just as much at home, while in the nursery the young plants had a jaded look, and were browned more or less under the hot blast which passed this region in May.

Thus discouraged, in regard to the Rocky Mountain trees, I went westward with little hope of finding much worth noting, but was most agreeably surprised at Franklin, fifty miles east of the one hundredth meridian, where an enterprising man has begun systematically to test the possibilities of Rocky Mountain conifers. Rev. C. S. Harrison is one of those hardy and hearty men of the West, full of vigor, will and push, bound to succeed, if success is attainable. The sight which met me at his nursery was astonishing, indeed, when the locality is considered. Here could be found more conifers in one spot than anywhere on the plains west of the Missouri. Nothing had been planted longer than four years, it is true, but here were not a few trial-plants only, but a nursery of conifers, in all stages, from the seed-bed to the six-year-old transplants. A space of 100 feet square protected all around by a loose board fence, and, shaded by a brush-roof, serves the purpose of starting the plants, either from the seed or from seedlings, carefully taken from their native haunts. Under this shed, as well as in the open, the Scotch Pines showed the thriftiest growth; the Austrians, though no beauties, were also well at home. Neither of these, and but few of the former, showed any loss of terminal-bud, the oldest transplants being six-year-old Scotch Pines, which had made this season shoots of from fifteen to twenty-five inches, and were now four to six feet high.

Under the shed the Engelmann Spruces were of the finest appearance, the Douglas Spruces next, while *Abies concolor* made only an indifferent show, and *Picea pungens* was, perhaps, still worse.

The sturdy *Pinus ponderosa*, which was present in many specimens under the shed, and freshly transplanted into the open, had not yet put on its best style, but when a lot of them were shown to me, neglected and overrun, almost smothered by grass, and yet as fine Pines as ever carried a head, I had to subscribe to Mr. Harrison's prophetic expression that this tree is destined to furnish the saw-logs of the coming forest of the plains.

I must not forget to mention the hardiest of the hardy, the ubiquitous Juniper, which, although hardly to be recommended as a forest-tree in this latitude, is probably the most reliable ornamental conifer here. The Rocky Mountains furnish it with a beautiful silver sheen added.

The last conifers met, save an *Arbor-vitæ* hedge, freshly planted by an enterprising settler at this place, were grown under the inspiration of the water-works of McCook, the "Magic City of the West," being fairly within the arid region, and yet converted into a garden-spot by its energetic population, who have spared nothing in ornamenting their homes and streets.

Two Scotch Pines at the depot, twelve years old, and several younger specimens in town, still recommend this species for ornamental planting. The White Pines, with the exception of one specimen, were all out of the race; a number of Norway Spruces, low and stubby, yet showed fairly well, while two stunted Blue Spruces had not been able to save their terminal-buds. This failure of the terminal-bud, which is the common injury, not only to the conifers, but to most trees in the plain, and which accounts somewhat for their crooked appearance Mr. Harrison hopes to overcome, by proper treatment and "schooling" under the shed and in the nursery for six years, having observed that this same loss is frequently sustained even in the native forest, and afterward outgrown. But while such treatment may be practicable for ornamental plants, for forestry purposes we would not be able to apply it, and it remains questionable whether the damage would be outgrown in time on the plains.

The Bull Pine (*Pinus ponderosa*) alone seems to be the one native conifer which, so far, promises to serve as a timber-tree of these wind-swept tables.

Stratton, Neb.

B. E. Fernow.

Direct Influence of Pollen on the Orange.

To the Editor of GARDEN AND FOREST:

Sir.—In spite of what some botanists set forth as Nature's unvarying law, the question of the immediate and direct influence of pollen on fruit should, in the matter of the Orange and Lemon and all Citrus fruits, be considered as one which has been settled.

For weeks each season I have been carefully examining the exterior and interior of oranges growing on Maltese Blood-trees and on the Imperial Blood of the St. Michael family,

which have a navel mark not common to either family. I have singled out these two families of the Blood Orange with the navel mark because I consider the three oranges as the best of all oranges, and have made careful experiments for years hoping and expecting to combine in one orange the superior points of the Blood and the Navel.

These Blood oranges having the navel mark are completely changed in outline, in their exterior and all through by the effect of the pollen of the Navel-trees. From being naturally oblong, they become somewhat flattened, the flavor is changed and the cellular form of the pulp is changed.

Of twenty oranges having a navel mark recently cut from a Maltese Blood-tree standing beside a Washington Navel-tree, only two of the oranges had a single seed, eighteen were seedless, while nineteen in twenty of the Bloods which were not marked by the navel had one or two seeds. Not always does the pollen of the Navel show its effect in the lengthened axis. Sometimes you find an orange shaped like the Navel except the umbilical mark is wanting on the outside. Inside there is no axilar centre; the inner orange has spread all through the fruit. There are two sorts of pulp, two sorts of fruit-cells and two separate and distinct flavors.

A few times I have seen an orange cut from a Majorica-tree, one side almost solidly colored, like an Imperial Blood, pulp dark as wine; the other side not a trace of rubricate, the divisions of fruit-cells as distinct and clear as though they had been fenced off by an impassable dividing-line. One side the decided piquant flavor, sub-acid, that a thirsty man gratefully remembers on a hot day; the other, the fruity-flavor of a Strawberry or Black-cap raspberry, with juice quite as dark as that of the latter berry. Such an orange I cut at Ocala, during the Exhibition, last winter, and observing visitors noted the difference in flavor as well as strong contrasts in color in the two sides of the same orange.

Sometime later I cut a Prata orange, such as L. W. Sherman, of Boston, sells for "whites," because the rind is a pale lemon color. I noticed before I cut it, longitudinal, single rows of rubricate oil cells, running from flower to stem as straight as the lines of longitude on a school globe. The opposite cheek of the orange had splashes of them, giving a beautiful contrast to the pale-lemon shade. I was not surprised to find in the pulp, usually as pale and white as a Villa Franca lemon, rubricate tints.

I then went to the row of trees on the opposite side of the Blood Oranges, and soon found on one of the outside branches of the Ribbed Du Roi, an orange well marked as a Du Roi save the blossom end, which was a well-defined Blood. I cut and found a more deeply-colored orange than the average Bloods with not a seed, although the Du Rois are not wanting in seeds.

Among the ornamental dwarf Orange-trees at Belair, President Berckmans, during a visit last winter, called attention to one found with rind not unlike the shell of the old Crook-neck squash when ripe, the exact counterpart of which he had seen on a tree in a distant part of the grounds. The distant tree originally came from Japan and has not been bearing more than three years. I know such oranges were never seen there on the tree on which he saw it till this one strange tree began to bloom and bear fruit. Now tracks of this ribbed and warty fellow are again and again seen on the other trees.

In March last I cut a cluster of five oranges from the tree sent me by Wm. Saunders, Superintendent of the Grounds of the Agricultural Department at Washington, labeled Bahia. The cluster looked precisely like similar clusters growing on an adjoining St. Michael tree. Cutting them all, I could see no difference in seed or flavor from the St. Michaels; the same sharp acid, the thicker, rougher and tougher rind than that of the Navels—not a thing to remind one that the sap of a Navel-tree nourished those five St. Michael Oranges.

Some years since I procured from A. W. Rountree, of New Orleans, the Double Imperial Orange. I budded a number of trees from the tree he sent. They bloomed fully for the first time last February and March. The past summer and autumn I found again and again oranges on adjoining trees so exactly like the real Double Imperial that the novice would say they were the same. This orange (the Double Imperial) has an exterior, as E. H. Hart says, *sui generis* and quite distinct from most oranges. It has as much pollen (yellow, too) as any Orange-bloom I ever examined. It is one of the coming oranges for Florida.

Meanwhile let me say, a race of oranges which can completely metamorphose whatever other variety its pollen touches must be most prepotent indeed. Out of the two strains, the Navel and the Imperial Blood, will come the future orange, which the intelligent lovers of the queen of

fruits will say are the best. Their price will depend on the conscience of the seller. Note that Palermo Imperial Bloods, on March 1st, sold in Boston at \$4.35 a box, when average Palermos sold at \$1.50 and less.

Lyman Phelps.

[The phenomenon of the direct influence of foreign pollen upon the fruit of various plants has long interested naturalists. It is a matter of much practical importance, too, to horticulturists, if certain fruits, especially those belonging to the Squash and Melon family, change and deteriorate, as some assert, by the influence of the pollen from other plants of the same family acting upon the ovaries from which these fruits develop. Persons interested in the subject will find a summary of what is known about it in a paper by M. Maximowicz published in the journal of the Royal Horticultural Society, new ser., iii., p. 161. See also Darwin's "Animals and Plants Under Domestication" (English ed.) i, 39; Asa Gray in *American Journal of Sciences and Arts*, 2 ser., xxiv., 442, and Darlington's "Fl. Cestrica," 2 ed., p. 555.—Ed.]

The Chinese Quince.

To the Editor of GARDEN AND FOREST:

Sir.—We send you a branch from one of our plants of this species in response to the suggestion (GARDEN AND FOREST, ii., p. 389) that "it would be interesting to know if this handsome plant is cultivated anywhere successfully in the United States."

When the senior member of our firm settled in Germantown, in 1852, he found a specimen possibly twenty feet high, and with a trunk eighteen inches thick—giving these figures from remembrance of the specimen only—on the grounds formerly owned by a Mr. Sickles, but about that time purchased by Mr. E. H. Butler, the founder of the well-known publishing firm of E. H. Butler & Co. It was a bushy specimen, with branches nearly to the ground. It produced its large oblong fruit but sparingly. From our subsequent experience with its rate of growth, that specimen must have then been at least twenty-five or thirty years old. No one could tell how it came there. It is remarkable that at that time there were found other rare Chinese plants in Germantown gardens. Among them the *Rosa rugosa*, which has again been introduced within recent years, and which is still growing where it then grew, on the grounds about the Chew House, so famous in the history of the struggle of the Colonies against Great Britain. We have always credited the old firm of W. R. Prince & Co. with these introductions, because some rare things have been traced there, planted in the early part of the present or toward the end of the past century.

The habit of the Chinese Quince is fastigate. Its great beauty is in the color of the autumn leaves, which is fully equal to that of the Tupelo, or Sour Gum, or Black Gum, as it is variously called. When our nurseries were founded in 1852, it was one of the first to go in the collection. It has been in every edition of our catalogue since that time, except our last, the compiler dropping it by a lapse of the pen through momentarily classing it with the "Pyrus," leaving out "*Cydonia*" in brackets, as often written. It is still there as *Pyrus Sinensis*, though that name properly belongs to the Sand Pear. Of the trees planted on our grounds prior to 1860, one remained to reach over twenty feet in height, when it fell a victim to public improvement, as it stood near the line of what is now Meehan Avenue in our city list of streets. There ought to be hundreds throughout the country distributed from our nurseries during the past thirty years. We fancy it must fruit freely in Virginia, as we frequently have specimens sent or brought from there by parties anxious for its name, as its large, delightfully-scented fruit attract the curious.

In conclusion allow us to thank GARDEN AND FOREST for the excellent work it is doing in bringing to notice the numerous beautiful things well adapted to our climate, of which a few have knowledge. There are probably between two and three thousand species or marked varieties of trees and shrubs that are hardy through the central states, the number, of course, increasing or diminishing as we go south or north, and which, if introduced and made known, would render American parks and gardens superior in variety to any others in the world. No nurseryman can catalogue or describe these properly. It would require the expense of a heavy volume. Only journals such as GARDEN AND FOREST, or societies such as the Massachusetts Horticultural Society, can do much in this line—and what both of these have done and are doing is worthy of all praise.

Germantown, Pa.

Thomas Meehan and Son.

To the Editor of GARDEN AND FOREST:

Sir.—Nearly twenty years ago Dr. George Thurber wrote in the *American Agriculturist* (December, 1871): "We do not know how so many Chinese Quince trees become distributed about the country without the owners of them having their names. For several autumns, including the one just past, we have received a number of fruits from different points in the vicinity of New York to be named."

"This year one of them remained on exhibition at our office for several days, where it attracted much attention from its novel shape. We have had the fruit and leaves engraved at about half the average natural size. The tree grows in a spreading form, and reaches the height of about twenty feet."

"The leaves are quite unlike in appearance to those of the common Quince, being of a dark green with a shining surface. The flowers are rose-colored with a violet odor, becoming darker with age, and makes the tree quite ornamental in spring. The fruit is irregularly egg-shaped, green and very hard and dry. We do not know that any use can be made of the fruit, but it is quite conspicuous and ornamental when upon the tree. The botanical name is *Cydonia sinensis*. We do not find the plant in any of the catalogues of our leading nurserymen, and cannot say where it may be procured."

Most of what is stated above is as true now as it was then. Many persons, otherwise well informed in horticultural matters, are entirely ignorant about the existence of this fruit. It is strange that a tree which combines so many good qualities is not more widely known. In Virginia and further South the tree reaches a height of some thirty feet. Under favorable conditions, the fruit grows to a very large size, single specimens reaching a weight of from two to two and a half pounds.

It has a very firm flesh, which, we are assured by reliable authority, makes an excellent preserve and jelly of a beautiful pink color. As the tree is a profuse bearer, it seems strange that its cultivation has been so much neglected. In Virginia and other localities where the fruits mature every year, the growing of the Chinese Quince and the manufacture of preserves from it could no doubt be developed into a profitable industry.

New York.

F. M. Hexamer.

Strawberry Plants for a New Bed.

To the Editor of GARDEN AND FOREST:

Sir.—The mode of growing superior Strawberry plants adopted by J. M. Smith, of Green Bay, Wisconsin, and detailed in full in GARDEN AND FOREST of August 7th, commends itself not only to the sober thought of all interested, but also agrees with the experience of those who have pursued the plan of propagating the new plants from strong and vigorous ones that have not been allowed to bear fruit and thus to partially weaken their reproductive force. There is no doubt that in all cases (other things being equal) this mode will produce better plants, and, consequently, a better yield of fruit the following season.

One of my neighbors has pursued this course for a number of years, and he has thus been enabled to retain in good bearing order and in a healthy condition that most excellent old variety, "Boyden's Number Thirty," when all the growers in the neighborhood of its early home, Irvington, New Jersey, were obliged to discard it on account of its deterioration. It is still true that like begets like, and in order to produce strong and hardy plants you must have vigorous stock to work from.

Newark, N. J.

C. L. Jones.

To the Editor of GARDEN AND FOREST:

Sir.—Referring to Mr. Horsford's note on the Swamp Milkweed (*Asclepias incarnata*), let me say that there is a variety of this species with white flowers. Not long ago I came upon a few plants of this sort, and the umbels of white flowers were most attractive.

Arnold Arboretum.

Jackson Dawson.

Recent Plant Portraits.

Botanical Magazine, July.

PANDANUS LABYRINTHICUS, t. 7063, a handsome species, native of the Malay Islands, which has flowered and fruited at Kew, its striking ovoid heads of fruit being particularly noteworthy.

SYRINGA VILLOSA, t. 7064, the Lilac from North China, which was figured in this journal (i., 521, fig. 83).

OLEARIA MACRODONTA, t. 7065, one of the Daisy trees of New

Zealand, and the most conspicuous one from the great abundance of broad white corymbs, which terminate every branchlet and cover the plant with a sheet of flowers. The tree is twenty feet high, with spreading branches, smelling faintly of musk.

DISA LACERA, var. *MULTIFIDA*, t. 7066, a beautiful blue flowered species.

ENCRYPHYA PINNATIFOLIA, t. 7067, a small, bushy Chilean tree, with pinnate leaves and flowers like large, single white roses. After the petals fall away the stamens persist, and are themselves very ornamental.

Notes.

The Japanese *Platycodon Mariessi*, of which mention is made in another column of this issue, is highly commended as a plant for the rock-garden in English horticultural papers.

Governor Green, of New Jersey, has appointed Andrew J. Fuller, Professor Byron D. Halsted and W. A. Stiles as delegates from that State to the meeting of the American Forestry Congress, to be held in Philadelphia in October.

The officers elected by the Society of American Florists for the year are as follows: President, J. M. Jordan, of St. Louis; Vice-President, M. H. Norton, of Boston; Secretary, William J. Stewart, of Boston; Treasurer, W. H. Hunt, of Terre Haute.

A National Chrysanthemum Society was organized last week, with John Thorpe, of Pearl River, New York, as President; William K. Harris, of Philadelphia, Vice-President; Edwin Lonsdale, of Philadelphia, Secretary, and John Lane, of Chicago, Treasurer.

The Society of American Florists presents the name of Dr. Hexamer as the executive head of the agricultural part of the World's Fair in 1892. Dr. Hexamer is widely known as editor of the *American Agriculturist* and as one of the leading authorities in the country on pomology. Mr. John Thorpe was, of course, recommended by the same body to represent the interests of floriculture.

A very neat plant for rock-work or border is *Plumbago Lar-penta*, which is now covered with its intensely blue flowers. It is perfectly hardy in this latitude, spreads rapidly and soon covers a large space, running with wiry stems in a half-prostrate way and never attaining more than six or eight inches in height. It starts late in spring, but begins to bloom here in early August, and continues to flower abundantly till freezing weather.

Plants of a so-called White Huckleberry (a variety of *Gaylussacia resinosa*) sent to the Arnold Arboretum last year by Mr. B. W. Westbrook, of Montague, New Jersey, bore a small quantity of fruit this season. When ripe the color is a yellowish-white on the under side, deepening to a pale crimson on the side exposed to the sun. As is the case with white or light-colored varieties of many other fruits, the berries of this are much sweeter than the typical black fruit which it resembles in size and other respects.

The London *Garden* protests against the irrational desire to increase the size of many flowers. One of the prettiest things that have suffered in this way is the Petunia; the most free blooming and constant of summer flowers is spoilt by this absurd desire for size. The huge flimsy blooms, too heavy to support themselves, are the perfection of ugliness, and show the flower in a false light. When a bed of this large-flowered strain is planted out in a somewhat exposed position, where the Petunia under ordinary conditions would do well, the thin, weak blooms cannot withstand the wind that would leave unharmed a strain of medium size and decided colors. The African Marigold is another case in point. The huge globe-like flowers are as ungraceful as it has been possible for the florist to make them, and yet he is not content even with this extreme and unnatural development, but aims at still further "improvement." It is the same with the Hollyhock, tuberous Begonia, Chrysanthemum, Pansy, Balsam and many another garden flower; all are in danger of permanent disfigurement by this crazy fashion.

At Headingley, not far away from Leeds, still stands an ancient Oak-tree "which is believed by devout antiquaries to have been part of the ancient forest which may have given its name to the town. The tree certainly gave its name to the 'wapen-take' Skyrack (Shire-Oak), and it may have witnessed in successive ages the horrible rites of the Druids, the assemblings of local crusaders, and the markets of thrifty cloth-work-

ers. Be that as it may, the Oak even in its decay is regarded with veneration. Winter storms have done much to shear it of its mighty proportions, for Whitaker's drawing in 1816 shows a more stately wreck than that of to-day. The last great branch fell in 1883; a portion of it was sold for £100 to furniture-makers, and the old man who owns the remains of the trunk has been offered £200 for them as they stand. His joy in the tree is more to him than the money, but there is some fear lest his successors may take a more mercenary view." An illustration from a recent drawing shows us an immensely massive and still lofty trunk, devoid of all but the stumps of branches and with a hollow, like a great arched doorway, yawning in its side, but still clothed to a considerable extent with fresh sprouting foliage.

In the *West American Scientist* Mr. Edward Palmer writes entertainingly of the fruit of the Opuntia, or *Tuna*, as it is called in Mexico, where it forms the principal article of food for many of the natives during several months of the year. The Tuna of the Mexicans must not be confounded with the Opuntias found in southern California and Arizona. Many valuable varieties of Opuntia are found growing in the Cactus-belt of Mexico, and seeds of some of the most desirable were furnished originally by the United States Department of Agriculture. When new varieties are produced by artificial crossing and selection as great improvement may be expected as has been made with other cultivated fruits, but the different varieties now have no distinctive names. This Cactus requires little care, and thrives on almost any soil, but it reaches its best condition on the table-lands of Mexico. A piece of the plant laid on the surface of the ground will take root and grow; it will endure considerable cold, and the most protracted drought only seems to increase the sweetness of the fruit. When gathered, the fine spines on the surface of the fruit must be removed, so that it can be handled without inconvenience. The skin is then removed, leaving the pulpy meat exposed in a most tempting manner. It is specially adapted to the breakfast-table, having something of the Water-melon flavor, with a suggestion of Strawberry. Tuna is abundant and cheap in the market from June till November. It is finding its way along the frontier of the United States, and is already on sale in Jacksonville and other southern cities.

The *Gardeners' Chronicle* reports that at the Paris Exposition many of the South American republics show specimens of the product known locally as Yerba Mate, or Paraguayan Tea, and derived from the torified leaves and stalks of different species of Ilex. It is exhibited in packets and in original bales of green hide. This is the dietetic beverage of about 20,000,000 in South America, and its popularity is shown by the exhibits in the various pavilions of the Argentine Republic, Paraguay, Uruguay, Brazil, Chili, Bolivia, etc. It is difficult to get at any reliable returns as to the entire traffic in this commodity, the production of which is carried on in such a desultory and wide manner, and extends over so vast an area of wild country where the Holly-trees flourish. In the Argentine Republic the consumption is over 35,000,000 pounds, against 5,000,000 pounds of Coffee. In Paraguay the production of Mate is about 5,000,000 pounds; from Brazil there is an export of 65,000,000 pounds to neighboring states, while the local consumption is about half as much. This is singular in the great Coffee-producing centre of the world, which sends into commerce annually more than half the entire production of Coffee. Strong efforts are being made to open a trade with it in Europe, especially in France, where shops advertise and recommend it. Whether this will succeed remains to be seen, looking at the increased production of Tea and the enormous increase in its sale in Europe. Approaching in its chemical composition to Coffee and Tea, it is asserted that it does not cause wakefulness or prevent sleep. In the rural districts, as well as in the smaller towns, this beverage is considered a regular form of diet, and not, like tea, a mere accompaniment of the breakfast-table. It is sweetened with sugar until it almost becomes a syrup. It is sold at twopence to fourpence per pound, and one pound will produce about twenty quarts of infusion. It is sometimes flavored with Cinnamon, Orange-peel or Lemon-juice.

Catalogues Received.

P. J. BERCKMANS, Fruitland Nurseries, Augusta, Ga.; Fruit and Ornamental Trees, Hardy Evergreens and Roses.—L. J. FARMER, Pulaski, N. Y.; Strawberries.—P. H. FOSTER, Babylon, N. Y.; Forest Trees, etc.—GARDNER & SONS, Osage Nursery, Osage, Ia.; Fruit and Ornamental Trees, Evergreens, etc.—SCHLEGEL & FÖTTLER 26 South Market Street, Boston, Mass.; Bulbs, Roots, Plants, etc.

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Spring-Flowering Bulbs.

AT this season, when all the air is filled with the fragrance of ripening fruit, and flowers are still blooming in mid-summer abundance, it is difficult to recall the impression made on the mind by the hardy flowers that begin to appear, one after another, under the first genial influences of early spring. After the long northern winter, any evidence of renewed life is welcome, and early flowers could not fail to give delight for the cheerful promise which they bring, if for no other reason. But apart from this appeal to the imagination, and from the fact that they have few rivals, spring flowers in themselves are among the most beautiful which the year has to offer; so that every one who has any appreciation of grace and delicacy in form and color takes especial satisfaction in a spring-garden. The testimony is universal that one who plants a spring-garden provides himself and his friends with a store of unfailling and ever-increasing pleasure.

These thoughts are seasonable, for the time is at hand when preparations for spring flowers must be made, if we are to have them at their best. Without mentioning the hundreds of other flowers that have been spoken of in these columns earlier in the year as they came into bloom, we wish especially to call attention to the endless variety of bulbs in which the flowers for next year's bloom are already stowed away. Snowdrops and Squills, Snowflakes and Crocuses, Fritillaries and Erythroniums, Daffodils, Jonquils, Chionodoxas, Satin Flowers and many more—most of them in endless variety—should be secured early, or the dealers will have nothing but refuse stock to offer. It is true that most of these will bloom if not planted until November, but many of them lose their vitality when kept too long out of the ground. Those who wish to deal directly with the great bulb-growers of Holland, or to secure rare varieties from specialists, have no time to lose. Careful study of the catalogues should begin at once, for at least six weeks will elapse between the sending of orders and the arrival of the bulbs. The middle of October is late enough to plant any of them, and most of them will become better established if planted in September.

Even in our wild February weather the fragile Snowdrop will often pierce the frozen soil and open in a sunny ex-

posure, and, if a proper selection of bulbs is made, flowers can be had in constant succession through all the spring months, until the summer Irises appear. Now is the time to choose a proper position for each according to its habit. Most of the earlier and more delicate ones are out of place in masses or formal beds. Snowdrops, for example, can be snugly placed under the shelter of a wall or a boulder in the rock-garden. Tall Squills like *S. campanulata* are at home in the grass, which may be a foot or more high when they bloom. Daffodils will grace the borders of a woodland path. Yellow Crocuses are beautiful on the turf, as they open just as the grass is warming into tender green. Gay garden Tulips and Hyacinths are quite too civilized for nooks in the wild garden, but some of the species of Tulips, especially those of recent introduction, are not misplaced on the border of shrubberies, or in pockets of the rock-garden. There is no spot in wood or meadow, by the brookside or byway, among the rocks, or in a trim enclosure, where some of these flowers cannot be placed to advantage.

None of these spring-flowering bulbs are more generally appreciated than the almost numberless species and varieties of the Narcissus. The single Daffodil opens early in April, with the Bloodroot, and for six weeks some member of the family will be in bloom. Latest of all, and hard after the beautiful *N. biflorus*, comes the Poet's Narcissus, the hardiest and most useful of all. No flower is more effective in the border, in the rock-garden, or as an edging to the shrubbery. It can be naturalized even in a hay-field, and it never appears more beautiful than when shining among the grass, as in our illustration on page 427, which gives a view on private grounds not far from Boston. The foliage should remain till the bulbs have ripened well, and this is true of all other bulbs; but long before the grass is fit for the scythe the tops will have died down out of the way, and the bulbs will have multiplied for fresh flowers another spring. The Poet's Narcissus is not particular about soil or exposure, but it will multiply more rapidly in a deep, rich soil, and gratefully repay kind treatment. Many varieties have been produced by crossing and selection, which are interesting to those who take pleasure in noting minor distinctions among flowers, but for general effect none of them are superior to the original type, which can be bought for a trifle, and a few of them planted every year in vacant corners will soon furnish an abundant supply. Like most species of Narcissus, they do better when planted early, and then, if the soil is suitable, they only need to be protected from the ravages of the lawn-mower to keep on spreading and flowering year after year. No one ever had too many Poet's Narcissus or other spring bulbs of that adaptable kind which will brighten up out-of-the-way nooks in unkept parts of the garden, and no one ever enjoyed such flowers in full measure until he has seen them scattered along the wayside or among the grass, or grouped naturally in a wood border.

In an article on "The Lesson of Conemaugh," in the *North American Review* for August, Major J. W. Powell, Director of the United States Geological Survey, says that "wherever the chief precipitation is snow, forests are a disadvantage if the waters are needed in the valleys below for irrigation, for the forests keep the snow distributed over broad areas of ground and expose it to the winds on their trunks, branches and leaves, so that altogether the mountain evaporation is enormously increased as compared with the evaporation from snow-drifts and ice-fields." If there have been measurements which show that forests enormously increase evaporation, the facts would have a scientific interest for students of forestry, and we should be glad to see a full report of them. But whatever the loss of water from such evaporations may be, the extinction of mountain-forests usually involves the destruction of the mountains themselves, and of the streams which flow from them. If the forests are destroyed there will soon be no possibility of controlling and utilizing the water from the

denuded hills. Under such conditions the question of a greater or less quantity of water dissipated by forest evaporation is not important. The forests are an indispensable factor in a system of irrigation by mountain streams.

Major Powell adds that in low mountain and hilly regions of humid lands, forests about the sources of the streams are of advantage, because they "serve to hold back the water and thus equalize the flow through the year and greatly mitigate the floods." That is a very good statement of an important truth, and the forests will perform this office just the same whether the precipitation is chiefly snow or not, and for any kind of country, humid or arid, where forests can grow. The evil, difficulty and danger of this whole matter are in the fact that the disastrous changes which result from the destruction of mountain forests do not take place immediately, or with the spectacular suddenness of scene-shifting on the stage. When the country is obliged to recognize the fatal and irretrievable consequences of the extinction of the mountain forests of California and Colorado, the men who are now clamoring for their destruction will have gone out of sight, and we shall all be silent. But a civilized nation should be capable of foresight, of learning without the lessons of experiments so disastrous and fatal. It is matter of regret that Major Powell and the admirable young men associated with him are not more vitally interested in the preservation of these important forests. Their indifference gives aid and comfort to the enemies of their own work, and of our national civilization.

The Art of Gardening—An Historical Sketch.

IX.—Greece.

THE history of the few nations which we have already passed in review is enough to show that a stronger or weaker feeling for natural beauty was never the only cause which affected the development of gardening art. The literature of the Jews, for instance, proves that they had an exceptionally deep and poetic feeling for the beauty, grandeur and mystery of the inanimate world; but their gift for art was small, and they were not wealthy or addicted to luxurious living. In consequence, their use of gardens was comparatively restricted, while the Phœnicians, who were akin to them in lack of artistic capability, and were doubtless as inferior in a sentiment for nature as we know them to have been in moral intensity, practiced gardening more generally, because they were a richer and more pleasure-loving people.

As I tried to show in my last chapter, the Greek was not so devoid of a love for the beauties of nature as is commonly said. He may well have loved it in an equally poetic and an even purer way than the Persian, and he was certainly the superior of the Roman in this respect. If, then, his gardens were less extensive than those of Persia and of Rome, we must look elsewhere for the reason. In this case, of course, it cannot be found in artistic inaptitude. It lay partly in the fact that the Greeks were not a rich people and they were not ruled by kings and courtiers; but chiefly it lay in the fact that above all other men they were the exponents of action—of the constant, vigorous exercise of body and mind. The game of politics was their diversion, not hunting or feasting as with the Persians; the hippodrome, the theatre and the gymnasium were their favorite refuges from care, not the country home which so strongly attracted the Roman of the Augustan Age.

The Greeks got their first impulse towards the creation of gardens from Persia. In the early periods of their existence they had neither villa gardens nor stately city squares. Domestic life in the modern sense hardly existed, nor social life in the Persian sense; men met in public to exercise or discuss, not to enjoy themselves in idleness, and they went to their homes for scarcely more than to eat and sleep. Of course there were sacred groves around their temples, but these—the common property of all ancient nations—were religious, not artistic, in their origin. Even such a picture as Homer paints when he makes Nausicaä say to Odysseus that he will

"A never-felled grove find, that poplars crown,
To Pallas sacred, where a fountain flows;
And round about the grove a meadow grows
In which my father holds a manor-house,
Decked all with orchards, green and odorous,
As far from town as one may hear a shout,"*

* Chapman's translation.

—even so simple a picture as this can hardly have had its prototype in Greece when Homer wrote. He must have seen such homes on the Ionian coast, where Persian influence worked towards beauty and luxury at a much earlier day than in the peninsula itself. And all his other pictures of gardens suggest little more than useful plantations—orchards, vineyards and vegetable gardens.†

Cimon, we are expressly told by Plutarch, was the first who adorned Athens with gardens, and the influence of Persia was very potent in his day. He "first embellished the upper city with those fine and ornamental places of exercise and resort" which the Athenians "afterwards so much frequented and delighted in. He set the market-place with Plane-trees, and the Academy, which was before a bare, dry and dirty spot, he converted into a well-watered grove, with shady alleys to walk in and open courses for races." Doubtless the state in which Cimon found the Academy was the result of the Persian invasion; it must have been an agreeable spot when the Pisistratidæ were in power. But Plutarch's words suffice, at all events, to show that Cimon did more than had been done previous to his time. As described in later years, the Academy—which lay in the suburb Ceramicos—was surrounded by a wall and contained marble canals, fountains, long alleys, chiefly of Plane-trees, and narrower walks, called "philosophers' walks," embosomed in shrubbery, all thickly intermingled with architectural and sculptural forms. In addition to the main buildings, there were small temples and altars, and statues without number; colonnades, pavilions, and isolated seats for repose; and a long, oval, marble-bordered race-course.

On the north bank of the Illyssus was another similar resort, the Lyceum, with an exceptionally fine colonnade of marble decorated with paintings. Here Aristotle taught, as Plato had taught at the Academy. And at a third "gymnasium," called the Cynosarges, laid out for the use of half-Athenians and foreigners, Antisthenes taught in later days, and from its name, most likely, his scholars got their name of "Cynics."‡

Such were the places which, for the Athenian, represented the splendid palace-gardens and hunting-parks of the Persian. Beautiful they were, of course, but with an architectonic rather than a natural charm—scarcely gardens at all in the modern sense, for by no means places for repose and contemplation. Much the same was the magnificent "sacred grove" called Altis which surrounded the temple at Olympia—a "forest of bronze and marble statues," a veritable city of lovely buildings, embosomed in trees and set about with flowering plants. Carthage, too, had her public gardens, where marble and foliage met on equal terms; and even in rigorous Sparta the young men exercised beneath the shade of gigantic Planes.

The form which the private dwelling assumed in the cities of Greece is too well known to need description. Even in early times, no doubt, its courts were planted or adorned with flowering odorous shrubs in pots. Fruit and vegetable gardens must also have been commonly attached to dwellings of any pretension, and perhaps small flower gardens for the delight of the secluded wives. But only when in the age of Pericles power and wealth came in unprecedented measure to Athens do we read of pleasure-gardens in any wider sense. Domestic life, as we understand the term, still hardly existed; but the wealthy courtesans who met the men on equal terms, social and intellectual, possessed beautiful gardens in which much of their life was passed; and the famous "symposia" were usually held in gardens or in open colonnades facing a verdurous, shadowy enclosure. Now, too, we hear of gardens on the flat roofs, and of the importation of exotic plants to be cultivated in wooden boxes or woven baskets, or even in vases of silver, or of clay made still more precious by the touch of art. Gradually a line of villas with gardens behind them stretched out of the city almost as far as Eleusis; and, it is said, few hedges or walls separated one property from another, but the prospect was everywhere open and harmonious. The garden of Phryne is mentioned with especial praise, and Epicurus possessed a famous one near the Academy, where, in a favorable environment, he instructed his scholars in the philosophical system which bears his name. Pliny, indeed, says that "Epicurus, that connoisseur in the enjoyments of a life of ease, was the first to lay out a garden at Athens; up to his time it had never been thought of to dwell in the country in the middle of the town."

New York.

M. G. Van Rensselaer.

† "Of the gardens of Hesperides we know nothing singular but some golden apples. Of Alcinoüs, his garden, we read nothing beyond figs, apples and olives. The gardens of Adonis were so empty that they afforded proverbial expression, and the principal part thereof was empty spaces with herbs and flowers in pots."—*Sir Thomas Browne*.

‡ Vitruvius's famous restoration on paper of the Athenian Academy cannot be accepted as correct.

The Sugar Maple and Maple Sugar.

A FORCIBLE writer has aptly said: "Timber trees declare a dividend only at death, and there is constant and strong temptation to their destruction. The Sugar Maple declares annual dividends and the tree survives." It is difficult to induce men to plant or protect trees by urging their beauty or usefulness in modifying the climate. But in the case of the Sugar Maple a direct argument can be addressed to the pocket of the farmer. The value of the Sugar Maple, and the rare delicacy and excellence of the product derived from it, is so great, in my view, that on my own farm, a fertile and productive one, there is no portion which yields more satisfactory returns than does a forty-acre sugar-bush. Nor am I alone. Mr. Eugene Davenport, of Woodland, Michigan, states that his forty-acre sugar-bush pays a net profit of twelve per cent. on a high valuation. I believe he has not overstated the facts. There is a delicacy of flavor about Maple syrup that is equalled by no other sweet. Art cannot counterfeit it, and from the nature of the case it will always be a luxury. Therefore, we can count on a ready market at a high figure for a product that can never be depreciated by excessive competition.

Many persons make a mistake in clearing out too thoroughly the underbrush from the sugar-bush. We must remember that trees grown in thick forests have been protected by neighboring trees and brush-wood from the severe winds, and so have not deep running roots to resist the heaviest blasts. If, then, we cut away the other trees and the undergrowth, we shall almost certainly lose our trees. I thin out trees and undergrowth very sparingly, and have lost very few. Others pasture their sugar-lot. This should be done with caution. I have turned sheep into my lot, but they are watched very carefully, for it is my aim to protect the young Maples. And if the old trees, which have now been tapped annually for more than fifty years, should show signs of decline (they do not as yet), I shall have a vigorous young grove to tap instead of the old one.

No rule can be given as to date of tapping. For the past few years about the 20th of March has been a good time to begin in this latitude. The tendency is to tap too early. The evil of this is that the cut dries up, and when the season does fully open, it is not in condition to yield the best returns.

In early times we used to cut an oval in the tree with an axe. This was often two by four inches in diameter. A terrible wound, yet some of my best trees of to-day were tapped in this way for years, and stand as monuments of Nature's recuperative power. We next used a two-inch augur, cutting about half an inch deep, and, as before, cutting a second gash just below for a spout. This, though an improvement, was still a cruel practice. The wonder is that the trees stood it as they did.

We now use a half-inch curved-lip bit, which cuts a very smooth hole. We bore from one and a half inches to two inches in depth. While science seems to have demonstrated that depth, not size of hole, measures the amount of sap, yet experience in my bush proves that a two-inch hole gives more sap than a half-inch cut, though not enough more to warrant the larger wound.

If we desire to secure the very finest article, we must exercise great care and absolute neatness. The best spout is a close-fitting metallic one, which also holds the bucket. The buckets should be of tin, should "nest" or have flaring sides, and should hold not less than fourteen quarts. The bucket has a small hole through the side close to the top, by which it hangs to the spout. The past year I have used two spouts to a bucket, one passing just over the rim. Hereafter I shall use two spouts to all but my smallest trees. I use an inch pine cover, one foot square, to each bucket. It is painted red on one side and white on the other. The cover keeps out all filth, rain and snow from the sap, and is a very great aid in gathering. As we turn the covers each time we can see for rods by the color if we have gathered the sap from any bucket.

Sap contains cane-sugar, which varies in amount with the tree. I think the average is about one pound to four gallons of sap. The best syrup—that which has sufficient consistency to please the palate, and yet is not so thick as to crystalize in the cans—weighs eleven pounds to the gallon when hot. We aim to have all our syrup of this exact weight. It takes about thirty-five gallons of sap to make one gallon of such syrup. To make the finest sugar or syrup requires great neatness and dispatch. Any dirt affects the color, and possibly the flavor, and therefore the sap is strained through cloth at least three times. Delay in reducing sap to syrup or sugar affects both color and flavor. I suppose that ozone colors the product, just

as it colors a piece of cut-apple. Thus long exposure is to be avoided. Again, delay, especially if the weather is warm, and if the greatest neatness has not been observed, induces fermentation, which changes the cane-sugar to grape-sugar. This injures both color and flavor decidedly. Could all sap be taken just as it oozes from the tree, and converted quickly into syrup or sugar then, we would always have a product nearly water-white and of the highest flavor. In the syrup there is a variable amount of malate of lime. Often this is almost absent. Sometimes we get a pint in reducing six or seven gallons of syrup. This lime malate often incrusts the bottom of the evaporator, and gives much trouble. I use an evaporator so arranged that the back-pans (all are connected by siphons) can be changed each day, and there is no trouble from these incrustations. In other evaporators, if the bottom of the pan at the very back end be occasionally scraped with a pine paddle the lime is said not to trouble. When the syrup is strained through factory-cloth, much of the lime is removed. The syrup then stands for half an hour, when the lime so settles that but little is left in the liquid, if carefully turned off. This is at once sealed, while hot, in air-tight cans.

We have a very neat house in which to boil the sap. Even the wood house is separate from the boiling room so as to save or prevent dust. The "Champion" evaporator reduces very fast. Mine is twelve feet by four, and will manage the sap for 800 trees. It consists of four separate pans connected by siphons. We run off the syrup once every three hours, about seven gallons at a time, and this rapid work helps to make a very fine article.

Trees vary much in the amount of sap they yield. Sound, vigorous, large, and heavy-topped trees are the best. Seasons differ exceedingly. What we need for sap is a cold night, freezing the ground, followed by a warm, still day. The season that has many such days will be a good one. Sap from different trees varies in sweetness. Sap late in the season is usually sweeter than that which runs earlier. Sap which runs rather slow is richer than when it runs very fast. Trees tapped on the south-west side run fastest early in the season; those on the north-east excel later. The sap is all equally good till the buds start, when the syrup will be rank both in taste and odor. The old idea that the first run was best came from the fact that the buckets then were all neat and clean. It is important to wash out the buckets often with warm water, so as to prevent any possible fermentation.

Agricultural College, Mich.

A. J. Cook.

Notes Upon Some North American Trees.—VIII.

129. *CRATÆGUS TOMENTOSA*, L.—This is one of the best marked and least variable of the North American Thorns. It may be readily distinguished by its large, ovate-elliptical leaves three to four inches long, narrowed at the base into a margined petiole, doubly serrate and sometimes incisedly cut towards the apex, glabrous, dark green and lustrous on the upper, paler and covered with soft pubescence on the lower surface; by the spreading, loose, pubescent corymbs of rather small flowers and by the small oval fruit, rarely more than a third of an inch long and always upright. It may be distinguished from all the varieties of *C. coccinea* by the absence of glands, and by the pale gray bark of the branches, which are generally unarmed. The thorns, when they do occur, are short and stout and of the same color as the branches. This species, with which a variety of *C. coccinea* is often confounded, does not occur in New England, or, so far as I know, anywhere east of the Appalachian Mountains; it is common in western New York, extends through southern Michigan to Missouri, where it is very common, and as far south as east Tennessee and Georgia. It is the latest of all our *Cratægus* to flower, with the exception of *C. cordata*; and the flowers emit an exceedingly disagreeable odor. This species is admirably figured in the "Arboretum Segrezianum," t. 22, under *C. leucocephalus*; and there is a doubtful figure in the "Botanical Register," xxii., 1877, under *C. pyrifolia*. But as these works are not very accessible, Mr. Faxon has drawn the figure, which appears on page 425 of this issue, which may serve to call the attention of botanists to this plant. I shall be glad of information of its geographical range, especially in Pennsylvania and in the states west of the Alleghany Mountains and south of the Ohio River. The specimen in the Linneum herbarium fixes the identity of this species and

settles, so far as concerns the oldest name, its rather complicated synonymy.

The plant which has been sometimes considered a variety of this species (var. *punctata*, Gray, Manual, 2 ed. 124.—Census Cat., 80) is, certainly, quite distinct from it, and one of the best marked and least variable of our species, always readily distinguished by the prominent primary veins of the leaves, and by the large, dull red or bright yellow pendulous fruit covered conspicuously with white dots. This plant is common in Berkshire County, Massachusetts; it extends west to Ontario, and southward along the Alleghany Mountains to the high peaks of North Carolina. The name which has been usually applied to it is that of Jacquin, *C. punctata* (Hort. Vindob., i., 10, t. 28), published in 1770; and this name can be retained, as the *Mesiphus cornifolia* of Munchhausen (Hausv., v., 145) is of the same date.

130. *CRATÆGUS CORDATA*, Aiton.—Walters name, *C. populi-folia* (1788), is taken up in the recent Catalogue of the plants of New York in the place of that of Aiton (1789). The oldest name for this tree, however, is *Mesiphus cordata*, Miller, "Figures of the most beautiful, useful and uncommon plants described in the Gardeners' Dictionary," i., 179 (1760), and "Gardeners' Dictionary," ed. 8, so that the oldest specific name being used it is fortunately possible and proper to retain the familiar *C. cordata*.

133. *CRATÆGUS BERBERIFOLIA*, Torrey and Gray.—This species, published in the "Flora of North America," i., 469, in 1838, had been discovered by Professor Carpenter on the prairies of Opelousas, in western Louisiana. Little was known of it, as the specimens were gathered after the petals had fallen and before the ovaries had grown perceptibly, and nothing more was seen of this plant until the spring of 1880, when I found it in eastern Texas, not very far from the original locality. I visited Opelousas for the third time four years ago, and fortunately met with the tree on the very spot, probably, where Professor Carpenter had discovered it fifty years before. The trees at this time were only in bud, but later, through the kind offices of Dr. Mohr, of Mobile, I obtained copious flowering and fruiting specimens and an abundant supply of seeds, which have been distributed among the principal European gardens.

An examination of this plant both in the field and in the herbarium makes it clear that it must be considered a pubescent form of *Cratægus Crus-galli*.* The Louisiana trees have the habit of *C. Crus-galli*, with the peculiar horizontally spreading branches, making the low, flat-topped head of that species. The bark is identical in the two trees, and I find no characters, except in the pubescence of the young shoots, of the leaves and of the inflorescence to distinguish it from the ordinary broad-leaved form of the Cockspur Thorn. The plant was described as unarmed in the "Flora of North America," but I have, thanks to Dr. Mohr, who purchased Dr. Carpenter's herbarium, one of his original specimens, which has stout, straight spines an inch and three-quarters long; and branches may be found on the same tree covered with thorns, or entirely unarmed. The fruit is ornamental, half an inch in diameter, and orange with scarlet cheeks. This plant grows quite abundantly about four miles west of Opelousas, on ground adjoining the plantation of a Mr. Pierre Pompon Petre. It is found among an open growth of Oaks and Hickories, associated with Hornbeams, Flowering Dogwoods and the Parsley Haw, close to the margin of the prairie, which is here bordered with a most luxuriant growth of the beautiful *C. brachyacantha*. Dr. Mohr sends what is evidently the same plant, collected on Black Creek, west Florida, in 1882, and Mr. Faxon, in 1885, found at Augusta, Georgia, *C. Crus-galli* with pubescent shoots and leaves which cannot be separated from the Louisiana plant. *C. Carrierei*, of which *C. Lavalleyi* is a synonym—a seedling which sprung up in the

garden of the Museum d'Histoire Naturelle, at Paris, is the same as our plant, except in its less developed pubescence.

135. *CRATÆGUS FLAVA*, Ait.—This, according to Karl Koch, is the *Mesiphus flexispina* of Moench (Verzeichniss ausländischer Bäume und Stauden des Lustschlosses Weissenstein bei Cassel, published in 1785). I have not this work before me, but if the reference is correct, the specific name of Moench must replace that of Aiton, which was not published until four years later, and *C. flava* become *C. flexispina*—a change which is less objectionable than many others, as the fruit is never quite yellow, and more often red than yellow-green. *C. S. Sargent.*

Foreign Correspondence.

London Letter.

AUGUST is usually the interval between the summer and autumn crops of roses, while as a rule it is too early for Dahlias and other autumn flowers. But this year, owing, probably, to a fine and warm early summer and an abundance of rain lately, our open air gardens are particularly gay with flowers, and the Royal Horticultural Society's show in mid-August was brighter and more crowded than I remember to have seen it at this season. The hall was lit up with masses of Dahlias, Gladioli, Roses, Carnations, Java Rhododendrons, Begonias, Orchids, a host of border flowers, specimens of hardy and ornamental trees and rich collections of fruits, including a marvellous array of Tomatoes from the Society's gardens. Here was a feast to suit all sorts and conditions of gardeners, but there was but a handful of admirers after all, and all these directly interested. The real flower lovers are those who have the best and most richly stocked gardens, and go to exhibitions only to see for themselves what is new and good.

There was an unusually large number of novelties at the meeting, and amongst them were some first-rate plants, and I was glad to see the new *Vanda Kimballiana*, shown splendidly by Sir Trevor Lawrence and Messrs. Low. It is, without question, a lovely Orchid, and a valuable addition to the small number that flower in late summer. The plants exhibited differed somewhat from those I saw before, the sepals being almost pure white, while the trilobed labellum was of a vivid crimson purple. The flower reminds me much of the pretty *V. Hookeriana*, being similar in size and form. Some of the specimens shown bore as many as seven flowers and buds. I hope it will prove a good grower, but the rounded quill-like leaves do not indicate robust growth. It was, of course, honored with a first-class certificate, as was also a new Cypripedium from Baron Schroeder's collection. This was *C. orphanum*, supposed to be a cross between *C. Drurii* and *C. barbatum*. It is handsome, but much resembles several other hybrids, *C. Harrisonum superbum*, for instance. It is one of the finest of its class, and will delight specialists in Cypripedia. A far finer hybrid is that named *C. Stoneo-superbiens*, indicating a cross between these two species. It so nearly resembles the beautiful hybrid named after the late Mrs. Morgan that it was re-labeled *C. Morgania*. The parentage of both hybrids is the same, and there might be, perhaps, some slight variation in form and color. It is the nearest approach among hybrid Cypripeds to the unique *C. Stonei platytanum*, and some look upon it as really handsomer, and certainly it is more free in growth and flower. The long, broad and drooping lateral sepals, richly spotted with black on a pale ground, gives distinction to the hybrid, while the rest of the flower partakes of the features of *C. Stonei*.

A great treat for Orchidists was a specimen of the grandest of all Cattleyas, *C. Hardyana*, which, when first exhibited, was supposed to be a natural cross between *C. gigas* and *C. Dowiana aurea*, but probably it is only an extraordinarily fine variety of *C. gigas*, or, as it is now called, *C. labiata Warscewiczii*. The flowers are as large and as fine in form as any variety of *C. gigas*; the sepals and petals are a very rich and bright rose-purple, while the broad labellum is of an intense crimson magenta, and adorned with two large blotches of bright yellow, and netted with the same color. This grand Orchid is still very rare, and probably does not yet exist in American collections. It is said to have cropped up, in a few instances, from gatherings of imported plants of *C. gigas*.

Among the other choice Orchids shown was a fine example of the blue *Saccolabium caeleste*, a small-growing species with short, dense spikes of exquisite little flowers, violet-blue and white; *Lælia monophylla*, of the size of *Sophranitis grandiflora*,

* *CRATÆGUS CRUS-GALLI*, var. *berberifolia*, arbor mediocris, ramulis horizontalibus, hornotinis pubescentibus, foliis oblonge cuneato-obovalibus, superne serratis subtus dense pubescentibus, 2-poll-longis; corymbis dense hirsutis.

and with similar flowers of a brilliant orange-scarlet, and the rare little *Oncidium triquetrum*, with modest little flowers of no great beauty. The Marquis of Salisbury's gardener contributed about a dozen spikes of *Saccolabium Blumei*, from eighteen inches to two feet in length, with glorious wreaths of tiny blossoms of lovely color and form and delicious fragrance. On seeing such Orchids as these one can understand how captivating they are to the public, who value flowers for what they are, and not for their rarity or money value.

so tasselled at the points as to make it quite different from the well-known old favorite. It received a first-class certificate, and it well deserved it.

Among the large number of florists' flowers, only those of superlative merit received awards. Most interest centred in a splendid collection of new Gladioli of M. Lemoine's raising, and shown by Messrs. Veitch. In addition to the hybrids raised by intercrossing *G. purpureo-auratus* and *G. Gandavensis*, M. Lemoine has now some crosses from *G. Saundersii*, a Cape



Fig. 126.—*Crataegus tomentosa*.—See page 423.

An extremely handsome new Pitcher plant named *Nepenthes Curtisii superba* was shown by Messrs. Veitch, who won for it a first-class certificate. The pitchers are of bold yet elegant shape, with a broadly recurved, grooved rim of dark crimson, the rest of the pitcher being of the same color, copiously marked with irregular blotches of very pale green. Some of the pitchers measured nine inches long, and the plant is a vigorous grower. A good market Fern will probably be found in the new *Pteris tremula Smithiana*, which has every frond

species, having large flowers, with hooded sepals of a bright scarlet. It is as hardy as *G. purpureo-auratus*, and, therefore, was well calculated to yield progeny possessing vigor of growth and hardiness. These Saundersii hybrids he has named *G. Nanceianus*, and two sorts were considered worthy of awards of merit. One was called President Carnot, with flowers four and a half inches across, and of a bright scarlet-red, the other, Comte Horace de Choiseul, with crimson flowers, freckled with white. Both are superb varieties, and will

certainly become popular. Of the other class of hybrids (those from *G. purpureo-auratus*) there were numerous sorts shown, three of which, named André Chenier, Alsace and La France, were distinguished by awards, while another, shown by its English raiser, and named Hippolyta, was also voted an award of merit. It has large and perfectly-shaped flowers of lemon-yellow, blotched with maroon-crimson. The growth is vigorous, and the spike long and massive. Next in interest were the double Begonias of Messrs. Cannell, who showed a really wonderful group of seedling plants, all raised from seed in February of the present year. The remarkable point about these seedlings was the very large size of the blooms, which looked more like double Hollyhocks than Begonias, so perfect were the rosetted blooms. Some may think they are too big, and perhaps so, to be really beautiful, but the amateur is always asking for larger and larger blooms, and so the business of the florist is to produce them. The colors of these new double flowers are exquisite, soft, yet brilliant, and one could trace almost every intermediate gradation of tint from a rich deep crimson through the palest of pinks to snow-white. The sorts to which awards of merit were given were named Litkie, pale salmon-pink; A. Blanc, rich cherry-crimson; Mrs. Cayzer, bright rose. Though only three won distinction, there were others equally fine, but the committee do not like to be too liberal with awards.

The Java Rhododendrons of Messrs. Veitch are always admired, and, now the firm whose peculiar specialty these greenhouse shrubs are, have taken to show cut blooms in boxes like Roses, so numerous have the sorts become. It is not often now that anything special is obtained in the way of color, but on this occasion they showed one, called Duchess of Fife, of a singular color—pink-cream, I heard it described—while the large blooms were perfect in form as well as large in truss. This race of greenhouse plants is becoming extremely popular now, as they do not require much heat to grow them to perfection, while they yield flowers almost throughout the year, in winter especially.

There was a first-rate new Chrysanthemum called Golden Shah, which the experts on the committee considered worthy of an award, as it is said to be finer than any other yellow early-flowering sort. It is dwarf, perfect in bloom, and in color bright and good. The crowds of new Dahlias exhibited sufficiently proves that the demand for them is as great as ever. I will not attempt to describe even those that struck me by the distinct colors or other novel point. Only two were certificated, as the committee are very careful now in dealing out awards to new Dahlias. Both were single, one, called James Scobie, is warm yellow, with a centre zone of crimson—a distinct break in color; the other is yellow, flaked and pencilled with scarlet. Single Dahlias seem to have had their day of popularity, the rage now being for Cactus-flowered sorts of the Juarezii type, and here were to be seen from such great growers as Ware and Cheal some beautiful sorts in color different to any shown before. Those I made special note of were Panthea, Charming Bride, Zulu, Empress of India, all first-rate. But we shall see Dahlias better later, when other things are less engaging. A firm of market-growers, Messrs. Hawkins & Bennett, think they have obtained the perfection of a double scarlet Pelargonium for the market-grower. This they call the Duke of Fife, with massive truss of brilliant scarlet and very double, and, lest it should be thought that it too much resembles that well-known and first-rate sort, F. V. Raspail, they showed some blooms of the latter for comparison. The Committee believed in it, too, for they voted an award of merit.

London.

W. Goldring.

Cultural Department.

A Few Late Pears.

THE Abbott is a good pear for family use, though not much grown. It is a little smaller than the Bartlett in size, with a nice blush on the sunny side, and people who dislike the musk of the Bartlett would prefer the Abbott. The tree is a strong grower and yields well. Its merits have been overlooked.

Belle Lucrative is a pear of medium size and excellent quality when well-grown. It is an abundant bearer, and, if allowed to do so, will over-bear, to the detriment of the fruit, both in size and quality. The skin of the fruit is an unattractive green, and for this reason, among better-looking pears, it is apt to be passed without notice, but its buttery, juicy flesh amply compensates for any lack of good looks.

Golden Beurre is of medium size, and in appearance directly the opposite of the preceding, while approaching it in quality.

It is an abundant biennial bearer, but, for some reason, has not achieved great popularity.

Flemish Beauty is another large and exceedingly delicious pear, and of almost honeyed sweetness at its best, but it cracks and spots so badly over a large extent of territory, that it is absolutely worthless except in limited areas.

The White Doyenne or Virgalieu, with a dozen other names as synonyms, used to be the standard of excellence of the whole pear family, and would be to-day if it could be grown as well generally as it was forty years ago. At that time it was the pear of pears in the farmers' estimation in this part of New Jersey (but this was before the advent of the Bartlett or Williams' Bonchrétien, as it was sometimes called), but it also became subject to spotting and cracking, and is now so absolutely worthless that it is seldom seen, and is unknown to most of our younger people.

Howell, a large, handsome, light yellow pear, a good grower and bearer, is highly esteemed by many, but I never considered it quite good enough for a standard dessert fruit.

Louise Bonne de Jersey, where it succeeds, is a noble fruit, of buttery texture and juicy, but in this section it is gritty, astringent, and only fitted for cooking purposes. Of late years it has developed the fault of shedding its leaves so early that the fruit is seldom more than two-thirds grown, so that it is difficult to imagine that it could ever attain the degree of excellence which it reaches when grown in perfection.

Angouleme, or Duchess, as it is popularly known, is of the largest size and best quality, if well-grown; if not, it is just the reverse. The larger the specimen, generally, the better it is. The flesh is coarse-grained, but juicy, sweet and delicious; one of the most popular pears grown, after the Bartlett, and more largely grown as a dwarf on Quince-root than any other. It must have congenial soil, however, and high culture. On my soil, as a dwarf, it is like other dwarfs, of little account. It is said to prove satisfactory as a standard, but I have no experience with it as such. There are few advocates of dwarf-Pear culture left. The few successful orchards of dwarf-trees, are those which have rooted from the graft, and have become standards in fact.

Anjou is another large, popular pear of very good quality, when in perfection, and it will keep till November and December in good condition, if properly cared for. The tree is one of the best in health, foliage and growth, and should be in the smallest collection. This was Colonel Wilders' favorite.

Buffum, a pear of medium size and fair quality, is one of the most healthy, vigorous growers in the whole list, and an abundant bearer every other year. Sometimes the fruit is rather under-sized from over-bearing, a tendency in all pears, and some years, too, it is less juicy than others. It is then excellent for cooking. With approaching ripeness it assumes a yellow and handsome appearance.

Bosc is a long, slender-necked russet pear of the highest excellence, sweet and rich. The tree is a poor, open grower while young, and the fruit is borne singly or in pairs generally, and very evenly distributed. It is most satisfactory when top-grafted. This was Mr. Downing's favorite pear, and his judgment on this point seems to me eminently sound.

Claireau is a pear of the largest size, handsome and good, when in perfection. The tree is a fair grower and an early and abundant bearer, but it is liable to shed its leaves prematurely. When the foliage is held till October, and the fruit is fully matured, it ripens up handsomely, and the quality, to my taste, is much superior to that of the best Bartlett. This spotting and premature fall of our Pear-leaves is a more serious trouble with me than the fire-blight. The latter kills, and leaves no doubt as to the course to pursue, while the former leads on hopefully to certain disappointment in the end.

Sheldon, a round, russet pear of medium to large size, flesh granular, melting, sweet, juicy and aromatic, is a fruit of the highest excellence. The tree is a lusty grower and generally productive. It should be in the smallest collection.

Seckel is too well known to need description. The tree grows moderately slow, bearing its fruit in clusters, which should be thinned to single specimens, if possible. Its small size is its only fault.

Onondaga is a large, greenish-yellow pear of excellent quality. Tree vigorous and productive.

Lawrence is an American pear of great excellence. The tree is of moderate growth, very healthy and productive; the fruit of medium size, smooth, yellow at maturity when grown on young trees, but on old trees it is very apt to become cloudy or rusty. The skin is thick, flesh fine grained, buttery, sweet and juicy, and it will keep till Christmas with ordinary care, and, on the whole, is the nearest approach to a good winter pear I am acquainted with. The tree holds its foliage

with great persistency—a very valuable feature in any tree.

Winter Nelis is a small russet pear of excellent quality when well grown, but the tree generally loses its foliage early before the pears mature, and, therefore, they seldom reach perfection. The tree is a slow, slender grower, and should be top grafted on some more vigorous kind.

Dana's Hovey is among winter pears what the Seckel is among autumn varieties. The tree is a good, healthy grower, and produces fruit about the size of the Seckel, but better and more highly flavored. If it were only a little larger!

Sweetness is a prominent characteristic of most of the pears so far named. In Superfin we have an acid pear of large size, green at maturity, but sometimes ripening up a bright yellow. In the latter case the acidity generally be-

Urbaniste is another large pear, in quality equal to any named; skin, smooth, greenish-yellow; flesh, melting, buttery, rich and juicy. The tree is a fair grower, but is not popular among dealers and planters because, like the Tyson and some others, it is tardy in coming into fruit. The old adage about planting pears for one's heirs is not regarded with favor by tree-planters now-a-days; they are in a hurry, and would like the trees to commence bearing at once. When one has old trees of undesirable kinds, a new head of Urbaniste could be grafted on and this excellent variety would soon come into fruit.

I have grown many other pears, but the list is long enough to meet the wants of an amateur. I have mentioned only the leading and most popular varieties now before the public,



Poet's Narcissus flowering in the grass.—See page 421.

comes much modified and assumes a rich, vinous flavor that can hardly fail to please any palate not wholly partial to sweetness. Seasons and soils have much to do with the full and thorough development of this pear more so, perhaps, than any other. I have eaten it when I could desire nothing better, and again when it was disagreeably sour. Stewed or canned it is excellent, and needs no lemon or other flavoring as do the Bartlett's and other sweet kinds. The tree is a good, thrifty grower and a fair bearer.

Diel is another acid pear of large size and very good quality when in perfection. The flesh is more coarse, and sometimes gritty and less acid than the preceding. The tree grows well and bears well. But the fruit sometimes cracks and the leaves fall prematurely, and we cannot expect trees that do not hold their foliage till the fruit is mature to produce that fruit in perfection.

trees of which can be easily obtained. One who has a longing for the pears of his childhood had better get cions or buds and insert them in stock more easily obtainable.

And what about the Kieffer? Well, if one wants a handsome, strong-growing tree, and an abundant cropper of fruit for canning purposes, the Kieffer just meets his case, but as a table fruit it does not deserve planting. It is a valuable substitute for the quince, and, as it will produce fruit far more abundantly and cheaply, it is well worth planting for its excellence in taste and appearance when preserved.

A few trees on the smallest place can be made in a short time to supply a family with a great variety in sufficient quantity for all purposes, by making one tree yield several kinds of those least required. A little judgment in this direction would secure a greater variety, covering the season more effectually, and avoiding a useless and wasteful surplus of a single

variety, which is apt to occur when a tree gets into full bearing.

The pear is the easiest of all our fruit trees to graft successfully, and the merest tyro need not fail in so simple an operation.

Montclair.

E. Williams.

The Wild Garden in August.

SEVERAL clumps of *Clethra* in my wild garden fill the air with their delicious fragrance, and *Clematis Virginiana* is one mass of bloom. A tall, cedar post was set in the ground, and crooked, gnarled Grape-vine stems were nailed to it, which makes a support for its leafstalks, where they can clasp and climb in all directions. Long, pendulous branches are drooping from every side, loaded with white blossoms, which attract numerous butterflies and other honey-loving insects.

A very showy Sunflower has been in blossom since the middle of June. I found it on an island on the New Jersey coast, some four or five years ago, where it attracted my attention with its wonderful amount of bloom. I have called it a form of *Helianthus latiflorus*. But June is early for this or any other Sunflower to blossom. Its leaves are quite thin and smooth, not at all like the normal *H. latiflorus*. It is now full of flowers, and will continue so until frost, and when I look at this beautiful plant I am not surprised that so many persons favor its adoption as the national flower. The Narrow-leaved, Pine-barren Sunflower (*H. angustifolius*) is just coming into bloom. This is also a pretty species; but to do well it must be grown in a damp spot, which can be easily secured in any desirable place in the garden by sinking a tub in the ground and filling it with good soil and keeping it moist. My plan is to get oil-barrels and saw them through the middle, thus securing two good receptacles from one barrel. After they are sawed I set fire to the inside and burn out the oil and slightly char them, which makes them last an indefinite time. Groups of many of our most charming swamp-plants can be grown in these tubs as easily as a Morning Glory at our window.

One of the most remarkable plants in my collection is a *Rudbeckia*. At the base of each ray is a dark-brown spot, making the flower very handsome. It was brought to me in a bouquet this summer, and the young lady collector, having excellent observing powers, could tell exactly where it grew. On going to the spot we found the plant held several flowers, all marked in the same way, so we carefully removed it and planted it in one of the tubs in the garden, where it continued in bloom a long time, attracting much attention. It grew in a swamp, and has undivided leaves and a dark-purplish disk, but, according to Gray, this division of *Rudbeckia* ought to grow on dry soil.

The white and yellow fringed Orchids (*Habenaria blephariglotis* and *H. ciliaris* and *H. cristata*) are very beautiful through July and August. What is more attractive than a group of these plants in a half-shady nook, surrounded by low, cool-looking Ferns? This use of the sunken tub enables us to grow them in any desirable spot.

One of the most stately groups in my garden, among these wild swamp-plants, is of sedge (*Scirpus Eriophorum*). It is five feet in height, and each stem is surmounted with a large, graceful, drooping, umbel-like panicle of flowers. This sedge is lovely from April—when it first begins to throw out its long, rather broad, grass-like leaves—until November, when it is crowned with its persistent, drooping panicles of fruit.

The Arrow-head (*Sagittaria*) and Pickerel-weed (*Pontederia*) are among the bog-plants now in bloom. So is the bright orange-colored *Polygala lutea*, which flowers all summer. This species is the most showy of the Polygalas, and deserves a place in every garden.

Among upland plants the Eupatoriums are now quite showy with white and purple bloom. The Butterfly-weed (*Asclepias tuberosa*) is still brilliant with orange-red flowers, attracting hosts of butterflies. Many wild plants not in flower are lovely now in their mature foliage. The Sumachs are specially fine. The Stag-horn Sumach (*Rhus typhina*) was stripped of its flowers in June by the almost omnivorous Rose-bug, but I never saw its foliage more beautiful than now, while the Dwarf Sumach (*R. copallina*) is strikingly handsome, with perfect, smooth, shining leaves.

The blossoms of the Holly met the fate of the Stag-horn Sumach, but the prickly leaves were left intact, and their shining verdure will be a joy during the winter. The Bayberry and Sweet Fern are still handsome with perfect, fragrant leaves, which one cannot help noticing in this season of unusual insect-devastation.

The smooth Alder (*Alnus serrulata*) and *A. maritima* are both handsome shrubs which grow finely in my garden, and the

latter makes a small tree from eighteen to twenty feet in height. Their smooth, straight-veined leaves are as handsome as those of the Beech, which tree, to my regret, does not succeed in our soil, so the next best thing are these Alders, which grow luxuriantly and are attractive, even in winter, with their clean-looking bark and clusters of small, persistent, cone-like fruit.

Vineland, N. J.

Mary Treat.

The Ismenes.

ISMENE is now considered to be simply a sub-genus of *Hymenocallis* of the *Amaryllis* family. It differs, however, from the rest of the genus to such a degree that the old name is likely to stand for a long time among horticulturists. It is very desirable that plants should be known by their right names, for correct nomenclature is necessary to intelligent gardening, therefore, though the name of the sub-genus heads this article, I shall call the species by their proper generic title. Counting *H. deflexa*, there are seven species. Of three of these I write from experience.

All of the *Hymenocallis* have a central cup surrounded by six radiating segments, the cup in sub-genus *Ismene* being very much larger proportionally than in the rest of the genus. All of the species are natives of the Andean chain, from Ecuador to Bolivia.

H. Macleana is a very pretty species. Its flowers are of a decided green color, and give the species a distinctness which is very satisfactory to those who prize individual character in plants as well as general effect. The flower-stalks are about twenty inches tall, and bear frequently as many as ten flowers, the average being about six. As in the other species, these do not all open together, but at intervals of a day or two, so that the same cluster often presents fresh flowers for nearly two weeks. This species increases very rapidly by offsets. Last autumn I selected twenty strong bulbs and stored them in a cellar where the temperature averaged 42°, falling occasionally to 38°. Dahlias and Gladioli, stored in the same cellar, are now doing well, but the bulbs in question, planted on the same day with the bulk of my stock, wintered under a green-house bench, were fully ten days later in coming up; not one bloomed, and they now present a stunted and feeble appearance. I conclude, therefore, that cool wintering is not at all to their taste. I have never been able to get good seed from this species, which is the *Ismene undulata* of catalogues.

H. calathina is a much larger plant than the foregoing in all its parts. In the whole range of summer-flowering bulbs I do not know a more noble and stately one. The large cup is white, a little marked with green; the flowers are nearly as numerous in the cluster as in *H. Macleana* and last as long; their perfume is very pleasing to most persons, though a little too strong if brought into a close room. The foliage is so green, vigorous and erect that a row or cluster of the plants is very beautiful even after the flowers are gone. By careful fertilization seeds may be obtained, which are of the peculiar bulb-like nature observable in those of *Nerine*, *Brunsvigia* and *Amaryllis Belladonna*. They are of the color of a pea a little too old to cook, and of very different sizes, the largest being the size of a sparrow's egg. They are best sown on the surface of a pot of earth without any covering. In a short time a shoot is sent out which turns down into the earth and presently sends up the young foliage. June is the flowering time of both these kinds.

H. Amancaes is also a remarkably beautiful species, its broad flowers being of a strong deep yellow, somewhat striped with green, and very fragrant. It is a rare bulb, rated at a high price in catalogues, and usually not to be had if ordered. With me it is late to start and late to bloom. At the present time, August 10th, it is less than a foot high and shows no sign of a flower-stalk. The seeds of this species often make no growth above ground, but form a bulb as large as a swallow's egg, with no foliage at all until the second year. A lemon-colored hybrid has been produced by crossing this with *Calathina*. The "Botanical Register" contains an animated account of the annual fiesta in Lima, when great throngs of people, on foot or horseback, go out upon the hill of Amancaes to gather the blossoms of this bulb and spend the day in amusements.

H. Quitoensis, *H. Andreana*, *H. deflexa* and *H. nutans* are known to me only by figures and descriptions. They are all white-and-green-flowered, and not much unlike *Macleana* in general appearance. *H. deflexa* is ranked as a species by Mr. Baker, though it is a natural hybrid; Colonel Trevor Clarke has produced it by crossing *H. calathina* and *Elisena longipetala*.

Canton, Mass.

W. E. Endicott.

Lemoine's Hybrid Gladioli.—With the early and brilliant Brenchley's Gladiolus, this new race comes into bloom. The value and beauty of these Gladioli cannot possibly be overrated, and the more I see of them the more I am convinced that they will in time usurp the place long occupied by the more delicate varieties of the Gandavensis race, which few can grow well. Lemoine's are hardier and more robust in growth, and though they have not at present that massiveness of spike which characterizes the best of the Gandavensis hybrids, they rival them in diversity and richness of color. This race owes its hardiness chiefly to its parent, *G. purpureo-auratus*, which is quite a hardy bulb with us, growing strongly and propagating itself with singular freedom. The other parent was one of the Gandavensis race, but now, as elsewhere stated, M. Lemoine has hybridized with *G. Saundersi*, which is another hardy species, with large, brilliantly-colored flowers. I have just seen a collection of the newest hybrids, and out of two dozen the following were in perfection of bloom and extremely fine: Sphinx, deep crimson, with lower petals blotched with velvety maroon; Lamartine, flowers very large, cerise crimson petals, with white blotches on lower petals; Boussingault, pale pink petals, flaked with crimson, lower petals half bright canary-yellow, and half blackish-crimson, a very striking sort; Deleuil's Zélie, mauve pink, lower petals, blotched with white; Gainod, like Zélie, but larger; Enfant de Nancy, very rich and deep crimson, lower petals maroon. Other sorts not past their best were Mars and W. E. Gumbleton, both choice kinds. All these have flower-stems ranging from two and a half feet to four feet high, the spikes carrying from ten to fifteen flowers. All have the characteristic hood-like flowers of *G. purpureo-auratus* and *G. Saundersi*, but this peculiarity is not so marked in the later as in the earlier hybrids, and no doubt M. Lemoine will in time produce varieties with flowers as large and open, and as dense on the spike, as the best of the Gandavensis race, which now they quite eclipse in point of color.

W. G.
Kew.

Perennial Coreopsis.—These are among the best of hardy garden flowers as they require very little attention, reproduce themselves freely from self-sown seeds, and make a brilliant display from June until frost sets in. *C. lanceolata* has become in a comparatively short time one of the best known of the genus, and certainly no hardy plant produces more flowers throughout the season. Its large, bright-yellow flowers are of good substance, and stand well when cut. *C. grandiflora*, from the mountains of North Carolina, is equally good in all respects. The flowers are a trifle darker in color, more stellate, and the plant itself has a spreading habit. As soon as it begins to grow, *C. grandiflora* also begins to branch, so that, by the time the flowering period is reached, the smallest plant has become a dense bush some two feet in diameter. This plant deserves to become as popular as *C. lanceolata*. *C. verticillata* is a pretty species, with whorls of very narrow leaves, quite distinct from the preceding. *C. verticillata* is very floriferous, and a desirable plant. *C. delphinifolia* is a taller growing plant, well grown plants being often three or four feet high. The foliage, as the name implies, resembles that of the Larkspurs. The flowers are produced from the tops of the stems, and are quite showy, though not so large as those of the other species. *C. tripteris* grows from six to eight feet in height, and is suitable for the back row of the flower border, or for planting in shrubberies. The stems are clothed with elegant three-parted leaves, and just now the stems are surmounted by a branched panicle of very fragrant yellow flowers, the fragrance resembling that of the old English Wallflower. This plant may be effectively associated with Silphiums, *Helianthus orgyalis* and *Rudbeckia maxima*, all of which are of about equal height. All the above species of Coreopsis are perfectly hardy and perennial, and they would probably be far better known, were they exotic, and less easy to cultivate.

Lobelia splendens var. Victoria is a plant that has often been catalogued and sent out as a variety of the Cardinal Flower, *L. cardinalis*, with which, however, it has no specific affinity. It is a variety selected from the Mexican plant *L. splendens*, and, it may be added, that as a decorative herbaceous perennial it has no rival, the dark, purplish, crimson foliage resembling in color the Iresines so much used for bedding purposes. The flowers are similar in color to those of *L. cardinalis*, but they are three times the size. For fall effect there are few plants to equal this Lobelia, especially when planted in masses, or associated with some plant of variegated foliage. I once saw a large circular bed of this Lobelia intermingled with the variegated *Abutilon Thompsoni*, and the effect was charming. The hardiness of the Victoria Lobelia is not sufficient

to warrant its being left in the open ground in the eastern states. The crowns need lifting, and require protection from severe frost during winter. In spring these may be divided and replanted in the position they are to occupy during summer. Any one obtaining this plant as a variety of *L. cardinalis* would be led to suppose that it required a moist soil and situation, while, as a matter of fact, this would be extremely injurious. *L. splendens* needs a rich dry soil. The variety in question comes fairly true from seed, but its germination is somewhat erratic. We have found that plants may be looked for anywhere between six weeks after sowing and the end of the succeeding eighteen months.

E. O. Orpet.

Passaic, N. J.

Odontoglossum Schlieperianum.—This Orchid should find a place in every collection on account of the beauty and size of its flowers. Its nearest affinities are *O. grande* and *O. Insleayi*, to the latter of which Dr. Lindley considered it to be so closely related that he gave it the varietal name of *macranthum*, because the flowers were much larger than in that species. *O. Schlieperianum* has dull-green, ovoid, compressed pseudo-bulbs, each bearing two broadly lanceolate leaves, about five or six inches long. The flowers are usually borne in June on strong, sub-erect scapes; the oblong-ligulate sepals are of a bright lemon-yellow, covered with transverse blotches of reddish-brown, except at the slightly recurved tips; the petals, which are broader, and somewhat abruptly narrowed at the base, are of the same color as the sepals, but have a few reddish-brown blotches on the lower portion only. The oblong-ovate, emarginate lip is pale-yellow with chocolate bars at the base, while the conspicuous bright-yellow crests are spotted with crimson. Like most *Odontoglossums*, this species requires to be potted in a compost of peat and sphagnum moss, and should be placed in a rather warm corner of the house, as it is a native of Costa Rica. Water may be freely given during the growing season, which takes place after flowering, but must be greatly diminished during the winter months, when the plants are at rest.

The earliest notice of this plant appears to be in 1856, when it was sold in Covent Garden, London, with other Orchids from Central America. It flowered for the first time in Europe in the collection of Herr Schlieper, of Elberfeld, Germany, in honor of whom it was named.

Vanda teres.—For the last three weeks several plants of this species have been flowering one after another in quick succession, and the beauty of their flowers and peculiar appearance present an aspect quite distinct from other members of the Orchid family. With the exception of the beautiful *Vanda Hookeriana* and *V. teres*, most plants of this genus have distichous, strap-shaped leaves, some being very long, and others very short in proportion. *V. teres* has quill-shaped stems and leaves of a dark-green color, and a climbing habit. Two flowers are generally borne on a short raceme springing from the side of the stem opposite the leaves. The sepals are oblong-obtuse, the upper being generally erect and nearly at right angles to the roundly-ovate petals. Both sepals and petals are creamy white, tinged with pink or magenta, which color is usually much more intense on the petals than on the sepals. The lateral lobes of the handsomely-colored lip are folded over the column in the shape of a helmet; the middle lobe is spreading in front, where it is cut into two obovate divisions, and in connection with the two side-lobes forms a large conical spur at the base. The throat is orange-yellow, with radiating lines of crimson spots on each side, while the surface of the middle lobe is beautifully veined and washed with rosy magenta. There are several varieties of this species, which can only be distinguished by the color of the flowers.

It is not very difficult to grow *V. teres* successfully, provided that it be grown in a house with a warm and moist atmosphere, in a position exposed as much as possible to the rays of the sun. Here the plants are grown in a compost of peat and loam, with silver sand mixed, and all planted out close to the glass. During this warm weather they are syringed several times during the day, and receive a liberal supply of water at the roots also. Very little shading is given except when very hot. The plants may also be grown on blocks of wood with equal success, and placed in a pot three parts filled with charcoal, and covered with a layer of sphagnum moss, receiving abundance of water during the summer months, but much less in the winter, when the temperature for this species should be about 65°–70° Fahr. during the day, and from five to eight degrees lower at night.

Dr. Wallich introduced this Vanda from Burmah in 1826, but it is not, however, confined to this region, having been

sequently found in Khasya, Sylhet, and other parts of India, where it has been nearly always found growing on branches of trees exposed to the sun's rays. About ten years from this date it flowered for the first time in England in the collection of the Duke of Northumberland, at Lyon House, opposite the Royal Gardens, Kew, from which this place is divided by the river Thames. Now that the requirements of this species are better understood it is becoming much more popular than in former years, and a specimen of it will now be found in nearly every collection.

St. Albans, England.

John Weathers.

Correspondence.

An Interesting Wildwood.

To the Editor of GARDEN AND FOREST:

Sir.—Overlooking part of Lake Superior, the Nemadji Valley, the Bay of St. Louis, Fond du Lac and the Dalles of the St. Louis, from the north, are prominent and breezy terraced bluffs (some five hundred feet high), mantled with dense groves of Sugar Maple and Yellow Birch, with an occasional giant White Pine. From deep fissures in trap, gabbro and granite many little streams of cold, clear water trickle and tumble over mossy rocks, shaded by Vine Maple, Thimbleberry, Alder, Birch and Arbor Vitæ, through deep glens and park-like openings to the river and bay.

Shady groves on natural terraces, deep, clear pools with darting trout, or extensive views and fresh lake breezes are here at option within a few minutes ride of Duluth, a city notably barren of trees and shade.

This could have been said twenty years ago.

To-day, though not destroyed, this remarkably attractive strip of wildwood is marred. Pine and other timber have been cut; fires are killing bushes, uncovering streams to the sun, warming them and making them impure, while dead and blackened trees are standing as monuments of the past and warnings for the future.

During July and August of this year I have learned to value this varied wildness, because it has no equal short of the great mountain chains or some rocky sea coast, and because a quarter of a dollar car-fare and a short walk and scramble will furnish any one a lift out of and above the ruts of life.

Speculators have bought some acres in this region, seeing value in them for parks and pleasure-grounds. On one of these tracts recent cutting was noticed, with Pine-tops and broken hard-wood lying so thick as to kill most, if not all, the Birches and Sugar Maples left if fire should get in. Inquiry developed the fact that the owner, a speculator of Duluth, was holding the land for country residences and a park, yet he permitted a contractor who wanted piling to go there and cut as suited him, leaving the tract with anything but a pleasing appearance, and in great danger of being made worthless by fire.

The lesson I would draw from this is, that, while it may be for the best interest of holders of beautiful woodlands to keep them as woods, they are often unable to keep them, while many do not know how to keep them if they would. Yet the people should not loose the privilege of the woods, nor have to pay too much for the privilege. If men with capital to buy such tracts, and the knowledge to improve them, do not appear, then it is the duty of the men chosen by the people to look out for their interests to see that the benefit of such restful resorts are not lost.

Duluth, Minn.

H. B. A.

Trees Which Shade Dwellings.

To the Editor of GARDEN AND FOREST:

Sir.—How near a country-house is it safe and desirable to have Elm trees growing? I have recently purchased a house, the front piazza-steps of which are flanked on either side by a noble Elm about fifty feet high. Both trees have branches overhanging the house, and although it is situated on high ground, and in a location not exposed to dampness, still there is cause for much complaint on that score, and I am inclined to ascribe it to the proximity of the trees. I may add that both trees are sorely afflicted with the Elm-beetle. As a result the lawn is littered with dead leaves, and the Elms are, to all appearances, dead in midsummer. I saw the remedy for this beetle in GARDEN AND FOREST for June 19th, too late to profit by it this season. Being reluctant to cut down two such beautiful trees, even under the above provocation, I respectfully ask your advice.

Yonkers, N. Y.

H.

[Trees standing near a house, and especially on its

south side, may obstruct the light and check the breeze to an unpleasant and, perhaps, an unwholesome degree, and the lack of sunshine and ventilation would naturally aggravate any tendency to dampness in the house. The evil effects of trees in this respect are often exaggerated. This summer has been exceptionally humid, and even unshaded houses have been "damp." The Elm is usually a tree of open habit, so that it would offer, as a rule, comparatively little obstruction to ventilation. If the trees in question have been defoliated by the beetle they can do little harm this year. But, after all, no positive counsel in a particular case can be given until the premises are examined. If the trees are well placed, so far as the appearance of the "house-scene" is concerned, we should allow them to remain another year at least.—Ed.]

The Asparagus Beetle.

To the Editor of GARDEN AND FOREST:

Sir.—I observe that you recommend arsenites for destroying this pest, but Paris green has failed with me to check the beetle. I planted this year 3,000 roots, imported from Erfurt, and the beetle has made havoc with the plants in spite of lime, sulphur and other remedies. When Paris green was prepared for spraying the Potatoes I directed my men to spray half a dozen rows of the Asparagus plantation. A strong solution was used, and I expected to see both plants and beetles destroyed; but the plants were uninjured, and beetles and larvæ seemed to be enjoying the best of health.

My children have picked 500 to 600 beetles two or three times a week the whole season through, but the enemy is still here, though I think less numerous.

New Rochelle.

W. K.

[There is the difficulty of making arsenites adhere. We tried London purple this spring in a very fine spray, but most of it dropped off and very little poison remained. Where it did stick, it killed larvæ and beetles both. The best way of applying Paris green is to dust it on mixed with plaster or some other vehicle. The work should be done while the plants are wet with dew in the morning. Asparagus is hardy, and there need be little fear that the arsenic will burn it. Contact-killing powders destroy the larvæ or slugs, which, after all, do most of the damage and provide for future beetles. Pyrethrum acts very quickly when put on with a bellows, making a cloud of fine dust—but it is expensive; White Hellebore is good, but it acts more slowly and less certainly; Tobacco powders act rapidly and certainly, and a cloud of Tobacco dust blown over the plants once a week ought to be useful. It will kill nine out of every ten larvæ on the plants and will drive away all the beetles; the latter will return and lay more eggs, but the enemy can be held in check. The beetles may very easily have been imported with the roots for our correspondent's plantation. The larva pupates in the ground by the roots, and the beetles often creep in there to hibernate.—Ed.]

Recent Publications.

Japoneries d'Automne, by Pierre Loti. Paris: Calman Lévy. 1889.

Nothing is more difficult than to conjure up in words a vivid picture of unfamiliar lands. It can be done by no mere accumulation of facts general and particular, of statistics comprehensive and minute, of features great and small, of prosaic impressions abiding or transitory. How many big, instructive books we have had about Japan, and how little we know how the land would appear to us should we go there. Every traveler tells the same tale: he starts out equipped with what he thinks an exhaustive knowledge of the country, lands in a spot as strikingly unfamiliar as though he had never heard its name, and the longer he stays grows the more bewildered and surprised. Then he comes home and writes a book which shall really open in advance the eyes and minds of his successors; and then they follow in his track with an experience just the same as his.

But all this is because most men are *prosateurs* by nature, and merely reveal the fact more plainly when they set their pens to work. If they are intelligent, they learn facts wherever they go; if they are stupid, they think they do. But in

either case they do not receive real impressions, or they lack the power to convey them to others. Once in a while, however, comes an artist—a man born not merely to see but to feel, and dowered with the gift of adequate expression. Then, if his craft be painting, he shows us more than all the maps and diagrams and faithful prosaic paintings of generations have shown; and if his craft be writing, he tells us more than all the learned students and careful statisticians who had gone before him.

Such an artist is Pierre Loti, a young French naval officer, known in common life as Monsieur Julien Viaud. No one had heard of him until a few years ago, when he published the "Roman d'un Spahi," dealing with Algerian life, and the "Pêcheur d'Islande." He was not a writer by profession, but merely a born artist who had chanced to take to the sea, and now, inspired by strange foreign sights, showed himself at once a master in the art of writing. To say this is to say very much of a Frenchman. Almost every Frenchman is a born writer, as compared with Englishmen or Germans. A literary gift seems his by birthright, and when he does what would make instant fame for a man of any other modern race, he merely does what his countrymen expect of him if he dares to put his pen to paper. To say that the charm of Pierre Loti's style instantly gained him a place among the best of his contemporaries means, indeed, that he possesses an extraordinary talent. More than once before he published this present book he had spoken of Japan. But in "Japoneries d'Automne" (one must coin a word in order to translate and say "Autumn Japanesques") he gives us something more delicious than even "Madame Chrysanthème." It is but a little volume, a brief rambling account of an autumn ramble through a few districts familiar to every tourist. No one need turn to it who wants "information," much less statistics. Yet any one who wants to know how Japan appears had better turn to it than to anything else which we could cite. Pierre Loti's mood is that which has been cleverly called "detached sympathy"—the best of all moods for the non-scientific tourist. He neither tries conscientiously to put himself in the mental and emotional shoes of a Japanese, nor to don the shoes of a European bent upon understanding the point of view of Europe by the contrasts offered in Japan. He simply sees and feels with gay spirits, keen perceptions, a humorous delight in every oddity, and a genuine artistic enthusiasm for every charm. His impressions are incomparably fresh and vivid, and he reports them with incomparable vivacity, wit, good humor and literary skill, and, as an element in this skill should be noted, a brevity even beyond that which marks almost all French descriptive writing. It is impossible to translate any passages from his book; he is too Gallic in style to be Anglicized, even with as much success as one may translate such writers of an earlier day as Gautier. All we can do is to point our readers to the little volume, assuring them of a couple of hours' intense amusement, and a clear, abiding picture of Japan to hang in the gallery of their recollections. Of course, there would be no reason to do even as much as this in these columns had Pierre Loti not spoken of the gardens of Japan; but some of his most delightful chapters are devoted to them, and, though his treatment is superficial in the sense of being neither scientific nor categorical, he gives us a more interesting and more illuminative account of the Sacred Mountain of Nikko and the tombs of the Samourais than any one who had preceded him in these well-worn paths. Reading other writers we learn what there is in these places; reading him we learn how it all looks and what the sensitive Occidental feels as he is looking at it. The difference between the two results is immense, and Loti's we get through an hour or two of pleasure instead of through days of wearying study. This it is to be an artist. When will one arise to do the same service for those who read English only?

Meetings of Societies.

American Florists at Buffalo.

THE late meeting at Buffalo proved the most interesting yet held by the society. The attendance was full and the proceedings earnest and business-like from beginning to end. President May argued that more spirit should be infused into exhibitions to make them educational influences, and to the same end he counseled members to report their experience in the horticultural press. He also showed the advantage of raising new seedlings in America as more likely to give satisfaction than imported novelties.

Mr. W. C. Barry, in his essay on "Roses for Garden Decoration," said that of 334 varieties sent out in 1887 and 1888 there

were only fourteen which he considered worth cultivating in this country. He named, among those of conspicuous merit, Sir Rowland Hill, Madame S. Rhodocanachi, Vicks Caprice, Bonait, Max Singer, and the new hybrid, *R. Rugosa*, Georges Bruant, which has cream-colored flowers, borne in trusses of six to eight. He also mentioned, as likely to prove of great value, Mrs. John Laing, Dinsmore and Blanche Moreau, an almost perfect pure white Moss Rose.

Mr. Robert Craig, in an instructive paper, said that in the florists' business, as in other business, it was the specialist who won success. Boston and Philadelphia had been highly favored, as private persons had endowed their horticultural societies with fine buildings, and to this fact was largely due their high standing. He spoke in favor of the establishment of horticultural halls in every city, and urged the construction of a national botanic garden. Mr. John Thorpe advocated the establishment of an experimental garden for comparing varieties and species of plants, for testing various fertilizers and florists' seeds for making trials of insecticides, and pursuing investigations in every branch of horticulture. A business representing more than \$3,000,000 of capital and directly occupying the attention of 150,000 people, should be entitled to some governmental support. The result of this paper was a committee appointed to bring the matter before Congress. A paper on "Useful Summer-flowering Plants," by Mr. A. E. Whittle, of Albany, advocated the planting of many varieties of hardy plants for the decoration of American gardens.

Mr. Forstermann's essay on the "Habitat of Various Orchids" had a practical value in suggesting the proper temperature for their successful cultivation. For example, *Phalænopsis* houses are often kept at a temperature of from 80° to 90°, while in their native state they flourish in a climate which ranges in the growing season from 70° to 80°.

Other papers of importance were read by Edwin Lonsdale and H. H. Battles, of Philadelphia.

Mr. Wm. McMillan, Superintendent of the Buffalo Parks, read a paper on "Landscape-Gardening," from which we quote some of the opening passages. In a future number we hope to add further extracts from this paper, which was received with many marks of approval, and contained much sound doctrine.

"An ornamental landscape is not merely a composition of choice trees, shrubs, grass and flowers, but includes as well every inorganic element of Nature embodied in the scene. The 'lay of the land'—to use a familiar phrase—is in a double sense the ground-work of the composition. This includes every form or feature which the earth's surface presents to us, from the flat plain to the beeding cliff; every variety of hill and vale, ridge or dell, bare rock, sterile sand, or rich soil; and also water, flowing or still, of whatever volume, large or small. Even the atmosphere must be included as a part of every landscape, for the scene varies with every variation of sunshine or shade, dim haze or clear sky, still air or stirring breeze. The lights and shades of a landscape-painting are carefully studied, and whatever is appreciated in the copy is surely of greater value in the original.

"In the embellishment, then, of any grounds of sufficient extent to have a distinctive landscape-character, the gardener must take into account all the impressive and attractive natural elements of the place. The general aim of his work will be to make a harmonious combination with the dominant characteristics which Nature has already stamped upon the site. He will seek a fuller or richer development of the essential leading features, simply softening what is hard, clothing what is bare, filling out what is meagre, and enriching what is beautiful, all in harmony with the original type. He will thus avoid all novel conceits, all conspicuous eccentricities, all incongruous intrusions, and be guided by his understanding of the laws of Nature as enacted by the ruling Divinity of the scene, and his sympathy with them.

"I lay special stress on this fundamental principle, because it seems to be so commonly overlooked or ignored in ordinary landscape-gardening. In fact the very opposite rule is followed in much work that is done, and the result receives much popular approval. It is a common thing to value the decorative work on any given site in general proportion to the degree in which it is obviously artificial, new or peculiar. This unfortunate fashion seems to pervade every branch of landscape work. Instead of the artificial being subordinated to the natural, it is made specially prominent, and in some cases it even becomes the 'be all and end all' of the scene. For instance, drives and walks are made unnecessarily broad, or sinuous, or prominent, or intrude where not needed. A sharp terrace is formed mainly to display its bold lines, or a channel is dug for an artificial runnel, to give occasion for introducing

a bridge. Summer-houses, arbors, rockeries, pools, fountain basins and jets (usually dry), clumps of trees and shrubs, or beds of flowers and foliage plants, are stuck around promiscuously in conspicuous sites, without any fitting relation to the natural conditions of the landscape.

"A common phase of the same taste is shown in the popularity of the class of plants which propagators call 'sports.' This includes that numerous list which pads out the pages of most catalogues, the endless varieties with the leaves abnormally shaped or colored, or with a drooping or contorted or dwarfed habit of growth. Nearly all the plants of this class are less hardy and vigorous and healthy than the normal type. It is probable that their peculiarities in color or habit are due to some unhealthy condition of the sap or defect in the channels of circulation. But in spite of this relatively weak growth, sickly color or deformed shape, they are all popular favorites. The paler and feebler and more distorted the growth, the more they are liked and petted and pampered. A few of the best of this class may be sparingly planted as foils or specimens or curiosities merely, but never in proportions to rival those of the true type of each species. For general use the natural color and shape are more pleasing and satisfactory, not only because more vigorous and durable, but also because they are in accord with the true order of nature, while the others are not. Nature, in fact, disowns her 'freaks' of this sort by the general sterility of such offspring. Their reproduction depends wholly on artificial propagations. It were better to let them all die a natural death than to treat them as if they were Nature's finest productions. Her sanction to their continued existence is given only when the seed, if produced at all, is true to the parent.

"On strictly private estates, where chiefly the eye of the owner is to be gratified, he may ride to his heart's content any hobby that may please him. But in places exposed largely to the public eye, as in ordinary villa grounds, suburban gardens and public parks, novel ideas will be introduced modestly and not generally adopted till they have stood the test of the fullest criticism. This means more than the ready applause of the populace which mere novelty, if daring enough, is sure to elicit; more than the hotbed stimulus of fleeting fashion, however popular for a time."

Notes.

It is estimated that the forest-fires which have been raging in Montana for the past four weeks have caused a loss of at least \$100,000 a day.

Tigridia Pringlei, which was figured in this journal nearly a year ago (vol. i, p. 389), has bloomed this year at Kew, and its flowers of fiery scarlet and orange were considered very striking.

It is reported in a bulletin of the Florida Experiment Station that the annual Crimson Clover (*Trifolium incarnatum*) promises to be profitable in that state as a winter pasture plant, as material for ensilage and for dry forage.

Several correspondents have sent us the browned leaves of the Horse-chestnut, with inquiries as to the cause. The disease is the work of a fungus, *Phyllosticta spharopsoidea*, and it seems unusually prevalent this year. It is difficult to suggest any remedy, because the fungus, as now known, is an imperfect form, and we are unable to tell what its perfect condition is.

The leaf-blight of the Pear and the cracking of the fruit is caused by a minute fungus known as *Entomosporium maculatum*. Professor Halsted writes to the *Rural New Yorker* that the spraying of some copper sulphate mixture upon the trees in early spring may help to arrest its ravages, although this has not yet been demonstrated. The National Department of Agriculture promises to publish soon the results of some hopeful experiments in overcoming this disease.

The Cassava, which has already become a standard product in Florida, is now on trial in several parts of Louisiana, and Mr. J. L. Normand reports in the *Southern Cultivator* that it thrives and produces wonderfully in the latter state. In his judgment it will yield more to the acre than any other article of food. Many nutritious and delicate dishes for the table can be made from Cassava, while as a food for domestic animals—cattle, poultry, sheep and swine—it is invaluable in that region.

The Governor of South Carolina has appointed the following gentlemen to represent that state at the annual meeting of the American Forestry Congress in Philadelphia, October 15th to

18th: Hon. A. P. Butler, of Columbia; Dr. F. P. Porcher, of Charleston; Professor H. A. Green, of Chester; Hon. Walter Hazard, of Georgetown; H. E. Buist, Esq., of Greenville. The Governor of Ohio has appointed Hon. John B. Peaslee, of Cincinnati; Hon. Leo Weltz, of Wilmington; Hon. James Poindexter, of Columbus, and Hon. Adolph Lene, of Cincinnati.

The exhibition at the late meeting of the florists in Buffalo, was larger and more interesting than any former one. Some remarkably fine and distinct colored Asters, new Dwarf Cannas, Hybrid Tropæolums and Tuberous Begonias, together with numerous Palms and Ferns, and a collection of Orchids and Stove plants were greatly admired. The mechanical part of the exhibition was full of interest, the greatest competition being over the hot-water boilers. Twelve patterns were shown, some solely for hot water, others for steam, and others again could be used for either hot water or steam. The "Standard flower pot" which was adopted at the meeting in New York, seems to have been generally accepted by all the flower-pot makers in the country.

Last week many of the leading fruit-growers of the middle states and New England visited the nurseries of Stephen Hoyt's Sons, at New Canaan, Connecticut, to inspect the new Green Mountain Grape, which has been introduced by that firm. The vine is a strong grower, and bears abundantly large, shouldered clusters of white, or rather green, grapes, which are among the earliest to ripen. The berries are rather small, flavor good, and skin very thin. Considering the fact that this is a bad year for the vine, and that the soil and climate about New Canaan is not favorable to grape production, the visitors were favorably impressed with the quality and promise of the variety, and feel confident that it will prove a valuable addition to the list of earliest grapes.

An interesting exhibition of Tomatoes was on view at the seed warehouse of J. M. Thorburn & Co., in this city, last week. Eighty varieties were named, and although several of them were plainly duplicates, the diversity of form and color and texture was so marked that some fifty distinct types could be recognized. The smooth outline and solid flesh of some of the newer varieties, like Thorburn's New Jersey, proves what can be accomplished by patient selection; and yet the tomato which, perhaps, showed the most compact and yet the finest texture, was *Ignotum*, which, as its name implies, is from absolutely unknown parentage. The Peach Tomato, so called from its resemblance to that fruit in size, shape, color and even in an incipient down upon the skin, was a novelty to most visitors, and so was another variety known as the Station Tomato, because produced on the grounds of the New York Experiment Station by hybridizing the upright Tree Tomato with one of Livingston's varieties. The plant is upright, producing a fruit of fine quality, which begins to ripen much earlier than either parent.

A correspondent of the *Gardeners' Chronicle* observes that while many bulbs like the Emperor Daffodil are of inferior quality the first year, and gain strength the second season, other bulbs deteriorate, and especially the Tulip, for this reason: The outer coat or skin of the Tulip is exceptionally hard and tough, and does not readily decay, as do others with softer skins; and, further, their mode of increase is so rapid—for a fair-sized flowering bulb will produce in some varieties three and four "chickens" in one season, though all are not equally prolific—that the offsets, being encumbered by these hard skins, have not the chances of putting forth their roots into the soil and are thereby crippled; the bulb does not make half its growth, and a general weakness is the result. Thus it is that we see clumps of Tulips which have remained undisturbed for several years, producing, it may be, one or two sickly flowers where dozens might have been, if they had been annually lifted, cleaned and replanted. Next to the Tulips the English and Spanish Irises are, perhaps, the most liable to deteriorate when left undisturbed in the ground for a year or two. The coats of skin upon the bulbs are very thick, and to keep the bulbs in good health for any length of time they should be annually lifted, cleaned and replanted with as little delay as possible. Erythroniums are benefitted by lifting every second or third year, as by this time they become crowded and require separation. Lilies may, if in good health, be left for an indefinite period; but where replanting is deemed necessary, it should be done as soon as flowering is complete, because it is just at this time that the new basal roots are emitted, and to preserve these intact should be the aim of all cultivators.

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A New England Rock Garden.

A BOSTON correspondent contributed to our pages early in the season a series of notes upon some of the interesting spring-flowering plants of his rock-garden, and now he has sent us a series of views of this garden, taken when the Poet's Narcissus was in flower. Two of these views are reproduced in this issue, for the purpose of showing how interesting and attractive a garden of this sort may be made, and how an ugly bit of waste ground may be easily brought to serve a good and useful purpose. The site of this garden, a few years ago, was an abandoned gravel-pit partly overgrown with brambles. A few old trees grew about the borders, and the lower side extended down into the low, wet, peat margin of a pond. The flight of rough stone steps, which appears in the picture on page 439, was carried up the steepest face of the gravel-pit to connect a wood-walk at the lower level with dressed ground above. Large stones, lichen-covered, when such could be obtained, were spread over the surface of the gravel-slopes to hold the soil, which was placed between them, from washing away and to make the "pockets," which are desirable to protect delicate plants from the encroachments of too vigorous neighbors. A few tall-growing shrubs were planted at the top of the now rocky hill to increase its apparent height; and a few low ones were scattered through the rocks to break the surface and avoid any danger of monotony. Then the remaining space has been gradually filled with spring-flowering plants—hardy bulbs of many sorts, hardy ferns, and such native plants as flower before the full development of the leaves on the forest trees, for as these shade the ground, except on one side, it is suited for early flowering plants only. These thrive here and make this small garden a spot of interest and beauty during the six weeks which follow the opening of spring; and then the ferns cover the ground during the remainder of the season, or Sedums or House-leeks, and other sun-loving plants, on the exposed side keep up the succession of flowers.

The view on page 438, taken from the low ground near the pond, shows a section of the garden open to the south-

west. The large tree to the right of the picture in the foreground is a Sassafras, with the deeply furrowed bark admirably brought out. This view shows the manner in which the rocks are arranged to hold the soil placed among them, and to prevent the water from pouring off from the surface. The whole secret of a successful rock-garden is in the manner the rocks are placed. If they are laid in such a way that they offer no resistance to the flow of water away from them, the moisture-loving plants, which properly belong to such gardens, cannot survive our hot, dry summers, but if they are arranged so as to resist the flow of water, they are of great service in increasing the humidity of the soil, not only by preventing the rain-water from flowing rapidly away, but also by checking evaporation. They are of great assistance, too, in forming barriers between different plants and in protecting the weak from the strong, and in keeping deep, cool recesses for the fine roots of Alpine plants. The number and variety of plants which can be grown in a small space, prepared in this way, is astonishing, and thousands of the smaller bulbous plants like Crocuses, the smaller Squills, and Dogtooth Violets, may be tucked away close to the edges of the rocks, or at the points where they join, without in any way interfering with the more prominent occupants of the larger spaces.

Certainly, there is no sort of garden which, in our northern climate, is capable of giving more pleasure than one, whatever its arrangement may be, in which the principal feature is the cultivation of the hardy plants which flower in spring.

The production of staves has been an important industry in the United States for more than a century, and vast quantities of the very finest timber produced in our forests have been consumed in this way. Virginia was for many years the great stave-producing state, but as good Oak became scarce in the accessible parts of that state, the business gradually spread west to Ohio and Indiana. Now Missouri and Arkansas and the region covered by the southern culmination of the Appalachian Mountain system produce the largest quantity. We gather from a recent issue of the *St. Louis Lumberman* some interesting information with regard to this industry. The wood preferred for stave-making is white oak. It is used for tight barrels, except molasses barrels, which are made of cyprus (*Taxodium*) or bass-wood. Barrels used for holding flour, potatoes, apples, sugar and similar commodities are made of elm, ash, red oak and other woods. There are three classes of staves, the classification being based on the methods used in getting them out. These classes are the "split," the "sawed" and the "cut." The first are used for beer, wine and other liquids, and are made from the best white oak. The sawed staves are also made from white oak, and are used in the manufacture of coal-oil barrels, lard tierces, white-lead kegs, well-buckets and other vessels intended to contain liquids. Cut staves are made by machinery, and are put into barrels used for solids. There is, in addition to the great home consumption, a large export of staves to England, and to France, Italy, Spain and other European wine-producing countries. The annual export is now estimated at twelve million pieces. The principal stave markets are New York and St. Louis. New York and New Orleans are the two principal export ports. The importance of St. Louis as a stave-distributing centre is of comparatively recent date, and is due to the exhaustion of the forests east of the Mississippi, and to the great development of barrel-using industries in the West, such as milling at St. Louis and Minneapolis; beer-making at Milwaukee, and especially the wine-making of California, for in all the territory west of the Rocky Mountains there does not grow a tree from which a wine-cask can be made. St. Louis now receives annually between 2,500 and 3,000 car-loads of staves, which are distributed all over the United States and Europe, although large quantities are used in supplying local factories. There are still

immense stretches of stave-timber in the United States; as some of the very best of it is not yet within reach of the railroads, but the vast increase of wine-production in California, and the fact that good stave-timber cannot be found now anywhere in any quantity, except in our Southern states, must have an influence upon the value of southern hard-wood lands, and must in time destroy the forests of Oak in these states, as it has in Virginia and in the valley of the lower Ohio River.

Drives and Walks.—I.

IT is generally thought that in planning a country-place, whether large or small, the main thing to be considered is the situation of the house. Aspect and prospect—the way the house will look to the passer-by or the approaching visitor, and the way the landscape will look from its windows and piazzas—are supposed to be considerations of such paramount importance that the choice of a site may well be made and the house constructed before anything else is arranged. Important considerations these are indeed, yet there is another of quite as much importance—one which must, indeed, be borne in mind from the outset, if aspect and prospect themselves are to be satisfactory in the end. This is the arrangement of the various drives and walks which run through the property. Convenience as well as beauty dictates that the position of the house and its dependencies should not be fixed until this arrangement has been mapped out.

If the grounds are large, and their surface is not perfectly flat and uniform, it may easily happen that the site which seems best to the architect is one where the relative positions of the high road and the entrance-front will be such that no good approach can be designed. For an approach to be good there must be an easy turn-in from the high road; the grade within the gate must be as gentle as possible; there must be no sharp turns, dangerous alike to meeting vehicles and to bordering turf; the house must be well displayed to advancing eyes; the ground must not be so intersected by the line of gravel as to interfere with a beautiful arrangement of its parts, and this line must not be a disagreeable object from the house. Too often in the approach not one of these necessities is fulfilled, although all might have been fulfilled had the house been properly placed. Sometimes even a change in position, so slight that it would not have perceptibly altered either aspect or prospect in general, would have made all the difference between a good approach and a bad one. It is folly, we know, to force a landscape-gardener to lay out a straight road where a curved one would look better, or a curved road where a direct one would be more sensible, and therefore more beautiful; to compel him to run it over a hillock which it might encircle, or down into a hollow and up again when it might pass to one side; to give him no convenient access to the high road except at a point where turning-in is awkward; to forbid him to take in a good point of view which might easily be shown from the drive, or to show disagreeable objects which might be concealed. And yet it would be easy to point to many new places where just such necessities have been forced upon the landscape-gardener by an error in the placing of the house, or where, to avoid them, he is compelled to spend a large amount of money, and perhaps to injure the general effect of the place, in altering the configuration of the ground. When the position of the principal entrance relative to the high road and to the varieties of surface in the ground is fixed, there is nothing left for him but to do the best he can with his approach; this often means something very different from the best that might have been done; and upon the character of the approach may depend the success or failure of the place as a whole.

In places of any size a curved entrance-drive is better than a straight one. Naturally, there may be a case when a wide straight avenue can, with advantage, be made in a direct line through a great estate and leading to a house the architectural majesty of which demands a very dignified approach. But such cases rarely, if ever, occur in America. As a rule, what we call a large place is not large according to English ideas, at least in so far as the ornamental grounds are concerned; and a house which we consider stately, an Englishman would be apt to call merely picturesque. Almost without exception, therefore, wide straight approach roads are inadmissible in this country except in public parks; a curved road is better, because less pretentious, easier to build and to drive upon, unless the land be perfectly flat, more beautiful in itself, more harmonious with the character of our buildings, and less strikingly artificial.

But as all roads and walks are palpably artificial, no matter how they may be designed or of what material they may be composed, it is not good art to make too palpable an effort to conceal the fact. The real reason for the existence of the drive—its utility—should always be acknowledged to the eye as well as practically secured. This means that, though the approach is curved, it should not circle about to an excessive degree, irrationally increasing the distance that must be traversed before the house can be reached, and, when its course is overlooked from the house, wearing an unmeaning, wandering look. English writers on landscape-gardening often deplore the fact that in the effort to make a display of magnitude in the estate or to show various effective points of view, an approach has been so laid out that it is positively irritating to the visitor; when he thinks he is near his destination he finds himself carried away again, and sometimes this process is repeated several times. In addition to the pretentiousness and inconvenience of such an arrangement it injures the place as a whole, for there is no more fundamental principle in the art of gardening than that the fewer the roads and walks the better, and the shorter their course, consistent with convenience and good lines, the better, too. A line of gravel is not a beautiful object in itself, it is conspicuous on account of its difference in color from the surrounding verdure; and wherever it comes it cuts a landscape composition in two as with a knife. Its virtue lies in being at once as useful and as inconspicuous as possible.

Old Mission San José Gardens.

CALIFORNIA has but few old gardens, although the Bidwell grounds at Chico, the Fox Nurseries at San José, and some of the old Oakland and Sacramento homesteads date back to the early fifties. Still older, belonging to a different régime, are the old Mission gardens of the last century. Some of these are still kept up; others have fallen into decay, but all are full of a tropical beauty of their own, because the Palm, Olive, and the Vine so much predominate. One old estate, within thirty-five miles of San Francisco, combines in a remarkable degree the charm of the Spanish gardens of the eighteenth century, and the charm of the early American gardens. I refer to the Gallegos grounds, near the Mission San José, planted chiefly by the Beards and Elsworths, thirty and forty years ago.

The estate of Juan Gallegos includes six hundred and forty acres of vineyard, besides large orchards and extensive pastures. The twenty acres or so that immediately surround the old mansion show as fine a lawn and landscape of native trees as can be found in California. Besides this, there are some trees which were planted by the Mission padres, old Pears and Olives of sixty years growth. There are avenues of Figs, and groves of Olives and Oranges, all large trees in full-bearing. There are many Palms, large Pines, and choice specimens of deciduous trees. On the hill slopes, east of the plateau, at the base of Mission Peak, where the home-grounds are situated, is an old avenue of Spanish-planted trees, Pears and Olives of nearly a century's growth, which rank among the finest relics of Mission gardens left in California.

E. L. Beard, a man of great ability and energy began farming in Santa Clara Valley at this old Mission in the days of '49-'50. He established a nursery here in 1852, sending an agent to the Atlantic states for seeds, scions and young trees, which were taken to California by way of Panama. In 1853 the ordinary price of a one-year-old Cherry, Peach or Pear tree was five dollars, and those who bought, and set out orchards, found that, in 1857 and 1858, the fruit brought twenty-five cents and more per pound. Mr. Beard, and his step-son, Henry Elsworth, developed an orchard and wheat-farm which extended over an area of two thousand or more acres, in and about the Mission San José. Their homestead tract, where plantings of ornamental trees began early in the fifties, was the tract that is now the heart of the Gallegos estate. We have seldom had farmers on the Pacific coast who showed the intense love of beautiful trees that Mr. Beard always did. His groves were on rich, well-watered and sunny slopes. To these he brought specimens of nearly all the native conifers of California, and of many of our finest deciduous trees and ornamental shrubs. His eastern connections enabled him to secure, and he planted here, all the Spruces, Firs and Pines, to be had in eastern nurseries. He also had Australian and Japanese correspondents many years ago, and planted Acacias, Japanese Persimmons, and other imported trees, ten years before any one else had them. He planted a great many Olives and Oranges in groves and avenues; large Fig groves, and many Palms. Chestnuts, Walnuts, and other nut-bearing trees were grouped

near bridges across the stream, and, behind his residence were large fruit orchards and vineyards stretching down the valley.

At present, after more than thirty years of uninterrupted growth, under most favorable conditions, the trees that surround the lawns and "opens" of the place are notable for size and beauty, even in California, and they attract many visitors. Mr. Juan Gallegos, the present owner, is a wealthy Spanish gentleman from Costa Rica, educated in England, and now one of the largest and best known of viticulturists in the state. He has greatly extended the ornamental grounds, and especially delights in plantations of Palms of various sorts, particularly the Date Palm, so that the estate is becoming more and more tropical in its appearance. He is passionately devoted to the old trees, planted by his predecessors, and to the still older Pear and Olive trees planted by the Spanish padres. The Orange-groves are now in heavy bearing condition; the Olives begin to yield well, and the vineyards are so extensive that he has sometimes carried a stock of one million gallons of wine in his cellars.

An interesting fact in reference to the Olive in this region deserves record. The trees of the old avenue of which I have spoken are of the Mission variety, so-called, the kind brought to this coast by the padres, and variously identified since with sorts still cultivated in Spain. The trees planted by the padres here, however, differ much in growth, and are probably seedlings of the Mission variety. Some ripen early, others are very late, and some are much better bearers than others. The old Pear trees were of two sorts, a small, early pear of russet color, ripening about with the Madeleine, and a large, bronze-colored, late, coarse pear. The grapes were all of the old Mission sort, the same grape that grows to-day in the vineyards of the lower Rio Grande, and is so famous in the southwest as the "El Paso Grape." I am told by an old pioneer who knew the Mission San José, before the conquest of California, that the quaint old Spanish garden contained in its exact centre a seedling Apricot tree, which was an object of superstitious fear to the Indian neophytes, for they were taught that its fruit was the fruit of "The Forbidden Tree." They always went by it with bowed heads, and crossing themselves. On three sides of the old garden towered an immense wall of *Nopal*, or Mexican Prickly-Pear, with adobe buildings, walls, and the church on the other side.

Niles, Cal.

Charles Howard Shinn.

Notes Upon Some North American Trees.—IX.

LYONOTHAMNUS ASPLENIFOLIUS, Greene.—This interesting tree was discovered by Mr. Barclay Hazard on Santa Cruz Island, one of the Santa Barbara group, in 1885, and was described by Mr. Edward L. Greene in the *Bulletin of the California Academy of Science* (i., 187, and ii., 149, t. 6). Mr. Greene visited the island a year later, and found that "this tree is no rarity on its native shore. There are a hundred fine groves of it distributed up and down the thirty miles of the island's northward slope, individual specimens often as high as thirty-five or forty feet. The wood, close-grained and hard, is called iron-wood by the men of the island. No other small tree of our coast equals this in grace of form and beauty of foliage. The flowers, too, are quite showy in their season, the larger corymbs often measuring a foot in diameter." Mr. Brandegee found *Lyonothamnus* last year on Santa Rosa, where "the trees are small and often distorted by the wind. This species always forms small groves of a hundred, more or less, trees. It sends up several trunks from one cone, and the whole grove probably is connected underground by its roots" (Brandegee in *Proc. Cal. Acad.*, 2 ser., i. 2, 210).

The genus *Lyonothamnus* was established by Professor Gray (*Proc. Am. Acad.*, 2 ser., xii., 291) for a shrubby plant, discovered by Mr. W. S. Lyon, on the island of Santa Catalina, in 1884—*Lyonothamnus floribundus*.

Lyonothamnus is the first representative of the Saxifrage family among the trees of North America.

TERMINALIA BUCERAS, Hemsley.—This tree was detected by Mr. A. H. Curtiss, on Elliot's Key, at the time of our visit to southern Florida in the spring of 1886; and a few specimens, forty or fifty feet high, were found in full bloom on the 19th of April. It is the *Bucida Bucas* of Linnæus, but the genus *Bucida* having been merged into *Terminalia*, the plant becomes *Terminalia Bucas*, and

the author who first used this combination of names is the authority for it. The author in this case, unless some earlier application has escaped me, is Mr. Hemsley, in "Bot. Am. Cent.," i. 402. We have never been able to find a good seed of this tree in any of the herbaria of this country or of Europe, or to procure one from any of the West Indian or Central American botanists, although it is a common and widely-distributed littoral species. The plate, therefore, for the North American *Silva* lacks the figure of the embryo, an omission which may still be rectified could a single perfect seed be sent to me.

147. *EUGENIA LONGIPES*, Berg.—This species, as it grows on No Name Key, in Florida, the only station known for it in the United States, is a slender, spreading bush with stems six or eight feet high, and with no tendency to assume arborescent habit. I propose, therefore, unless I can learn that it becomes under more favorable conditions really a tree, to omit this species entirely from the *Silva*.

ARALIA SPINOSA, L.—This species must find a place in the *Silva*. I have seen it on the western slopes of the Big Smoky Mountains of Tennessee, growing to a height of thirty or thirty-five feet, with a straight, clear trunk, eight inches in diameter, and stout, wide-spreading branches.

148. *EUGENIA PROCERA*, Poir.—Two Florida trees have been confounded under this species. The larger of these, a tall tree, almost entirely confined, within the United States, to a single hummock on the shores of Bay Biscayne, east of the mouth of the Miami River, with scaly red bark, narrowly-acuminate, coriaceous, shining leaves, which are contracted into a long, blunt point, small flowers in axillary clusters, and small, pea-shaped scarlet fruit, has already been described in *GARDEN AND FOREST* (vol. 2, f. 87) under the name of *Eugenia Garberi*, a name bestowed upon it in memory of its discoverer.

E. procera is a much smaller and a much more common and more widely-distributed tree in Florida, occurring on nearly all the Keys. It is rarely more than twenty feet high, with a perfectly smooth, ashy-gray bark, broader, much thinner and duller leaves than the last, larger flowers, and larger fruit, which is first yellow and red, finally becoming black when fully ripe.

Eugenia Garberi should stand in the catalogue immediately after the last species.

153. *NYSSA CAPITATA*, Walt.—An older name for this species is that of Marshall (*Arbustum Americanum*)—*Nyssa Ogeche*, published in 1785, or three years earlier than that of Walter. The orthography of Marshall's name, although it is not that now used for the river Ogeechee, had best be retained.

154. *NYSSA SYLVATICA*, Marshall. The various forms of *Nyssa* with clustered, fertile flowers borne on a long peduncle, were all united in the Census Catalogue under the name of *Nyssa sylvatica*, the Linnæan species *N. aquatica* being held to include both a form of this plant and the very distinct *N. uniflora*. It may, however, be convenient to retain as a variety the Water Gum of the south Atlantic States, which would then become *N. sylvatica* var. *aquatica*. This, owing to the fact, probably, that it grows in shallow ponds where the trunk is surrounded with water during a large part of the year, is generally a smaller tree; and these conditions would account also for the enlarged base of the trunk, as the stems of aquatic trees display generally this peculiarity. The leaves are often lanceolate or orbicular rather than oval or obovate, the form they generally assume on upland trees, and the peduncles are inclined to be rather shorter. These characters are not constant, however, and it is the manner of growth and the general appearance of the Water Gum rather than any characters apparent in the herbarium which must be relied on to separate it from the Tupelo of the New England coast and the Black Gum of the Alleghany Mountains and the Valley of the Mississippi, as these three distinct-looking trees are connected together by innumerable intermediate forms.

162. *GENIPA CLUSIEFOLIA*, Griseb. — This is a common, littoral plant on several of the south Florida Keys. It shows, however, no tendency to become a tree or to grow to a greater height than five or six feet, and should be dropped, therefore, from the North American Silva.

167. *ARBUTUS XALAPENSIS*, HBK. — Professor Gray, in his supplement to the "Synoptical Flora of North America," 2 ed., ii. 1, 396, proposed for this Arizona tree the name *A. Xalapensis* var. *Arizonica*. It is not easy to connect this plant, with its thick, white, scaly bark on the old trunks and thin, narrow, glabrous leaves, with the Mexican *A. Xalapensis*, which is known to me only through herbarium specimens, and through the figure in Hooker's "Icones" (t. 27); and it seems impossible to understand properly either the Arizona or the Texas *Arbutus* without more detailed information with regard to the Mexican species of this genus than is now available.

168. *ARBUTUS TEXANA*, Buckley. — Professor Gray proposed (l. c.) for this plant the name *Arbutus Xalapensis*, var. *Texana*. It was believed formerly to be confined to Texas, but two years ago I found a single plant on the Sierra Madre, near Monterey, in Mexico, where Mr. Pringle has since collected it. It may be expected, therefore, to be a widely-distributed Mexican species at the northern limits of its distribution in central Texas. The specimen collected by Parry and Palmer (No. 562) near San Luis Potosi, and referred to *A. Xalapensis* is certainly identical with the Texas plant. C. S. Sargent.

Entomological.

The Periodical Cicada.

A CORRESPONDENT in Essex County, New Jersey, writes that when the seventeen-year Locusts visited his region last he discovered that these insects were by no means as harmless as they had been described. Farmers were assured that they might prune orchards and forests a little, but would inflict no serious loss; but the fact was that many of the trees in a young orchard, set out the year before, were killed outright, and most of the remainder were injured beyond recovery. He adds the common belief that some of this army will appear a year or so ahead of schedule-time, and some may follow later, but thinks the main host will appear in 1894, and he adds that the years '92 and '93 will be dangerous seasons for setting out young orchards.

This letter expresses fairly well some of the beliefs on the subject of this, perhaps the most interesting of American insects. The fact that it appears every seventeen years is stoutly maintained by some, and as stoutly denied by others. Cases are cited of their appearing in the same localities at shorter periods, while in other regions the seventeen-year record is unbroken. To the scientific entomologist the problem has long been a settled one; but, somehow, the explanation has not become generally known. As a matter of fact, instead of one, or two, or three, broods, which are grudgingly admitted as possible by ordinary observers, we know positively twenty-two distinct broods, each brood with its own peculiar distribution, and each of them well recorded for several periodic appearances. Another fact not generally known is that in the more southern regions eight of these broods have become accelerated, from climatic causes, so that they appear at intervals of thirteen, instead of seventeen, years. These broods are just as true to their thirteen-year period as are the others to their seventeen-year term. In some sections the two varieties—for the thirteen-year brood is smaller than the other—overlap, and sometimes it happens that a seventeen-year and a thirteen-year brood will occur at the same time in the same place, as in 1885 broods vii. and xxii. appeared together along the Mississippi Valley. Of course, in such regions, there will be a brood thirteen years from that time, and another four years later. Such facts, incorrectly understood, give rise to the popular ideas of an irregularity in appearance. So, also, where two, or even more, broods occur in the same region, there will be an apparent irregularity in dates. This is instanced during the present year in Washington (brood viii.), where the cicada last appeared in 1885 (brood xxii.), only four years ago. A very full account of all the broods is given by Professor Riley in Bulletin 8 of the Division of Entomology, United States Department of Agriculture, and

a great deal of additional information in the report of the United States Entomologist for 1885.

New York is credited with six broods: 1889 [viii.], 1894 [xii.], 1898 [xvii.], 1899 [xix.], 1900 [xx.] and 1902 [xxii.]. It will be seen that for three years in succession some part of New York will be visited by the cicada.

New Jersey is credited with four broods: 1889 [viii.], 1894 [xii.], 1898 [xvii.] and 1902 [xxii.]. New York thus has all the broods appearing in New Jersey, and, in addition, two others.

The New Jersey broods do not overlap—i. e., there seem to be no places covered by two broods, and I have therefore received letters in abundance, and seen numerous notices in local journals, denying the appearance of brood viii. this year.

To be somewhat more specific, brood viii. (1889) has appeared in Long Island, New Jersey, along the Atlantic Coast to North Carolina and westward through Pennsylvania. The brood becomes scattering and small in number along the Atlantic Coast, and is very generally overlooked. In New Jersey it appeared in small numbers at the Palisades, at Princeton, Palmyra, Red Bank, and for some little distance along the line of the Cape May Railroad. Mr. Angell, a very reliable entomologist, assures me that he heard the insects at Orange, but I received no specimens. Long Island is the only New York locality recorded.

Without mentioning other broods, it only needs to be added here that the largest of the seventeen-year race, brood xxii., which covers the greatest territory and is also very numerous, does not appear here until 1902. In New York it appears only on Long Island, extends in small detached areas through middle New Jersey, until, in Pennsylvania, the main army is struck. It is somewhat doubtful whether the brood in 1902 will be very numerous on Long Island, for the sparrows assembled in force in Prospect Park when the Cicadas appeared, and spared very few indeed. So well was the work done that in a search for eggs I spent an entire day along the line of their appearance and found but a single punctured twig!

Brood xii. (1894) appeared last in 1877 and is a very numerous one. It extends along both sides of the Hudson as far north as Troy, and crosses Long Island. They were in 1877 most abundant on Staten Island, less so on Long Island, and I observed them within the limits of New York City. In New Jersey they were very abundant nearly all over the State, and this brood is the one most generally remembered by farmers, and to which most of the letters received refer.

The larva of the Cicada lives underground and subsists by puncturing the roots of trees and sucking their juices. The rate of growth is so slow that the damage done is never perceptible, and need scarcely be considered. The mature insect takes its food in the same way, puncturing branches only instead of roots, and its damage in this respect is very small. The real injury is caused by the female in ovipositing. For this she selects, preferably, the tender terminal shoots of trees, shrubs, or, where they appear in large numbers, even low bushes, and makes a series of deep longitudinal slits into which the eggs are deposited. Where the twig or branch is small, it soon loses vitality, and eventually dies. On large trees this amounts to a severe pruning only; but in small, nursery trees or a young orchard, it frequently, if not generally, means the death of the tree. The advice not to put out young trees just before "Locust year," is sound. In New Jersey this advice should be remembered for the 1894 brood, and so too the farmers along the Hudson should take warning. This is really the only brood occurring in damaging numbers in these States. No practical remedies against these periodical pests have been suggested.

Rutgers College.

J. B. Smith.

Foreign Correspondence.

London Letter.

THERE are certain variegated and golden-leaved trees and shrubs that display much beauty of foliage in spring and early summer; but, after exposure to strong sunshine, they are often anything but beautiful; indeed, nothing in a garden is more unsightly than a tree or shrub with sunburnt foliage. There is now such a great demand for these gold and silver variegated trees and shrubs that every tree-nursery is crowded with them, and the nurserymen are always alert to add some novelty to their lists. In many cases I have asked for a Catalpa, but was told it was not kept in stock, while I could have any number of the golden-leaved variety. The same is true of the beautiful pale-green *Acer Negundo*. One who orders it will probably get the variegated form, now too common everywhere. There are many people who do not see the

least beauty in green-leaved trees, though the wide range of greens, from that of the Evergreen Oak to the tender green of the Negundo, is capable of producing far more pleasing effects in garden-scenery than a superabundance of bright gold and silver foliage.

The newest addition to gold and silver-leaved trees is the golden variegated Negundo, shown before the Royal Horticultural Society last week. Though it did not find general favor with the committee, it is interesting as an ornamental tree because its foliage is less glaring than the common silver-leaved kind. The yellow variegation is good, and blends pleasingly with the green of the leaf, and, no doubt, in habit of growth and vigor, it is identical with the older sort. It has been exhibited three or four times, and on each occasion its merits have been at once compared with its more showy relative. But Mr. George Paul, who showed it, tells me that those who see it in the nursery are much pleased with it, and that it is selling well, which, after all, is the test of the popularity of a novelty. Another new golden variegated shrub of decided value is a variety of *Ligustrum ovalifolium*, named *Elegantissimum*, which is very different, and much superior, to the older yellow-margined kind. The leaf of the newer variety is larger, of thicker texture, and the broad golden zone is more pronounced. It, moreover, keeps its color throughout the season. It was one of the most striking things shown by Messrs. Veitch in their great collection of ornamental trees and shrubs from their Coombe Wood nursery. Among other trees of this character at Coombe just now is the golden variety of your Hop-tree, *Ptelea trifoliata*, which is quite a cloud of soft golden-yellow, and, of course, it retains the picturesque umbrageous growth of the typical form. This golden variety is different from the golden variegated form, of which the late Charles Hovey sent me some specimens several years ago. In this, the leaflets are in most cases half green and half pale yellow, which, no doubt, would be effective on the tree, but I have not seen this form here yet.

Of the shrubs in flower at Coombe the most noteworthy, perhaps, are *Eucryphia pinnatifolia* and *Spiraea Bumalda*, the first because of its rarity, the other on account of its novelty, for, though it is not absolutely new, it is yet but very little known. The *Eucryphia* is a Rosaceous shrub from south Chili, introduced about a dozen years ago by Messrs. Veitch, and, like some other Chilean plants, such as Darwin's Barberry, *Buddleia globosa*, the Fuchsias and the Pernettyas, has proved quite hardy in these islands. It grows about a yard high, the numerous branched stems being clothed with deep green pinnate leaves. The flowers recall those of the large-flowered *Philadelphus grandiflorus*, having four broad, white petals and numerous stamens spreading out like a broad tassel. I do not suppose it would be hardy enough to stand your winters, but it is worth green-house treatment. The little *Spiraea Bumalda* is quite a gem here among flowering shrubs, and, although it is scarcely different in flower from the common *S. callosa*, its neat and dwarf growth, rising only about two feet high, tends to make it very popular, and in some of the nurseries it is a difficult matter to maintain a stock equal to the demand. The ordinary form of it has a dense, flat flower-cluster, pale pink on first opening, getting darker later; but this week Mr. Anthony Waterer sends me a specimen of a new variety he has in his nursery, the flowers of which are a deep crimson, richer even than the *Atrosanguinea* variety of *S. callosa*. It is quite worthy of a distinct name, and a good one would be *Fulgens*. Of other *Spiræas* now in flower there is none so pretty as the variety of *S. hypericifolia*, known as *Flagelliformis*. It is much more floriferous than the type, as its long and slender, curved shoots are perfectly wreathed with small clusters of white flowers. I rank it among the choicest of flowering shrubs, but it is rarely seen. The plants I saw came from Transon's, of Orleans, where it is largely grown. Another first-rate shrub, in bloom now, is the old *Hypericum oblongifolium*, from the Himalayas, which is quite hardy here, and never fails to assert itself in an attractive way every August. It is a thin-growing plant, about two and a half feet high, and has numerous clusters of large cup-shaped flowers of the richest yellow. It is a beautiful companion shrub to the showy *Hydrangea paniculata grandiflora*, which is now expanding its huge clusters of snow-white blossom in the open air. The two group well, the *Hydrangea* as a centre mass, then the *Hypericum*, and outside that the Rose of Sharon (*H. calycinum*), which forms a neat margin to a shrub group.

The Catalpa is, for the time, the glory of many an old garden. I say "old" because you very seldom see it planted in a new garden, except, perhaps, the golden-leaved variety, which, however, is generally cut down periodically so as to get large and vigorous foliage. In the old suburban gardens, such as

Sion, Claremont, Cienwood and Kew, the Catalpas are wonderfully fine this year, the great spreading trees being crowded with clusters of white bloom. The common kind is your *C. bignonioides*, which is hardier than the Japanese *C. Kämpferi* which has the finest leafage. *C. speciosa* promises to be hardier even than *C. bignonioides*, and in some nurseries it is being propagated in preference. It is quite distinct enough in growth to enable one to single it out when growing among the common kind. There is a good deal of talk here about the new hybrid Catalpa of Mr. Teas, described and figured in a recent number of GARDEN AND FOREST, in an article which has been copied into English journals. Its rapidity of growth, its vigor and floriferousness indicate a first-rate ornamental tree, and we hope to see it soon on this side. It is so seldom now that a new flowering hardy tree is introduced that it is quite a red-letter event.

Bulbs are, of course, now engaging the attention of gardeners, and I am reminded of this by the multitude of trade lists which the mails are carrying. My table is strewn with catalogues from all quarters, the Hollanders being particularly attentive in this respect. At one time you rarely saw a Dutch bulb-grower's list, but now each grower seems anxious to impress upon you the fact that it is folly for English people to buy their bulbs through the seedsmen here when they can get the same from him at wholesale price. The bulb trade with our nurserymen and seedsmen is not as profitable as it used to be, as the auction sales tend to keep prices low, but after all, really fine bulbs are more certainly secured through the best houses at home. The nursery and seed trade naturally resent the innovation of the Dutch grower in sending his catalogues broadcast in this country, but it has had a beneficial effect for those who habitually buy their bulbs from tradesmen at home.

London.

W. Goldring.

Cultural Department.

Shrubs with Conspicuous Fruit in August.

IN this latitude the month of August does not afford a great abundance of showy-fruited shrubs and trees. Of the economical or domestic fruits few are conspicuous in color, and these are chiefly early red and yellow varieties of apples and plums. As the fruit of these early kinds is not left on the plants to be admired, they do not come under the head of ornamental plants. But the coloration of many varieties of fruit in September and October certainly adds much to the autumnal beauty of New England landscapes.

Among all the handsome-fruited shrubs grown for ornament, none can surpass the Cranberry Tree (*Viburnum Opulus*) when well laden with fruit. This plant was mentioned as having noticeable fruit in July, and, as August advances, the berries, or drupes as they are called botanically, become bright red and remain brilliant through the autumn. The fruit of the Arrow-wood (*Viburnum dentatum*), of which the birds seem very fond, ripens about the middle of the month. It is blue in color and is borne on erect terminal cymes. This is followed by *Viburnum molle* which, though a more southern species, is quite hardy here. The plant, as well as the fruit, closely resembles *V. dentatum* in general appearance, but the fruit is usually somewhat larger.

Viburnum pubescens and *V. acerifolium* have oval blue-black fruit which is not particularly showy. The Wayfaring Tree (*V. Lantana*) holds its ripe yellow or red drupes until near the end of the month, when they lose much of their beauty by becoming dull and black. Towards the end of the month the broad cymes of the common Elder (*Sambucus Canadensis*) have become fully ripe and dark purple or black, and the branches bend over with the weight. The berries remain on the plant for a considerable time, and on this account, as well as for its handsome white flowers, it is very ornamental in shrubberies. A yellow or golden-leaved variety is very much admired by many, and its fruit is lighter in color than the type.

There are several species of Dogwood which are interesting on account of their fruit during the month. The fruit of *Cornus alternifolia* is blue-black and will remain on the plants for many weeks, if not devoured by the birds. It is a shrub more interesting for its succession of horizontally growing branches and neat habit than for beauty of fruit. The bluish-white fruit of *Cornus circinata* is generally too much scattered to be effective.

Cornus stolonifera is a handsome and pleasing plant, having deep-blue or metallic lead colored drupes, the color being somewhat faded or paler on the side exposed to the sun. They ripen from the middle to the end of the month, and with

those of the next species may remain on the bushes for some time. This species is worth planting for its conspicuous red stems, which are especially noticeable towards the end of winter, as well as for the profusion of white flowers which it bears in June. The silky Cornel (*C. sericea*) does not generally ripen its fruit until the end of the month, and in some situations not until September. In the Arnold Arboretum and vicinity the bright-blue fruit is produced in great abundance. *Cornus paniculata*, which is one of the most slender of the native shrubby species, bears a profusion of delicate white flowers in June followed by pale white fruit about the end of August.

If only one-fourth of the yellow early spring blossom of the Cornelian Cherry (*Cornus Mas*) developed into ripe fruit, the plant would again be a most beautiful object from the middle

small, slender-twigged, partly trailing shrub, from two to three feet in height, with deep green leaves, one or two lines wide and from one to two inches in length.

The fruit ripens early in the month, when the purplish pods open, disclosing the seeds enveloped in an orange-colored aril. This little shrub is quite hardy at the Arboretum, and is excellent in rockeries or for the borders of shrubberies.

The smooth Sumach (*Rhus glabra*) throughout the month bears velvety, crimson fruit, which is often collected for use in making vinegar or as a substitute for lime juice. It is not such a tall growing species as the Staghorn Sumach, which, in some respects, is to be preferred for planting in groups.

The well-known Snowberry (*Symphoricarpos racemosus*) ripens some of its large, white berries during the month and at the same time continues blossoming. Another plant with



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to the end of August. The drupes are oblong, from three-fourths of an inch to an inch long, and deep orange or bright scarlet, or cornelian colored (whence the common name), when fully ripe. They are edible, though somewhat acid, and in parts of Europe are made into marmalade and used in other ways. Unfortunately, in this latitude, even large plants bear very little fruit, and it drops to the ground almost as soon as matured. *Cornus sanguinea* is another European and Asiatic species sometimes planted in our gardens. It is a close, compact shrub, which will grow eight or ten feet high, and it bears small, terminal cymes of almost black, and not very ornamental, fruit.

Enonymus nanus (*E. angustifolius* of some catalogues), a native of the Caucasus, is the only species of the genus which fully matures its fruit here during this month. This is a neat,

the same habit of flowering is the Alder Buckthorn (*Rhamnus Frangula*), which continues to produce its ripe, shining, purple-black and inconspicuous flowers from July until well into the autumn.

Except *Rosa rugosa*, which ripens first, *Rosa Engelmanni*, recently described and figured in these pages (vol. 2, f. 121), and *Rosa acicularis* are the earliest species to become conspicuous with fruit in the Arboretum. The bright red fruit of *R. Engelmanni* especially is large and attractive.

Fruits of other species of roses also assume bright colors during this month as well as some species and varieties of Barberries. But as they are not always fully matured until September, and remain on the plants for a considerable time, they deserve mention later.

Jamaica Plain, Mass.

J. G. Jack.

Memoranda From a Northern Garden.

RHUBARB is an easy plant to grow, and market-gardeners find ready sale for the leaf-stalks in spring-time, when there seems to be a very general craving for sharp, pure acids of vegetable origin. It does not take much time or much expense to establish a bed of this plant. The old-time fashion of trenching and deep intermixture of manure is as needless as with Asparagus. A coating of good stable manure, three to four inches thick, well plowed under, is sufficient. Strong, single eyes set this fall after such preparation, four feet each way, will make plants which will shade the whole ground the next fall, and be ready for cutting the succeeding spring. From such a bed I have cut ninety-three stalks which together weighed 100 pounds.

the raw state. Is it not significant that the Oldenburgh apple brings about as good a price as the Gravenstein in many if not in all our markets? Yet the former is strictly a culinary apple. But besides this, is the consideration that many of our choicest dessert varieties are either shy-bearers or very local as regards success; while others are unusually susceptible to the inroads of insects and fungi? Productive sorts of handsome appearance and fair medium quality are, in my opinion, the most profitable to plant. The pains-taking amateur, who is not thinking of profit, may find some pleasure (mixed with a good deal of vexation) in cultivating what are rightly styled "fancy" sorts.

It is the fashion to disparage the quality of Russian Apples, and I observe that our government pomologist, Mr. Vandeman, follows this fashion in his recent report. But in this he



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Should Asparagus seed be planted deeply, as often advised—say at the bottom of a hole six inches deep? It will come up, but, as with all seed too deeply planted, it will not grow so vigorously as from shallow planting. But about the cutting? Must there not be deep planting to get the white butts required in most markets? Not necessarily; ridging with the plow at the end of the second season's growth will accomplish the same end. If the hills are four feet asunder, both ways, the double mouldboard-plow will give either ridges or hills, as desired. In cultivation during the summer, after cutting is over, these are somewhat leveled; but are easily renewed at the last working, previous to which it is well to give a shovelful of manure to each hill.

Is it not a mistaken notion that all but fruits of the highest dessert quality should be disparaged by horticultural writers? It is safe to say that much more than one-half the crop of our tree fruits (excluding the Citrus family) is cooked before it is eaten. Some of the best for cooking are scarcely eatable in

is widely at variance with all those who have had the longest and most complete opportunity of testing these apples. It will take a good while yet to sift and thoroughly test the more than 300 varieties that have been introduced to this continent from eastern Europe within the last twenty years. Suppose a similar number of the best American varieties had, within the same time, been on trial even in so comparatively small a country as New Zealand, would not a large proportion have been condemned? But probably others would find acceptance and prove of great value. It has been abundantly shown that the apples of western Europe and their American seedlings are not suited to our colder states and Canada, where almost the whole Russian list are at home. When we come to consider dessert quality alone, I think a sufficient number of Russians are already known to possess that quality to a very encouraging extent; while in vigor of growth, early and free bearing, size and beauty of fruit, they decidedly excel most American apples. Their great lack is in long keeping.

This is, no doubt, due to the fact that the Russian orchard region lies about 600 miles north of our northernmost settlement. There the growing season is proportionally short, and a short autumn is quickly followed by steady cold weather. But from these Russian fruits it is highly probable that American seedlings will appear which will supply this single lack.

It is conceded that in climate the eastern coasts of Asia and America are much alike, and many fine species and varieties of trees and plants from northern China and Manchuria already flourish among us. I am inclined to believe that we shall yet find something of value to us among the fruit trees of the same region. At any rate, we may hope that it will yield "iron-clad" species and varieties which will prove useful in modifying and improving our native species, and the species of northern Europe. What a magnificent field for work is here opened for the young and ambitious staff of our experiment station! They should not hesitate a moment in entering upon it with energy and persistence.

Newport, Vt.

T. H. Hoskins.

Seasonable Hints about Foliage Plants.

AS the cooler nights and heavy dews of Autumn are at hand some changes in treatment will be found beneficial to this class of plants, particularly as regards watering and syringing, for some of them will suffer more from carelessness in these operations at this season than they do in the winter, when the stronger fire-heat removes the moisture more rapidly. The better plan is to give water in the morning, and on most days to syringe at the same time, simply dampening the walks and benches in the afternoon, if the air seems too dry, so as to avoid the excessive condensation of moisture on the foliage during the night. Such condensation is decidedly injurious to many of the more delicate Palms, and causes the tips of the leaves to decay, and Pandanus suffers in the same way. *Pandanus utilis* and *P. heterocarpus* (otherwise known as *Pandanus ornatus*) will be found particularly susceptible to injury from over-watering, and, consequently, water should be given sparingly, both at the root and overhead during the short days of the year.

On the other hand, Caladiums will still be in full growth, and when in this condition should receive a copious supply of water at the root, with an occasional application of liquid manure to increase the size and heighten the coloring of the leaves. If intended for exhibition they should be given plenty of air, so that they may be able to stand changes of atmosphere without the necessity of staking each leaf to prevent its falling down on the pot, as the careful arrangement of a small forest of stakes in a specimen of this class (or any other) will not prove a point in its favor when examined by competent judges.

Most of the Marantas will yet be in active growth, and will take a liberal supply of water, but as the growth becomes slower, the allowance should be slightly diminished. They should not be allowed to get very dry, however, or a loss of foliage will surely result, and it should be remembered that a moist atmosphere and a shaded house are among the requisites for the successful cultivation of most of them, with the possible exception of a few of the stronger constitutioned sorts like *M. zebrina*, which grows very well out-doors in the summer as a vase plant, if placed in a somewhat sheltered position. With all of the above-mentioned, and, in fact, with stove plants in general, a reasonable amount of ventilation at night will be found advantageous, if care is taken to prevent draughts, and if the night be very cool, a little stronger fire-heat may be given to correct any deficiency in temperature.

If any of the Palms are pot-bound they should be given a shift at once, so that they may become well-established before winter, for though these plants do not come to a full stop in growth during the winter, yet their root-action is so much slower then, that there is greater risk of over-watering if they have been potted very late in the season. Of course, when it is desired to grow young Palms very rapidly, they may be potted whenever it is found necessary, without much attention being paid to the season of the year, because, when given extra heat and attention, they may be kept growing during the whole year, and this practice is common among trade growers, who often find it needful to grow their plants under high pressure in these days of sharp competition.

Cyanophyllum magnificum and *Sphaerogyne latifolia*, two of the handsomest stove-foliage plants in cultivation, should be found in every collection where there are facilities for growing them. But to keep these two species in good condition, liberal treatment is required, both as to pot-room and moisture, for, if neglected in either of these essential points, the

foliage soon becomes stunted and disfigured. If they are becoming pot-bound, an occasional watering with liquid manure will be a help, pure guano being probably the most effective fertilizer for this purpose. This should be used with caution, however, a two-inch potfull to an ordinary can of water being sufficient, if the guano is pure. The *Cyanophyllums* and *Sphaerogyne*s both being shade-loving plants, and also natives of the tropics, they should be furnished with somewhat similar conditions when under cultivation, but while giving them plenty of shade it will be found best to keep the plants within a short distance from the glass, so that the growth will be short-jointed, thus making the plants appear better furnished. These two plants are readily propagated by means of single-eye cuttings placed in bottom-heat and kept rather close until rooted, which is usually in from three to four weeks' time, after which they should be potted off into moderately light soil, and repotted as often as they become well-rooted, so that the growth does not at any time suffer a check, else the symmetry of the plant may be injured.

Holmesburg, Pa.

W. H. Taplin.

Crooked Norway Maples.—It is the general experience of nurserymen that the Norway Maple does not grow as straight, when young, as the Sugar Maple. In the majority of cases there is a bend at the beginning of each year's growth, which shows in the trunk until the tree attains a considerable size. What is the cause of this crookedness? The young shoots of the Norway Maple are as straight as those of the Sugar Maple. The normal habit of growth is a true perpendicular, but next spring a side-shoot takes the lead with a curve. It is evident, then, that the central terminal bud of the Norway Maple has suffered injury in some way. This has not been caused by the cold of winter, for it is the most hardy of the maples. Every nurseryman has observed that the growth of young trees of this species stops in the latter part of July, the shoots becoming very short-jointed, and the leaves showing injury with tips crisp, as if scorched by the sun. In previous seasons I have been uncertain of the cause of this stoppage. I have occasionally found flying thrips, much resembling, and perhaps identical with, the vine fretter, but these were so few in number that I had supposed them inadequate for such a sweeping result.

Early in July of this season I found occasional thrips on the tender terminal shoots of the Norway Maple, which flew immediately upon my touching the leaf. I at once had all the leading shoots of this variety dipped in a weak solution of the kerosene emulsion. This process has been repeated three or four times in as many weeks, and the result is that the shoots have continued to make a healthy growth. I have no doubt that the terminal bud will start next spring, as straight as an arrow; and I have no longer a doubt that the thrips has been the sole cause of the stunted growth of previous years. The Sugar Maple does not seem to be affected by this pest. Neither have I found the Schwedler and the Reitenbach maples troubled by it, although they are varieties of the Norway. The Sycamore Maple does suffer to a considerable degree. But the remedy is easily applied on small trees, and on large trees it is unnecessary.

Newton Highlands, Mass.

W. C. Strong.

Rhododendron odoratum, which is said to be a hybrid between *Rhododendron Ponticum* and one of the deciduous hardy Azaleas, was one of the chief attractions in the open-air garden at Kew for late July, when there were large masses of it flowering in great profusion. In growth it resembles the deciduous Azaleas or Swamp Honeysuckles of North America, though its foliage is somewhat different, being larger, of thicker texture and a deeper green. The flowers are Azalea-like in size and form, and are gathered into moderate-sized clusters. They are of a delicate mauve-lilac tint in the main mass of plants, but a few have as deep tinted flowers as *R. ponticum* itself. They are deliciously fragrant, and this heightens the value of the plant for the garden. Another point of value is, that it flowers at a time when the majority of the other Azaleas are on the wane, and it lasts three or four weeks in bloom. It grows well in any ordinary peaty soil, kept tolerably moist. Loudon enumerates it in his arboretum under the name of *R. azaleoides*, and he says it is the variety subdeciduum of Andrews' Botanical Repository. It is also known as *A. fragrans*. Though an old and well-known shrub at Kew, it is rarely seen in even the large tree nurseries, but now that its character is so well displayed at Kew attention may be directed to it.

Kew.

W. G.

Pyrethrum uliginosum is now at its best and is without doubt one of the very best plants we have for cut flowers, and for garden decoration in autumn. We find that plants in moist

situations produce much larger flowers than those in dry sandy positions, and as *P. uliginosum* is a gross feeder, it needs division every second year when the soil should be well enriched with decomposed manure. If this treatment is given, the stems grow five feet high, and from the axils of every leaf a flower stem is produced, bearing a cluster of flowers, each of which is four inches across, with petals pure white, and a bright yellow disc. This plant is thoroughly hardy, and is by no means new, although we received it as such, three years ago, from Switzerland. Twenty years ago it was quite common in English gardens, but its present popularity comes from its re-introduction with so many other fine old plants that had been under a cloud during the reign of the bedding system. *P. uliginosum* is easily increased by division of the stolons which are freely produced from the old stem, and with us seeds are matured in good seasons and germinate much better when self-sown than when sown under glass. The Great Ox-Eye Daisy deserves a place in every collection of hardy plants.

Clematis paniculata, as it is here, is worth going a long distance to see. There are over 200 plants, and although only nine months old, they are from seven to eight feet high, and covered with the large panicles of fragrant white flowers. Their fragrance, in the early morning, especially reminds one of that of the Hyacinth. This plant is being distributed also under the name of *C. robusta*, an appropriate name enough, for there is no *Clematis* in cultivation of stronger habit, but the name *C. paniculata* is now nearly 100 years old, and it ought to have right of possession, but this is probably only another instance of an old plant under a new name. In addition to the free flowering qualities of *C. paniculata* the foliage is large, of a shining, dark green, and the plant is an excellent climber, perfectly hardy, and needs no pruning in spring, except to cut off the old flowering stems. As a plant for the decoration of the piazza there can be no better, for after the flowers are over, the prettily-awned seeds are almost equally ornamental, especially when they take on their peculiar bronzy tint.

Passaic, N. J.

O.

Osbeck's Sumach.—The Japanese variety of *Rhus semialata*, known as the var. *Osbeckii*, again flowered profusely at the Arnold Arboretum, and when in blossom, with its many large panicles of greenish-white flowers, it was one of the most conspicuous of small-sized trees in this latitude. With the exception of the Japan Sophora (*S. Japonica*), which blooms at the same time but continues some days longer, it is the latest to flower of all the woody plants which assume the true arborescent form. The plant, like its American congeners, is a fast-growing one. With large, pinnated, dark green leaves, and broadly margined or winged petioles, it is handsome and interesting all through the summer, and in the autumn it assumes the brightest yellow and scarlet colors. A panicle of the small, greenish-white flowers is borne at the end of each branch. The panicles average nearly a foot and a half in length, with a lateral spread almost as great. The flowering period is rather short, the first flowers opening this season about July 29th, and the last August 15th. The large plant in the Arboretum bears staminate flowers, but, occasionally, pistillate or perfect flowers are borne also as the panicles sometimes produce a very few scattering fruits. This small tree gives promise of being quite hardy where the winters are much colder than at Boston.

Arnold Arboretum.

J.

Orchid Nomenclature.—Since Lindley's time almost every Orchid has been described by Professor Reichenbach, and, as no one else appears to have preserved authentic specimens, and the herbarium of the Hamburg professor is sealed up for twenty-five years, it is difficult, in many cases, to decide what has already been described and what is really new—a difficulty rendered greater by the fact that "his papers," as the *Gardeners' Chronicle* says, "are not only extremely numerous, but scattered through a wide range of publications, in almost all European languages."

Kew has stepped forward to fill the gap. We notice a letter setting forth that the director of that establishment is willing to assist cultivators of Orchids in naming their plants in cases where difficulty arises in their correct nomenclature. A second letter points out that many of the plants described by Professor Reichenbach still exist in gardens, and requests that specimens of the same be sent for preservation. By this means a considerable number of types might be recovered, if the suggestion is acted upon, which seems likely to be the case. Orchid-growers have learned a lesson—not to send all their specimens to a private herbarium again.

A suggestion has recently been made that the Royal Horticultural Society should appoint a Professor of Orchidology, who shall look after the naming and describing of new Orchids, and to whom all questions relating to their nomenclature shall be referred. Another proposal is that a committee be appointed to determine the principles on which they shall in future be named. It seems hardly likely that the first suggestion will be acted upon, as the expense of getting together the necessary herbarium and drawings would be no inconsiderable item. The second proposal is good in its way, provided always that the decisions of the Committee are accepted and acted upon, though we do not remember that the former conference, at Liverpool, led to any very practical results. Certainly the nomenclature of Orchids is in a good deal of confusion, and is likely to remain so while growers insist upon having a name for every slight variation which occurs.

The genus *Cattleya* furnishes a very good illustration. The *Gardeners' Chronicle* has seen fit, after a long interval, to continue its "List of Garden Orchids," and this genus is now just completed. Turning it over we note no less than twelve varieties of *C. guttata*, whose characters are briefly given, but on reaching the very polymorphic *C. labiata*, such an array of names present themselves as to be perfectly bewildering. About nine geographical varieties are recognized, and under several of these a host of variations or polymorphisms are given. The variety *Mossiae* seems the most polymorphic, having something like forty-seven sub-varieties, or polymorphisms, or whatever else they may be. The variety *Trianae* follows closely behind, with something like forty-one. We wonder how they all differ, for the characters are not given—perhaps on account of want of space, as they take up something like a column and a half as it is. However, those who wish to know will now be able to find them, by the references given and the list of published figures. We note such delightful combinations as *Cattleya labiata Mossiae Peetersii* and *C. Reineckiana superbissima*, whose correct name would appear to be *Cattleya labiata Mossiae Reineckiana superbissima*. Such names, we should think, require a good deal of regulation.

London.

Calypso.

Correspondence.

Forests and Civilization. The North Woods.—VII.
To the Editor of GARDEN AND FOREST:

Sir.—There have been marked changes in the thought of the people in the Adirondack region since I first began to observe things here. At that time nearly everybody thought the forests were inexhaustible, boundless and everlasting. It made no difference how much timber might be destroyed, or how great areas might be burned over and ruined, there were still illimitable, uninvaded wilds. There was then hardly any care among the guides about putting out fires, and if a visitor wanted his fire extinguished when he broke camp in the morning, his suggestion was often regarded as an impertinent and absurd interference with the affairs of the people of the woods. When a squatter wished to clear a potato-patch for the next spring's planting he fired his brush-piles in the time of greatest drought, and sent the flames roaring away through leagues of forest, not caring how far or how long they might burn. The region was being rapidly devastated by fire, and there were extensive and open depredations on the timber of the state lands. Visitors from the cities often displayed a most thoughtless and uncivilized enjoyment in destroying as much of the woods as they could during their summer stay here. There was little sign of forethought, or sense of responsibility, anywhere, regarding the value or the destiny of these mountain forests.

All this has been greatly changed. There have been few extensive fires during the last few years, and there has come to be a very general feeling among the people who live in the woods and from them, that injuries to the forests are injuries to their own means of subsistence, and are therefore to be avoided. Camp-fires are generally carefully extinguished, and the wanton destruction of trees by campers is discouraged. The old superstition that the woods are inexhaustible, has given place to the sense that things are coming to an end; that the very existence of this great summer resort is threatened, and that the permanence of its peculiar industries and revenues is no longer secure.

There is a rapidly developing feeling that the region ought to be taken care of, and that something should be done to prevent the complete extinction of the woods. These changes in the thought of the people here have been brought about, partly by the extension of the railroads into hitherto inaccessible parts of the wilderness, and the increased cutting for lumber everywhere, and partly by the influence of recent

discussions in the press. Since papers of influence have declared that "the only plan by which threatened injuries can be averted, and means provided for the permanent conservation of these invaluable forests, is the acquisition by the state of the entire Adirondack region," the minds of the people here have been turning more and more in the direction of such a change. A valuable educational work has also been carried forward among the woods-people by the chief Forest Warden and his subordinates. They remind everybody that unless the forests are preserved, the occupation and livelihood of the inhabitants of the country here will be gone. "No woods, no tourists, no living for you." The most intelligent and observant men here are coming to be in favor of the gradual acquisition of the entire region by the state. But nobody wants the state to buy the land before the timber is cut off! The lumbermen want the existing crop for themselves. But some arrangement could doubtless be made to purchase considerable tracts for the state as soon as the timber now standing on them is utilized. Then, if fire is kept out, the forest will soon come back again, and the state can take care of it if her people are wise enough.

There has been comparatively little depredation upon timber on the state lands during the last few years. Some ne'er-dowells steal a tree or two at a time for shingles, or to sell, and some lumbermen still buy logs from men who are known by everybody not to own a foot of land or a stick of timber anywhere, but the pillaging of the state timber lands has greatly declined. The Forest Commission has successfully prosecuted some offenders, and has successfully discouraged others. The Bill providing for a change of venue in suits for trespass on state lands, which the Commission brought forward in the Legislature last winter, was a good measure, and should have become law. Such cases cannot always be fairly tried in the vicinage where the depredations were committed.

The extensive and increased cuttings which thoughtful men deplore is, of course, not on state lands but on those of private owners, who have a right to cut their own timber whenever they choose. They have also a legal right to cut it as they choose, and to destroy forest-conditions all over their own territory, if they are so unintelligent as to wish to do that. What observing and public-spirited men regret is, that so much of the forest is cut off with so little thought of the future and its needs. There is really no sound objection to cutting off the woods if it were done in the right way, for they would soon be reproduced. But much of it is done thoughtlessly, carelessly, stupidly; without the application of judgment, intelligence or common sense. I think we shall have to interest, engage and educate the lumbermen, and get them to help us in the effort to establish a more enlightened and practical policy and method in cutting off timber, and maintaining permanent forest-conditions, so as to have a succession of crops. They ought to feel more interest than most other people in the permanent preservation of the forests as a source of revenue and profit to themselves individually and to their children, but, unfortunately, they do not always act from enlightened self-interest, any more than the rest of us.

While these mountain forests are in the hands of private owners we must expect that they will be utilized, as other property is, for their benefit, and it is not reasonable to denounce them for managing their possessions for profit, as other people do. Here are two lines of work, the encouragement of forethought and wise management among lumbermen and private owners of forest lands, and the discussion of the policy of the gradual extension of state ownership of land in the Adirondack region.

The Conemaugh catastrophe has had a distinct influence here in stimulating thought about the relation of mountain forests to streams and their flow, and the effect of mountain denudation in producing destructive torrents and freshets, and intelligent men in the wilderness, and in the towns along the Hudson, are giving these subjects more attention than ever before. It is not quite plain to them just how this disaster teaches the lesson drawn by my friend Major Powell, "that forests are a disadvantage to irrigation where the chief precipitation is snow." But the question of the quantity of water that might be saved, by destroying the mountain forests of California and Colorado, is not practically important. If forest-conditions are destroyed on the mountains, in which the streams to be used in irrigation have their sources, evil and destructive forces which no human power can control will be liberated and set in motion. The soil will be carried down from the mountain slopes. The irrigation reservoirs will be filled up, and the fertile lands below buried under sand and gravel. The streams will be ruinous torrents for a short time each year, when the snows melt, or the rains fall, and their channels will be dusty chasms during the season when water

is most needed. The air will be filled with dust from the perpetual erosion of the hills. The regions which might be the permanent seat of vast and prosperous populations will be wrecked, desolate and accursed. The laws and forces of nature will not make exceptions in our favor, though we are a great country.

But why should our friends, the geologists and hydraulic engineers be eager for the destruction of the forests on our western mountains which still belong to the nation? The forests are not in their way. Their permanent conservation and proper management will in no way interfere with the great expansion of engineering and constructive work for the storage and distribution of water, upon which it is evident that we are about to enter. There will be plenty of business for the engineers for a great while to come, and vast revenues will be appropriated for its cost. The magnitude of the possibilities before us is indeed stimulating to the sanest mind, and it will not be wonderful if some enthusiasts conclude that arid lands are better for agriculture than those to which nature has given an adequate rainfall, and that the world is to be saved by being sufficiently dammed. But the fact remains that mountain forests are the natural storage reservoirs for the water that falls upon them, and that they are indispensable to the integrity and permanence of the streams which have their sources in them.

J. B. Harrison,

Lower Saranac, New York.

Cor. Sec. American Forestry Congress.

The Practicability of an Improved Use of Popular Plant-Names.

To the Editor of GARDEN AND FOREST:

Sir.—Popular plant names are a part of a great mass of descriptive terms, applied to familiar or conspicuous natural objects, and form an important part of every language. They seem to be as necessary to the people at large who want names that easily become familiar, as "scientific" names are to the student who must have a universally understood system and mode of expression.

Botanists pay less attention to popular names than ornithologists, entomologists and other students of natural science. Why they should may perhaps be explained by circumstances connected with the early history of botany. The study of plants, first confined to the physician, who considered them for their real or supposed medical virtues, was for a time thrown into great confusion from lack of means for identification. Later students began to work out a system of classification and at length botany was established as a science apart from medicine. But in the mean time the early physician had degenerated into the herbalist, with his quackery and superstition, and both he and his vocabulary were held in contempt by the botanist. This early antagonism resulted in a separation between the popular and scientific names of plants.

Some popular names have come to us from a very early time, while others, more recent, can be traced to many different sources. We have not the various dialects that are responsible for many of the seemingly trivial names in English books, but from all parts of the world names have come to us with the plants to which they belong; while others have become attached to new plants. Purely American names have been adopted from Indian languages or corruptions of them, and many have originated among our people.

There are many common names which are used without practical confusion or inconvenience of any kind; such, for instance, as Quince, Elm, Wheat, Cabbage, Cocoanut. That there is a much larger number in the use of which there must be uncertainty and consequent confusion, is not a sufficient reason for outlawing all such names. If it were, scientific names must also be outlawed by the same reasoning, for even the best botanists often make changes in what is regarded as the correct name of a plant, and often append to the name of a particular plant a long list of synonyms.

Considerable attention has been given to popular plant names in England, and several books are published there on their origin, meaning and use; but the more important of these are written from the standpoint of the philologist and archaeologist, and while all deplore the uncertainty and confusion in the use of these names, little is done to correct it. It is often added to when a great number are given, by not specifying those worthy of general use.

We, in America, stand well to lead in establishing the correct use of popular names, for our text books and catalogues agree in the use and application of many of them, and we are comparatively free from complications that perplex our English friends.

The superceding of the system of scientific names by a system of popular names is not to be urged.

The ultimate object should be to establish for every plant one name which for good and sufficient reasons shall be known as the standard common name; all others for the same plant being made subordinate of it. Among the reasons for adopting the standard name would be that it is more frequently and widely used than another; that it does not conflict with the name adopted for another plant; that it has special fitness as a descriptive term; that it is descriptive of peculiarities in the structure and manner of growth of the plant or that it indicates its association with some interesting event. Priority should also be considered but would not necessarily establish the use of a name.

Most conspicuous or familiar plants have popular names, but if botanists, when describing a new plant, would publish with the scientific name an appropriate native appellation, or if necessary invent a name for popular use, they would do much to aid the purpose. A translation of the botanical name which is usually an abbreviated descriptive term, is often awkward and unweildy and would seldom be the best popular name that could be selected.

If the introducer of a new plant proposes a good and appropriate common name, the distributor will commonly be glad to adopt it, well knowing the value as a matter of trade of such a name. If one in use in its native habitat or elsewhere, or one given by the discoverer or botanist who classified it, is not available, it would be the duty of the distributor to invent one, short, easily understood and pronounced, descriptive of the plant in some particular, or referring to some association. If the botanical name only is used it is copied at first, but if the plant is widely distributed and popular it is sure to receive a popular name, often several in different localities.

A complete botanical name with a generic and specific name of the same character is seldom if ever used in a popular way, but the generic is often adopted, and with it an English prefix to distinguish it from other species. Such names when established are popular names, and often very serviceable, but it does not seem that the union of Latin and English can be as desirable as simple and expressive English names which may be, and so often are, used to express the same things as Latin generic and specific names.

When a cultivator creates a new variety and gives it a reasonable name, that name should be respected by everybody, and it should become odious for anyone afterwards to attempt to give the plant a new name, especially if this is done for a commercial purpose. A person who applies to a plant already having a good and sufficient name, one that better suits his individual fancy, and publishes it, should be held guilty of an inexcusable act. Only when a plant has a very conspicuously unfit or inelegant name should an attempt be made to give it another, nor should it even in such a case be made except with the approval of some notable body.

We need a work in which every name in use among the people to any considerable extent will be recorded and explained. Such a work would be valuable for reference for every one wishing to determine the meaning and application of unfamiliar names, but its highest value would be in its establishing a standard. It might be the work of an individual but better of an organization. However undertaken, the help would be needed of many specialists in sympathy with its objects, in every branch of botany and horticulture.

Brookline, Mass.

Warren H. Manning.

[A uniform vernacular nomenclature for all plants is, of course, desirable, but the difficulty of learning and using scientific names is greatly exaggerated. *Kalmia* for example, is now used almost as generally as Laurel, and is not more difficult to remember, and, when it is used, there is no doubt as to what plant is intended, while Laurel is used to designate at least half a dozen different plants. In one part of this country Ivy means *Kalmia*; in another it means *Ampelopsis* or *Rhus*, while the true Ivy is an entirely different plant. That Latin names may be learned and used generally, is shown by such names as *Spiræa*, *Paulownia*, *Rhododendron*, *Azalea*, *Euonymus*, *Fuchsia*, *Dahlia*, *Coleus*, *Coreopsis*, *Weigelia*, *Victoria*, *Begonia*, *Allamanda*, *Stephanotis*, *Cattleya*, *Mahonia*, *Ailanthus*, *Arbutus*, and so forth. Such names are as familiar and just as easily remembered as many vernacular names which are used indifferently, sometimes, for a dozen distinct plants, and, therefore, when used, do not convey any clear idea of the object

spoken of. Latin names only appear pedantic when they are unfamiliar, and while it is, of course, undesirable to substitute a Latin for a common name, which has become a recognized part of modern language, it might be a misfortune if English names were invented for all newly discovered or introduced plants, in addition to the Latin ones, bestowed upon them by scientific botanists, and as easy to learn as new English names.

In the case of new varieties of garden plants, an English name is preferable to a Latinized one, and the custom of giving such names now prevails, or should prevail. One reason for this is that these varieties may be distinct, for garden purposes, while they are practically identical in botanical characters, so that they do not deserve distinct botanical names.—Ed.]

Bits of Color.

To Editor of the GARDEN AND FOREST:

Sir.—We all return to the city too soon for the full glory of the foliage, but in August, even, there is much beauty to be seen. Autumnal coloring is not an effect of frost; it is rather a ripening as of the cheek of an apple. Frost withers, oxidation colors, so, at this comparatively early season, one will note elegant bits of color. A Sugar-Maple, otherwise green, will show one branch of glowing crimson. We have no Oaks, or Walnuts, or Chestnuts here, but the Elms grow yellow or russet. The wayside Ferns are rich in umber or sienna. The Ostrich Fern throws up its rigid plume of dark olive-green.

Some of the deepest colors I have noticed are afforded by the leaves of wild Sarsaparilla (*Aralia nudicaulis* and *A. racemosa*). These are of a very sombre purple. The same is true of the Virginian Anemone, whose tall fruit spikes along the roadsides look not unlike cannon sponges. In any account of autumnal colors the Golden-rods must be included. Here they abound and give a mellow glow to whole hillsides. They nod over the borders of forest-trails, and are of infinite variety of form, strict spikes, graceful wands, or broad, flat cymes. The Asters, too, begin to light up their pale stars of blue or white. Among the fruits we have the scarlet of the ever-present Bunch-berry, the fine red globes of the *Viburnum Opulus*, the deep-blue clusters of the *Clintonia*, or the single glowing pod of the *Trillium*. Some flowers have a second blooming. Thus we see everywhere the acrid or tall Butter-cup in flower, and we have even found the dwarf Cornel and the pretty *Linnaea*. Its English name of Twin-flower, it shares with the *Mitchella*. Everywhere before the houses here there is a tree of Crab-apples, very rosy and charming. They are, apparently, grown only for ornament. Regretfully we record a bit of vandalism: the ruthless mowing down of the wayside shrubbery. It is with a pang that we see this reckless destruction of lovely masses of foliage, the graceful Sumach, the feathery Ferns, young Alders, Osiers, *Viburnums*, Elders and Cherries. What a misapplication of the word improvement! Last year, in Orange County, New York, we were told that such destruction was enforced by law. If such is the case it is time to look after the law-makers.

Sugar Hill, N. H.

W. Whitman Bailey.

Recent Plant Portraits.

Botanical Magazine for August:

STAPELIA GIGANTEA, t. 7068; the great flowered species discovered thirty years ago in Zululand, and more lately found in Namaqua Land, on the opposite side of the African Continent. The corolla is twelve to fourteen inches broad.

CATASETUM GARNETTIANUM, t. 7069; one of the Orchids which have so much scientific interest on account of variation of the perianth, due to sexual dimorphism.

GREVILLEA ASPLENIFOLIA, t. 7070; a species sent from New South Wales early in the present century, and well-known in green-houses.

BERBERIS ANGULOSA, t. 7071; a rare Himalayan species with the largest flowers and fruit of any of the thirteen species found on that range. In Sikkim it is a shrub four feet or more in height, and growing at elevations of from 11,000 to 13,000 feet, where it forms a striking object in autumn from the rich golden and red coloring of its foliage. The fruit is edible and less acid than in the common species.

ANOIGANTHUS BREVIFOLIUS, t. 7072; an acceptable addition to cultivated Cape bulbs. The perianth is a bright yellow, an inch to an inch and a half long.

Notes.

The occurrence of morphine in *Eschscholtzia Californica* has been recorded by Baudet and Adrian.

It is noted in several instances this year that where Potatoes were fertilized with potash salts the blight has been less prevalent.

Professor Bailey reports in the *American Garden* that the Crandall Currant has decided merits as a fruit for the home garden. It is hardly a "fixed" variety, however, and only the best plants should be used as stock for propagating.

Colonel Pearson writes that the copper sulphate mixtures have again proved themselves preventive of both rot and mildew even in this exceptionally wet summer. The grape-crop about Vineland is, however, almost a total failure, even where the clusters were bagged, and bagged early.

A black-seeded Maize, with cobs of various colors, from Bolivia and Mexico, interests American visitors at the Paris Exposition. In Bolivia this grain is used for making *chica*, the popular fermented beverage of the country, as, indeed, of most of the South American republics.

The annual Chrysanthemum Show of the New Jersey Floricultural Society will be held at Orange on the 12th, 13th and 14th of November. The President, Mr. James R. Pitcher, of Short Hills, New Jersey, has sent us a schedule of premiums, which are liberal, and the exhibition promises to be one of exceptional merit.

Professor Arthur has discovered that the red Wheat-rust is not a stage of the black rust (*Puccinia Graminis*), as has been generally held, but of *P. Rubigo vera*, a rust which does not need the Barberry go-between for its reproductive stages. This relieves mycologists from some awkward attempts to explain how there happens to be so very much rust on the grain where there are so few Barberries.

The French Government has made Professor C. V. Riley a Chevalier of the Legion of Honor as a deserved compliment for his effective studies in economical entomology. His researches have not only been of advantage to the farmers and fruit-growers of the United States, but he discovered that the phylloxera was an American insect, and identical with the pest which had proved so disastrous to French vineyards. He also introduced into France the spraying-nozzle which bears his name, and which, with certain modifications, is used in that country to counteract the mildew of the vine.

Professor Beal finds that the peculiar markings in birdseye Maple do not occur in young trees up to about three inches in diameter, nor very high up in trees which are very much pitted at the base. A specimen taken fifty feet above the ground showed no trace of birdseye, while another from near the base of the same tree was very strongly marked. If the cause of these formations could be discovered and used to produce the marks it would add greatly to the market value of the timber, for the wood of this Maple and of other trees somewhat similarly marked is comparatively scarce and in great demand for veneers.

Mr. Charles H. Shinn warns us that when the California papers give accounts of immense Redwood trees that have been cut, they too often refer to the giant Sequoias. There are many specimens of *S. gigantea* in the Sierra forests of Fresno and Tulare, and they are being destroyed rapidly and their timber sold as redwood in the San Joaquin Valley. The so-called Redwood which was stated to be twenty-eight and a half feet in diameter was probably one of these trees. The famous Felton Redwood is twenty feet in diameter and 366 feet high; and, although there may be stumps of Redwood with a diameter exceeding this, Mr. Shinn does not know of any larger tree of this species, *S. sempervirens*, now standing in California forests.

The first section of the Charles River Embankment, an important feature of Boston's public park system, is completed. It lies between the two lower bridges to Cambridge, with a length of half a mile. It adjoins a crowded quarter chiefly occupied by the tenement-house classes, and is of great sanitary value. Mr. Olmsted's design is appropriately simple; it comprises the elements of a wide promenade along the river-wall, adjoined by slopes of turf with masses of trees and shrubbery, mostly of common native species. There are two landings, with floats for boats and steam-launches. At one end of the embankment is a public open-air athletic institution, called the Charlesbank Gymnasium, the first of its kind in

America; it has already proved a great success. At the other end an exercise place for women and girls is to be laid out.

A correspondent, whose patience has been tried in the matter of labels for such plants as Gladioli, Irises, and the like, writes that her gardener has hit upon a contrivance which has proved a great comfort. He takes a stout bit of telegraph-wire, some two feet long, bends it to a ring at the top, which is secured by a few spiral twists, leaving a straight, slender metal rod, with an eye at one end. This is thrust down deeply beside the plant, and a wooden or metallic label is attached to the eye with a fine copper-wire. The rod and eye is not a new device (*GARDEN AND FOREST*, vol. i., p. 146), but this method of constructing it will be new to many readers, and they will find it better than tall wooden sticks, which get pulled out or broken off. There are many plants to which labels cannot be satisfactorily attached, and if the wire is set in firmly it will remain as long as the plant by its side.

Professor Scribner read a paper, at Toronto, before the Society for Promoting Agricultural Science, in which he spoke of the Grasses on the bare summits of the southern Appalachian Mountains. These treeless domes, concerning which Professor Plumb not long ago wrote an interesting letter for *GARDEN AND FOREST* (p. 382), are called by the inhabitants "Balds," or "Grassy Balds," and are highly prized as grazing lands. Professor Scribner found twenty-five species of Grasses on Roan Mountain, many of them, as for example Timothy and Orchard Grass, evidently introduced, but now naturalized. The greater portion of the turf, however, was formed of Mountain Oat-grass (*Danthonia compressa*). Where this grass occurs in quantity in New England it is taken as a sign of poor or worn out land, but on these mountains it deserves the highest consideration. The condition of the stock which grazes on these meadows among the clouds proves the value of this grass as a food, and an analysis made by Dr. Stone, of the Tennessee Experiment Station, shows that it contains forty per cent. more of protein and fifty per cent. more of fat than Timothy or Orchard Grass.

Professor Burrill has detected a new bacterial disease of Indian Corn which shows itself first in a dwarfed condition of the young plants over areas varying in size from a few square rods to an acre or more. After the tassels are formed, the disease may be found scattered throughout the field in single plants; the affected stalks, and especially their lower leaves, being yellow and smaller than the healthy ones. In anything like severe cases, at least half of the roots are injured and often dead, the lower portion of the stalk will be found dead or dying, and presenting a dark color when split. The disease organisms are found in great numbers on, and within, the affected parts, in many cases collected in gelatinous masses consisting of the bacteria held together by a stiff mucilaginous substance which they exude. Too little is known of the disease to suggest any remedy, but as it is probable that the germs live through the winter in the soil, the young Corn would be liable to suffer more if planted in fields where the disease had prevailed the year before. It is noted that the disease is usually the worst where Corn has succeeded Corn. •The disease is a very prevalent one, and may have existed for a long time. It is not always destructive enough to attract attention, but not infrequently it occasions very serious loss.

Mr. B. E. Fernow, Chief of the Forestry Division, read a paper at the late meeting of the American Association for the Advancement of Science, at Toronto, on National Interest in National Resources—a subject suggested by recent action on the part of the Government in regard to irrigation and persistent inaction in regard to the forests of the national domain. Mr. Fernow showed very clearly why our forests constituted one of our national resources, which demand the continued care and fostering administration of the state. In commenting on the fitful and illogical way in which the nation deals with its resources, Mr. Fernow said: "While our Government is ready to go to war in order to protect its fisheries, it has never even known the value as food-supply of the game which has been killed. Whole races of animals have been extirpated before there was population enough to require the meat. While with one hand we pay exorbitant prices in land and wasted energy to get the plains re-forested, and that with poor success, with the other hand we offer a premium for forest-destruction in mountains by leaving them without proper administration. And now we propose to establish irrigation-systems, neglecting to provide first for those conditions which assure a regulated water-supply—namely, by forest-preservation."

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The Landscape-Gardener and the Architect.

MONSIEUR Edouard André, one of the foremost landscape-gardeners in Europe, not long ago wrote for the *Révue Horticole*, of which he is joint editor with Monsieur Carrière, an interesting article on "Ornamental Buildings for Parks." He seems to feel that the English, with their love for the picturesque in architecture, have attained greater skill in this direction than the French, who are closely wedded to monumental and symmetrical forms of construction. The building in Sefton Park, Liverpool, which is illustrated in the *Révue*, does not, however, seem very excellent to American eyes; and if it is a fair representative of its class we may believe that foreign students could learn much by studying good examples of rural architecture in this country. But the passages to which we invite special attention are those in which M. André speaks in a general way of the relations of the landscape-gardener to the architect. To arrive at the perfect realization of those ideals which should guide in the design of lodges, pavillions, bridges, kiosks, and other buildings needed in a great park, it is needful, he says, that the landscape-gardener should be informed with regard to the principles of the art of building; otherwise he will be in a false situation and his influence will be null. He then proceeds to say:

"I know that here I touch upon a delicate point which has often embarrassed my confrères as well as myself. It has often happened—it happens constantly—that they find themselves in rivalry with architects who are averse to considering the designers of parks and gardens as true fellow-artists, or to treat with them on conditions of amicable equality. If the client, confiding in the taste of the landscape-architect whom he employs, asks him to furnish the architect charged with the construction of the dwelling with ideas relating to the accessory constructions in the park, it happens very often that the latter exhibits an evident, or dissimulated ill-will. Either he will execute badly, if he has no talent, the projects of the landscape-architect, or he will refuse to translate the ideas of another, and will secretly recast these projects in order to impress upon them his personal touch. What is the remedy for this?

Plainly to force respect and confidence by one's individual merits. If landscape-gardeners prove themselves to be sufficiently instructed in the art of building; enlightened by an elevated artistic sentiment, the fruit of their studies, their travels, and the comparisons and applications which they have drawn from them; capable of defending their projects to specialists, and able also to carry them well into execution, the opinion of architects will change, and my fellow-workers will advance in public esteem. I may add that our clients and their parks and gardens will likewise profit through a more fitting adaptation of ornamental details to the general effect by means of works in which science and taste will everywhere appear closely united."

Now it is true that the landscape-gardener should know something of architecture. Much of his work in connection with buildings is more closely related to architecture than it is to gardening. But there certainly is an equal necessity that the architect should acquaint himself with the principles of designing gardens and with the landscape-gardener's ideals, processes, and needs. In the discussion which followed the address of Mr. Eliot before the Massachusetts Horticultural Society, from which we quoted at length a few weeks ago, one gentleman argued that the proper way to secure unity in the "house-scene" is for the same artist to design the house and lay out the grounds. But this remark shows an imperfect appreciation of the requirements of both the arts in question. We can conceive it possible for the same person to be skilled in both, but the genius and industry which would be required to master and successfully practice two such complicated arts will rarely be found. What is really demanded is a hearty recognition of the importance of each of the two by the masters of the other, and the development of a spirit of brotherly concord, with an intelligent appreciation of both on the part of the client.

The architect, at least, should know enough of the scope and purpose of landscape-gardening to know that he can be materially aided by an artist trained to look at a building and its surroundings primarily from a different point of view from his own. There need be none of the antagonism suggested by Monsieur André in an associated plan of house and grounds. If a landscape-gardener first makes his study of the ground and suggests the proper location for the house, gives reasons why certain rooms should look in a given direction, and explains why the main entrance should be in a particular place, this need not limit or fetter the architect, but rather furnishes him with a secure basis upon which to make his own studies. In examples of actual practice which have come within our knowledge the result of such co-operation has not only been most successful as a whole, but the architect has recognized the fact that he has been aided to do more effective work in his special department. If either artist is consulted before the other, the landscape-gardener has the prior claim, especially when the grounds are of considerable size or when they are rugged and broken, as they are apt to be in the suburbs of eastern cities after the smoother and more regular lots have been occupied. We recall one instance where the approach-road to a suburban villa was constructed before an architect was selected. But, of course, the preferable method is to associate the landscape-gardener with the architect in the preliminary studies, so that there will be no discord between the designs of the dwelling and of its surroundings, but a unity of purpose which will not only make the place more attractive to the eye but more completely adapted to the wants of its owner.

It should be added that co-operation of this kind saves expense. By this we mean more than is meant by the mere statement that it pays as certainly to secure the advice of a landscape-gardener as it does to employ an architect. What a competent artist gives is always worth more than it costs. But, besides this, there will be usually found a direct saving in matters of construction—even in details of the building, and especially the adjuncts of the building. How much might have been saved is too often measured by the costly work which needs to be done when

the landscape-gardener is called in and asked to adjust its surroundings to a house after it has been built. This attempt to correct errors that might have been avoided is the most unsatisfactory and thankless of tasks. Too often these mistakes are beyond any sufficient remedy, or the expense of even partial correction may be excessive, and in either case the reputation of the artist and his art is unjustly called in question.

The *American Cultivator*, of Boston, under the title of "Practical Forestry," publishes some remarkable statistics from the pen of Mr. John D. Lyman, of Exeter, New Hampshire. "Taking," he says "the present forest-area of the United States as given in the latest reports of the Agricultural Bureau, and leaving the vast forest-covered regions of Alaska out of the question, and only reckoning 5,000 feet board measure to the acre, and assuming that our population is now 60,000,000, we have now ready grown and fit to cut 40,500 feet of lumber to every man, woman and child in the United States, or 222,700 to each family." Of the lands considered forest-covered, in the returns made to the Department of Agriculture, a considerable portion, such, for example, as the wood-lots connected with farms in most of the settled parts of the United States, contains no merchantable timber whatever; while in those sections of the country, still little changed by settlement or cultivation, the stand of timber over large areas of so-called forest does not average anything like 5,000 feet to the acre. Mr. Lyman must have discovered somewhere within the limits of the United States some unusually heavy timber to bring up his average to his moderate amount of 5,000 feet an acre. We should have supposed fifty feet an acre, taking the whole area covered with trees, to be nearer the mark. But Mr. Lyman is evidently accustomed to big timber, for he goes on to doubt, speaking of economic tree-planting in Massachusetts, if there is a man "in the state who has grown from seed or from trees set out 50,000 feet, or even 25,000 feet, of good timber to the acre." As it is less than sixty years since the first large plantations were made in Massachusetts, Mr. Lyman is probably correct. But such statements are hardly necessary to enforce Mr. Lyman's position that "the timber-crop per acre can be increased by the practical arts of forestry, the same as our grain supply has been increased, simply by knowing how to do it. The work, however, needs to be done on existing forests, and on lands adapted by nature to forest-growth." No one who has studied the forest-question in the United States will now deny that the care and improvement of existing forests, growing upon lands unfit for any purpose but the production of timber, is vastly more important than the creation of new forests by planting trees on lands adapted to other crops of more immediate productiveness. But while the forests are being made more productive, there is not a family in the United States, which will not feel happy at the thought that its quota of merchantable lumber is 222,700 feet board measure.

Drives and Walks.—II.

IT has been shown that, except in rare cases which are not likely to occur at all in this country, it is better that the approach to a country house in a place of any size should be curved rather than straight; but also that it should not meander about in an irrational way, injurious alike to convenience and beauty. It should not look as though the display of the various beauties of the property or the formation of graceful curves were its main object, while the conveyance of visitors to their destination was a secondary one; nor, on the other hand, should it be laid in a mathematical line, straight towards this destination, with a rigid disregard for surrounding objects. A happy mean between these two extremes is what is wanted—a line that is direct enough to seem sensible, and yet curved enough to be beautiful as well as easy for wheels.

Sometimes its bends will be dictated by conspicuous irregularities in the surface of the ground, or by existing trees, which

it is desirable to preserve. Then they will be evidently rational, and, if well drawn, entirely pleasing to the eye. But sometimes there will be no such reasons for curvature, and yet curvature will be necessitated by convenience in driving and the general desire to avoid too stiff a line. In such cases a good landscape-gardener will make the curves seem natural by some device of his own—by altering the surface of the ground or by planting. When his work is done, and time has assisted it a little, the effect should be the same as though nature had prescribed the line of his drive. The road may have been the first consideration, and the objects which govern its course merely later adjuncts; the curve may have been the necessity, the hillock, the tree, or the group of shrubs a device to excuse it. But the eye need not realize the fact—the surface irregularities and plants may be made to seem the cause, and the curve the natural consequence. To secure such a result is one of those artifices which are inexcusable if they fail of the right effect, but which are the highest art—the art which conceals art—if they produce this effect. It is an artistic defect to make too palpable an attempt to disguise the utilitarian character of a road as a means of transit from one given point to another; but it is an artistic triumph to make it look as though, while affording such transit with reasonable directness, it had chanced to take a course that is beautiful, too. Of course, while the careless observer will be deceived by the apparent naturalness, and its methods and results, the student of art will know that chance has had nothing to do with the matter; but his eye will accept the appearance of happy accident and his mind will enjoy it all the more for knowing that the hand of an intelligent man has been at work.

But to make the curves of a drive look natural it is not sufficient that they should have some visible reason for existing. The objects which supply the reason must themselves look natural or the artificiality of the whole arrangement will at once be plain. To throw up a hillock or plant a tree or a group of trees or shrubs in a spot where it will deflect the road will be futile, unless it looks as though, for other reasons, it ought to be there, and to look thus it must compose well with the features around it and play an acceptable part in the general aspect. The hillock must blend and harmonize with the general conformation of the ground, and the plants must form agreeable masses—not too large for their places, nor so small as to look as though they had been dropped down by accident—and must usually be supported by other plantations in their vicinity. On a lawn, which is large enough to be crossed by a road at all, there will be space for other trees and shrubs besides those which may immediately border the road; and all should be so arranged that the eye will be convinced that if the individuals which seemingly force the road to curve had been removed the effect of the remainder and of the prospect as a whole would have suffered. They should seem to have stood, before the road was built, in places where they were needed as items in an harmonious picture; and the road should seem to have respected them for this reason. Nor is it needful that every deflection in the road should be excused in just this way. For example, the approach may diverge to the right to avoid a beautiful tree; if it must then turn again to the left to reach the house in a convenient and pleasing way, this fact is its own sufficient explanation and excuse.

Whatever the objects chosen to justify the bends in a road, they should not be flower-beds. Anything which forces a carriage to turn from the direct path should be a real and a permanent obstacle—something over which wheels could not pass, and which could not be removed without destroying it. To make a flower-bed play the part of an obstruction to vehicles gives a deplorable look of triviality and wilfulness; yet there are few objects so often seen in the bend of a road that crosses a lawn. The truth, probably, is that the road has been curved without thought of supplying a reason for the curve, simply because it could not be carried straight or because of a belief that a curve, managed in any way, would be beautiful; and then the flower-bed has been thought of because the elbow in the grass seemed to offer a "good place" for it. But its trivial, ephemeral nature is not the only reason why a flower-bed is unsuitable in such a position. A lawn which is large enough to be crossed by a road has a somewhat park-like character, and in a park-like landscape a flower-bed is utterly out of place. The crude bright spot it makes is disagreeable enough in a small expanse of lawn, but doubly disagreeable when there is so much space that an effect of broad unity, of rural repose and peace might be secured. And where a flower-bed is out of place, so, too, of course, are small, isolated plants, and especially those which have evidently been brought from the green-house and must soon be returned to it.

The Art of Gardening—An Historical Sketch.

X.—Greece (Continued).

FROM what has already been said with regard to the paucity of descriptive writing of any kind among the Greeks, it will be understood why it is difficult to divine just how their gardens were disposed. That they were largely formal in arrangement cannot be doubted. Such was clearly the case in public gardens like the Academy and Altis at Olympia; and the nature of the Greek mind, the way in which it conceived all kinds of beauty, indicates that the art which entirely conceals art could not have been its ideal even in the most private pleasure-ground. But by a Grecian orderliness and balance we need not understand an Egyptian rigidity of design. A certain measure of symmetry and architectonic dignity must have been desired; but grace, too, was essential to the Greek, and the symmetry he loved did not exclude variety. Even a discreet degree of picturesqueness may well have added charm to his garden effects, as is implied, indeed, by the fact that grottoes were used no less than formal basins in which swans disported themselves. From the character of his other works of art we may believe that he planted his trees now in parallel lines, but now in well contrasted varied groups; that he never clipped them into unnatural shapes, and never objected to a graceful irregularity of growth if it did not pass into patent eccentricity or combine in awkward ways with the omnipresent architectural forms.

The favorite ornamental tree with the Greeks was the Plane, on account of its thick, wide-spreading shade. The Pine and the Cypress stood next in favor as garden-trees. The funereal significance of the Cypress, recognized by all the ancient peoples, as well as by the Orientals and Europeans of our day, probably had its origin in Persia. Here it was believed that the first Cypress came direct from heaven to Zoroaster, and the tree was regarded with peculiar reverence as symbolizing by its pyramidal shape the flames which were worshipped as themselves the emblem of the "principle of light." In Greece, as elsewhere, the Cypress was constantly planted by tombs, and was prominent along those suburban streets which were lined with the monuments of the honored dead. But it was thought no less appropriate for pleasure-gardens, where its formal outlines harmonized well with architectural features. It appears, too, that tombs were sometimes placed in gardens. Lycurgus, the orator, is said to have been buried in a private garden at Athens.

The Oak was another favorite and sacred tree; so, too, the Poplar. The reverence bestowed upon the Olive, and its part in the story of the founding of Athens, need hardly be referred to. But it may be explained that Olives and fruit-trees of all kinds were regarded by the ancients as garden-trees, and often formed the temple grove. No such line as we draw to-day was then drawn between useful and ornamental trees, or even, it seems, between vegetables and flowers. Plutarch even declared that the best way to show the beauty of Roses and Violets was to plant them, for contrast, among Cabbages and Onions. No shrub was more beloved in Greece than the Myrtle and the Laurel, needed for many religious rites, and no flower more than the Violet, the flower of Athene, the emblem of Athens itself, the "City of the Violet Crown."

It is impossible to decipher from the curtness of contemporary records just where or how flowers were grown for sale in Greece, although mention is made of their cultivation near temples, and flower-markets were held at stated intervals in the squares of Athens. It was only in later days, however, that they were profusely used. The simple taste of early times desired no more striking ornament than a crown of leaves. Coronals of flowers, says Pliny, were not employed until about the 100th Olympiad—B. C. 380. Nor at any time had the Greeks a great variety of flowers. Roses, Lilies, Hyacinths, Violets, and the blossoms of fruit-trees and shrubs were those with which they were most familiar.

By the time of Alexander, the Persian love for gardens and parks, with many other forms of luxury, had obtained a strong foothold among the Greeks, especially in their wealthy colonies; and wherever the conqueror's footsteps are followed we read of admiration for the works of the Persians and of a desire to imitate them in new constructions. When Harpalus was left governor of the province of Babylon he was desirous, says Plutarch, "to adorn the palace gardens and walks with Grecian plants, and succeeded in raising all but the Ivy, which the earth would not bear, but constantly killed."*

* "But such digressions," adds Plutarch, "the impatient reader will be more willing to pardon if they are kept within a moderate compass." The modern reader would be less impatient if the compass had been wider! Diodorus, by the way, tells that when they were returning from India, where likewise the Ivy did

When the city of Alexandria was laid out "in the form of a plethrum or military cloak," its vast palaces and public buildings were surrounded with squares and gardens to such an extent that, buildings and grounds together, a third of the space within the walls was absorbed. Dinocrates (or Dinocrates) was the architect to whom the work was confided; and it was he who conceived the idea of carving Mount Athos into a statue of Alexander "with a city in the right hand and a reservoir of mountain streams in the left." Is such a scheme entitled to be ranked among landscape-gardening designs? And if not, where shall we place it? for it can hardly be called engineering, since beauty, not utility, was the main object in view. At all events it remains the most ambitious idea that was ever conceived with regard to the adornment of the surface of the earth.

Lucian tells us that at Cnidos there was a great pleasure-ground dedicated to Venus, where even "distinguished citizens" enjoyed themselves on the verdant meadows, and where the common people came in crowds on holidays; and he mentions its Cypresses, Planes and Myrtles. In Sicily, where luxury went hand in hand with tyranny, gardening seems to have been practised in an especially sumptuous way. Dionysius of Syracuse had famous gardens where his feasts were held; one of the Hieros built a war-galley in which the poop-deck was covered with earth and beautifully planted; and some modern writers have thought that the famous quarry-pits near Syracuse, where the Athenians perished in agony, were afterwards planted as pleasure-gardens.†

About 300 years before Christ, Kotys, King of Thrace, "took his pleasure by a cool stream" in a forest through which he had built "level roads." A hundred years later, near Athens itself, Herodius Atticus possessed a villa surrounded by large forests, which is spoken of by Aulus Gellius in his *Attic Nights*; and when Xenophon retired from his native country to Scillus, near Olympia, he erected an exact copy, on a smaller scale, of the temple of Diana at Ephesus, surrounded it with a similar "grove of cultivated trees bearing whatever fruits are eatable at the different seasons," and had spacious hunting-grounds in its vicinity.

New York.

M. G. van Rensselaer.

Notes Upon Some North American Trees.—X.

172. MYRSINE RAPANEA, Roem. and Schult. This plant does not appear to assume anywhere in Florida an arborescent habit, and there seems no reason for retaining it in the American *Silva*.

180. BUMELIA SPINOSA, A. DC. Professor Gray, in the second edition of the "Synoptical Flora of North America," reduces this so far as relates to the Texas and Arizona plant to a variety of *Bumelia lanuginosa*,—the var. *rigida*.

182. BUMELIA CUNEATA, Sw. The Florida and west Texan tree, which has been referred to this species of Swartz, is not, it appears (Gray, *l. c.*), that plant; and Professor Gray has, therefore, taken up for it Nuttall's name, *B. angustifolia* (Sylva iii., 38, t. 93). *Bumelia reclinata*, Torrey (Bot. Mex. Bound. Surv.), not of Ventenat, a small tree of the Rio Grande Valley (Harvard in *Bull. U. S. Nat. Mus.* viii., 510) is referred to this species.

FRAXINUS CUSPIDATA, Torrey. This handsome Ash of the section *Ornus* must find a place in the *Sylva* immediately before *Fraxinus Greggii*. Often a shrub, especially towards the northern limits of its distribution, in Texas, notably in the mountain cañons of Chihuahua, it becomes a handsome tree, with a trunk six to eight inches in diameter (C. G. Pringle, in *GARDEN AND FOREST*, i., 142); and I have seen it nearly of the same size in the neighborhood of Saltillo.

189. FRAXINUS GREGGII, Gray. This species is abundant on the high slopes of the Sierra Madre, near Monterey, where it becomes sometimes a handsome small tree. Our illustration upon page 451 of this issue, made from a photograph taken last summer by Mr. Pringle in these mountains, will serve to give an idea of the habit of this tree and of its surroundings on the Sierra Madre.

not grow, Alexander and his body-guard made a long excursion to see a mountain where it flourished, and spent a day in Bacchic ecstasies and banquets, so great was their pleasure at beholding it again—a statement which certainly implies a strong love for the beautiful products of nature.

† Franz von Löhner: "Sizilien und Neapel." For a description of the present aspect of these quarries and their luxuriant vegetation see Symonds's "Sketches in Italy and Greece."

199. *FORESTIERA ACUMINATA*, Poir.—This plant, which I have seen growing with great vigor and luxuriance in different places in western Louisiana and in eastern Texas, hardly merits the title of tree, which was given to it in the Census Catalogue. It is rather a tall, broad shrub, with slender, spreading and recurving branches. It may be properly dropped from the *Silva* of North America.

Foreshiera reticulata, Torr., is reported by Dr. V. Harvard to grow as a small tree on the rocky slopes of the great cañon near the mouth of the Pecos River.

216. *NECTANDRA WILLDENOVIANA*, Nees. The oldest name of this plant seems to be *Laurus Catesbyana*, Michaux (Fl. Bor. Am., i., 244), for the *Laurus sanguinea* of Swartz (Fl. Ind. Occ., ii., 707) includes, according to Meisner (Prod., xvi., 165), two different plants; and it does not appear that *L. cyathifera*, Vahl. (Meisner, l. c.), has been published. *Nectandra Catesbyana* would seem, therefore, unless some older specific name can be found, to be the one to adopt.

219. *DRYPETES CROCEA*, var. *LATIFOLIA*, Müller. This is a very different plant from *D. crocea*, with snow-white bark, larger, thicker, and more lustrous leaves rounded at the apex, flowers with a single stigma, and oval, large white fruit an inch long, so that the original name of Vahl. (Eclog. Amer. 2, 119) *Drypetes glauca*, to which it was correctly referred by Nuttall (Sylva ii., 68) must be restored to it.

220. *SEBASTIANA LUCIDA*, Müller. The perianth of the male flowers is rudimentary in our plant, so that it must be restored to *Gymnanthes*, and so becomes *Gymnanthes lucida* of Swartz, the first name under which it was described.

223. *ULMUS FULVA*, Michx. Walter's *Ulmus pubescens* has been considered to be this species. The name is much older than that of Michaux, but Walter's characters leave it uncertain what plant he had before him, and his name cannot safely be taken up.

229. *FICUS AUREA*, Nutt. A specimen in the Kew herbarium collected by Brace (No. 356) in New Providence in 1879 shows that this common south Florida tree is also, as was to be expected, an inhabitant of the Bahamas.

230. *FICUS BREVIFOLIA*, Nutt. There appear to be only two indigenous Fig-trees upon the Florida Keys, *F. aurea*, with leaves pointed at both ends, and sessile, or nearly sessile, fruit, and a plant with cordate leaves and small, flattened pedunculate fruit, which is first yellow, but becoming scarlet at maturity. The peduncles vary considerably in length on the same plants. It is represented with yellow fruit in Nuttall's *Sylva* as *F. pedunculata* (t. 41), and with red fruit on shorter peduncles as *F. brevifolia* (t. 42). But the *F. pedunculata* of Nuttall is not the *F. pedunculata* of Aiton, but the *F. populnea* of Willdenow (vide Herb. Kew), the name which, unless some older one can be found for Willdenow's plant, must include *Ficus pedunculata* and *F. brevifolia* of the Census Catalogue and of Chapman's "Flora of the Southern United States."

232. *MORUS RUBRA*.—The variety of the Red Mulberry, first described by Rafinesque (Flora Ludoviciana, 113), with the under surface of the brighter green leaves covered with white tomentum (although the fruit is certainly not white, as Rafinesque described it),—the var. *tomentosa*, Bureau in DeCandolle's "Prodromus," xvii., 246, is common in western Texas. This is the large Mulberry-tree which abounds on the banks of the San Antonio River near its source; and I have collected it at Boerne, on the Guadalupe. The large Mulberry-tree (probably planted) in the Public Square at Laredo, on the Rio Grande, is of this form.

233. *MORUS MICROPHYLLA*, Buckley.—This Texas plant is not distinguishable from the common Mulberry-tree of Mexico and Central America, *Morus celtidifolia*, HBK, which is very common in the valley of the lower Rio Grande south of the river; and Buckley's name should disappear except as a synonym, although the Texas plants, as is natural, have generally smaller leaves than those on trees growing in the moister and more fertile Mexican valleys.

C. S. Sargent.

New or Little Known Plants.

Aster Lindleyanus.

THE handsome Aster which is figured for the first time upon page 449 of this issue is one of the latest additions to the flora of New England, having been first detected within its borders three years ago by Mr. Faxon, at Shelburne and Franconia, in the White Mountain region, and last year by Mr. E. L. Rand on the Island of Mount Desert, off the coast of Maine.

*Aster Lindleyanus** is a showy species, with stout stems ten to twenty inches high, the lower leaves ovate and obscurely cordate, with winged petioles, the upper oblong-lanceolate, the uppermost sessile and acuminate at both ends. The flowers, with pale violet rays a quarter to nearly half an inch long, are large and comparatively few, in loose panicles terminating the stems. This species is found from Labrador to the northern shores of Lake Superior, the Saskatchewan and the borders of British Columbia. It was first made known many years ago, from plants raised in England from seeds gathered in Labrador, but it has probably long ago disappeared from gardens.

Foreign Correspondence.

The Lindens for City-Planting.

THIS is the first warm summer we have had for many years. Grapes ripened before the month of August, and rye was harvested before the end of June; and, in places where the rains have not failed, vegetation is extraordinarily rich and luxuriant. I have never seen the Ash and the Oak more brilliantly decked with green. But there is a reverse to the medal. In the streets and public squares of Berlin, the Lindens, one of their chief attractions, present the sombre spectacle of a premature autumn. Their foliage, browned and withered by the heat of the sun, is already falling. The tree which has proved itself best adapted for city-cultivation—the tree so delightful for the richness of its verdure and its bloom in spring and early summer, seems no longer able to play its part in great centres of population. Yet, is it wise to banish the Linden from our cities and substitute everywhere the Elm, as some suggest? Let us consider the question a little.

Many people—let me say most people—know of but one Linden. Among us, the most common and most widely cultivated is *Tilia intermedia*, DC., commonly known as the Dutch Linden, since the Holland nurseries supply it in abundance. It possesses every good quality of the genus, but is extremely susceptible to heat. Even artificial watering fails to preserve its greenness. The same is true of *Tilia platyphylla*, Scop. Each of these species has a period of extreme beauty, lasting some months, which is followed by one of melancholy decadence. This again, toward the autumn, gives place to a partial re-leaving, never, however, as in the case of the Horse-chestnut, carried to the point of a second blossoming within the year.

For its ornamental qualities *T. ulmifolia*, so common in its wild state in the north of Germany, is superior to its congeners. It has not their fine flowers and foliage, and it falls behind them in growth, but it better resists heat and drought. To be convinced of this I have only to look out of my window upon Leipzig Square, where stand the noblest Lindens of Berlin. The leaves of this species are of a bluish tint. Looking at a single specimen, almost lost among the crowd of its neighbors, I am forced to concede to it a superiority in some respects. This particular specimen has also lost some of its leaves, but it is not an eyesore like most of the others around it, which, besides their suffering from drought, have been preyed upon for two years by voracious caterpillars (*Bombyx dispar*, *Daschyra pudibunda*, and a third species, whose name I do not know). I remember having noticed similar ravages among the trees in 1883, when, as early as the beginning of July, a long drought caused the blossoms of the Dutch Linden to fall in such quantities that they were swept away in heaps. The proper remedy for this trouble is not found in the substitution of another tree for the Linden, but in the employment in future plantations of a Linden different from the species now generally planted.

The species I recommend is the Crimean Linden (*T. dasystyla* = *T. euchlora*, K. Koch). Little known as a wild tree, it

**Aster Lindleyanus*, Torr & Gray, *Flora N. Am.*, ii, 122—Gray, *Syn. Flora*, i, 2, 182.



Fig. 127.—*Aster Lindleyanus*.—See page 448.

began to find its way into Germany about twenty years ago. It grows rapidly. Its top, while young, assumes a broad pyramidal form. The stout texture of its leaves, and their glossy surface, seem to have predestined it for intra-mural

plantations. The specimens which have come under my observation have remained unharmed, while other *Lindens* have suffered seriously. It would be advisable to make a trial of the Crimean Linden in America, where its advantages

would, probably, be even more apparent than they are here.

The beauty of all Lindens is great and incontestable. In the case of the Crimean Linden, this beauty is heightened by the lustre of the leaves, which resemble those of the Beech. It also has the advantage of blooming as late as the last week in July. The tree must attain a considerable age before it blooms, which it did in Berlin for the first time in 1873. My trees at Scharfenberg are fruiting well this year, and we shall have an abundance of seed.

We have here, also, some specimens of a variety of *Tilia platyphylla*, which is remarkable for the yellow color of its young branches and buds, a peculiarity which disappears in summer, but is very noticeable in winter and early spring. This is the variety known as Aurea. I mention it here because I have learned something as to its origin. It was discovered before 1829 in a forest of Alsace, near the outskirts of Bollwiller, by M. Baumann, who also first distributed it.

Berlin.

C. Bollé.

Cultural Department.

Notes on Hypericums.

THE Hypericums, or St. John's-worts, embrace more than 160 described species of herbaceous and woody plants, and there are, probably, a good many more still unknown. Of the known species only a comparatively small number are of much value to the florist or gardener, although all may be interesting or beautiful from the botanist's point of view. Except in very rare cases, in which the blossoms are white, the flowers of all the species are yellow, and they vary in size from very minute ones on slender annuals, an inch or two high, to the large golden yellow blossoms, several inches in diameter, of some of the cultivated species.

They are chiefly found in North America, Europe and Asia; but a few are tropical, and some inhabit the southern hemisphere. In Europe a few of the tender species are thought worthy of green-house culture. The name of St. John's-wort is said to have been derived from the fact that the common people of some European nations, especially the English and Germans, used to gather large quantities of the flowers and ornament their dwellings with them on St. John's Day, as a supposed protection from evil spirits. The species chiefly used for this purpose and to which the name was first given was the common St. John's-wort (*Hypericum perforatum*), which is found all over Europe and a large part of Asia, and which, having become naturalized in America and spread over a large area, is now looked upon here as a troublesome weed. It is a perennial herb, and when in full bloom is certainly as handsome as some of the occasionally cultivated herbaceous or half-shrubby species. The deep yellow flowers, in large corymbs, are over an inch in diameter and crowned with many stamens, and the leaves have very distinct pellucid dots, which are plainly seen when held up to the light. These dots on the leaves are characteristic of this genus, but they vary in number and size on different species, and are often black instead of pellucid. They secrete aromatic resinous juices and a volatile oil.

The Hypericums are generally not difficult to cultivate and propagate, yet very few classes of hardy ornamental plants are so little known and so poorly represented in American gardens generally. Some of the group are particularly valuable, because they flower after most shrubs and early summer-blooming perennials have past their best condition, and before other autumn flowering kinds have developed much of their efflorescence.

A number of shrubby and half-shrubby species of Hypericums, grown in England and the warmer parts of Europe, cannot be relied upon for hardiness to withstand the winters of our New England or Northern states. But among those tested at the Arnold Arboretum are some which are thoroughly satisfactory, and others that have promised well in the short time that they have been in the collection. They have been grown in an exposed situation where there was little protection in winter and no shade in summer, and where it was, perhaps, too wet in winter and spring to give the best results.

Of the low-growing, half-woody species, *Hypericum calycinum* is decidedly the most interesting and satisfactory. The stems are less than a foot high, and although killed back to the ground every winter, new flowering shoots arise from the creeping, woody rootstocks. The large, smooth, green leaves are ovate or oblong, and have very small, pellucid dots. Rarely more than one flower is developed at the top of each stem. The handsome flowers are bright yellow, from two to three inches in diameter, and crowned with many long sta-

mens. This species is easily propagated by root-cuttings, or cuttings of ripe wood in late summer. The roots spread and ultimately make large clumps, and the plants will thrive very well either in the open sunlight or under trees, if the soil is not too poor. In the Arboretum this Hypericum begins to flower early in July, is in its best condition during that month, and bears a few flowers in August, or even later. It is a native of south-eastern Europe. This and all the other Hypericums bloom later and for a longer time if grown in a cool, partly shaded place.

Hypericum hircinum, though not so handsome as the preceding species, is a very free bloomer and is easily cultivated. The stamens are very long and of varying length, the longest being about one and one-half times the length of the broad, pale yellow petals, which are three-quarters of an inch long. The stems are killed almost to the ground in winter, and come up again each year to nearly two feet in height. It begins to flower about the second week in July and continues until near the end of August. The form known as the Minor variety is simply smaller and more compact in every way, and it seems to flower somewhat later.

H. multiflorum grows taller than the last species, which it much resembles in foliage and flower. It is more shrubby, but its blooming season is shorter, lasting for only about two weeks in July.

H. oblongifolium, a native of high altitudes of the Himalayas, has not proved very hardy, but should be further tested. It has large leaves and very handsome, golden-yellow flowers from two to three inches in diameter. Another Asiatic species is *H. patulum*, with somewhat smaller leaves and flowers. It has usually proved hardy, but, with some others, was killed last winter. *H. Androsæum*, the Tutsan or Sweet Amber of England, requires further proof of hardiness before it can be recommended here. Some of these species, as well as some others, may thrive with little care in the climate of the middle states or further south, but here they require a good deal of protection in order to give very satisfactory results.

But among the thirty known North American species are several which are perfectly hardy and also very bright and effective as ornamental garden shrubs. By far the best of these is the beautiful *Hypericum aureum*, of which a description and figure were given in a recent number of GARDEN AND FOREST (pp. 184 and 185). In cultivation it is a bushy, very much branched shrub, three to four feet high, and often more in diameter. Several flowers are usually produced on the end of each branch and branchlet, although in a wild state the flowers are often solitary. The flowers are an inch and a half, or sometimes nearly two inches in diameter, and the petals are very thick and firm, and pale yellow or orange in color. The stamens, of which a careful count shows a thousand in a well-developed flower, are a little more than half the length of the petals, and of a golden-yellow color. When the flower is first open the stamens are so arranged that they have a beautiful dome-like shape, but, after repeated visits by humble-bees, which eagerly collect the pollen, the stamens lose their anthers, become more spread out, and have something of the appearance of a broad square-faced brush. The color gradually changes to an orange-brown, and after the third or fourth day the filaments become brown and are ready to fall with the first wind or rain. Although a native of Tennessee and other southern states, this species proves perfectly hardy about Boston, where it continues blooming from the first or second week in July until the middle of August, or later if the plants are young, or are grown in a moist or partly shaded place.

Hypericum prolificum is a species found from New Jersey southward, and also westward in Minnesota, Illinois, etc. It is the American species which is perhaps most commonly cultivated in European gardens. Between this species and *H. Kalmianum* there appears to be no very great choice as to ornamental value. The latter was originally found in the vicinity of Niagara Falls, and extends over the region about the Great Lakes, and within a few years it has been reported from Middle Tennessee. In its native habitat it varies in size from a few inches in height in exposed places to a couple of feet or more in favorable situations. In cultivation it will grow about as large as *H. prolificum* which attains a height of three feet or more. Both species are quite hardy. Perhaps *H. Kalmianum* being found so far north would do best in localities where the winters are very severe. The leaves are narrow, one or two inches long, and the thin petalled golden-yellow flowers are about an inch across, and produced in single or compound clusters at the ends of the branches. The leaves of *H. prolificum* are usually larger, and the flowers more numerous, though somewhat smaller, than

in *H. Kalmianum*. Botanically the chief distinctions between these two species are the five styles and five-celled capsules of *H. Kalmianum*, and the three styles and three-celled capsules of *H. prolificum*, but, in cultivated seedlings, these divisions appear to be by no means constant, and the capsules of specimens grown as *H. Kalmianum* are sometimes three, four, five, or six-celled on the same plant or branch.

These two species and *H. aureum* have been grown together in the Arboretum, and the seedlings produced from them have shown a tendency to variation, which seems very strongly to indicate hybridization. This might result from the work of bumble bees, which, in collecting the pollen, fly indiscriminately from one species to another. These plants do not seem to be very long lived and though they may do well for eight or ten years, or more, renewals should be made every six or seven years. Young plants from seed may begin to flower the second year if well grown. With a little trouble they may be propagated by cuttings, and in this way a particularly fine form might be best perpetuated.

Hypericum densiflorum is closely related to *H. prolificum*, of which it was classed as a variety in Gray's Manual. It is said to grow five or six feet high and to have more numerous, though smaller flowers. *H. Buckleyi*, a rarer species, is found in the mountains of North Carolina and Georgia, and is described as a branching shrub about a foot in height with flowers about an inch across. These two species have not yet been grown at the Arboretum. They will probably be quite hardy, but, horticulturally, not an improvement upon, or more desirable than the species already cultivated. *H. fasciculatum*, a plant three to six feet in height, has extremely narrow leaves. It has not yet been tested thoroughly at the Arboretum.

H. sphaerocarpon,* another southern species, is hardy, though dwarf, and not very shrubby. It has large cymes of rather small flowers followed by dark brown fruit. It cannot be called a very ornamental species, and is hardly more interesting than the troublesome *H. perforatum*.

The largest fruited American species is *H. pyramidatum* which Prof. John M. Coulter, in his "Revision of North American Hypericaceæ" (*Botanical Gazette*, vol. xi, 1886, p. 83), refers

to *Hypericum Ascyron* as it is found to be identical with that European and Asiatic species. It is herbaceous, and, though interesting in a general collection, is hardly ornamental. In cultivation the stems grow five or six feet high, the flowers are large with pale thin petals, and the large conical capsules are three-quarters of an inch or more long, and half an inch in diameter.

Arnold Arboretum.

J. G. Jack.

Border Carnations.

THE specialists in Carnations and Picotees held their meeting and exhibition as usual this year in London, but the

plain fact is that florists of the ancient type—those to whom a faultless circular outline to a flower and a smooth, flat petal are matters of momentous interest—are fast dying out, and with them the cunning art of "dressing" and "tweezing" flowers so as to make them artificially conform with the models of perfection they set up for themselves. But while we see the gradual decay of the old type, we are, at the same time, witnessing the rapid and vigorous growth of the modern florist and a flower-loving community caring less for highly bred varieties, distinguished by perfect "points," than for sorts of vigorous habit, great floriferousness, and the rich and distinct colors which characterize the modern race of border Carnations, which every year become more and more popular, not only because they are so beautiful, but because everybody can grow them without extra care and coddling. Consequently we see little or no improvement among the Flaked and Bizarre Carnations year after year, while each exhibition brings to the front numerous beautiful border varieties, rich and varied in color and with strong perfume. These self-colored sorts are



Fig. 128.—*Fraxinus Greggii*.—See page 447.

infinitely more beautiful than the striped flowers, and at the exhibitions the self and fancy Carnations and the Picotees seem to win the most admirers, and at the last show this was particularly noticeable. Since the border Carnation has become such an important flower in the cut flower trade, it has been the aim of every Carnation grower to raise the best white, the best yellow, or the best scarlet, or raise some new and striking color that will take in the market. We have many good scarlets and not a few good whites, but there is still room for yellows of various shades. Pride of Penshurst, Germania and

*Since this was written, Prof. John M. Coulter, in *Botanical Gazette* (p. 200), states that *H. sphaerocarpon*, of Michaux, must now be called *H. cistifolium*, of Lamarck.

Will Threthfall are good, but we want more pure yellows, both of deeper and paler shades. We have a host of what are called yellow-ground sorts—that is, those in which the body-color is yellow, striped or edged with red or some other tint—but these are not nearly as popular as the pure colors. Among the finest whites is Gloire de Nancy, a clove-scented sort that is now as common almost as the old Crimson Clove and the Blush Clove. Probably the greatest hit that has been made of recent years in point of color was that by the raiser of the Mrs. Reynolds Hole variety, its color being distinct from any other. It is popularly described as terra cotta, but its more definite description would be apricot red. It is among Carnations what W. A. Richardson is among Roses—a color admired by every one.

Since the above was written I have found at the Messrs. Veitch's nurseries some fine novelties. One of the most distinct new whites is Elaine, whose purity of bloom and vigor of growth is admirable. A very fine scarlet is Defiance, though it is not such an acquisition as a new white or yellow would be, since there are some splendid old sorts of a similar color. A very rich crimson sort, named William Toby, is likely to prove an extremely fine hardy border plant, being free in bloom and strong in growth, while a splendid purple is Purple King.

The Clove Carnations are the best of all town-garden sorts, and the gardens of the Thames Embankment have been enriched this season by glorious masses of the old Crimson Clove, the White Clove, and Blush Clove, the latter being the most remarkable because less common. There is much discussion about the new Crimson Clove, named Paul Engleheart, on account of its sturdiness of growth and dwarfness, which does away with the necessity of staking, which is one of the objections to border carnations. If we can get a race of dwarf Carnations of various colors that would hold up their flower-stems without stakes, it would indeed be a boon. I first saw Paul Engleheart some three or four years ago, and since then I find it has become widely distributed, even reaching American gardens. I was pleased to see Mr. Gerard's favorable mention of it in GARDEN AND FOREST (p. 332), and I hope it may lead to a wider knowledge of the plant. Other sorts of similarly dwarf growth would be welcome. Mr. Robinson, the editor of *The Garden*, is devoted to the Border Carnation, and at his garden in Sussex he grows every sort worth knowing. He offers prizes for the finest novelties so as to encourage raisers, and he receives, throughout the Carnation season, an enormous lot of blooms from all directions, but he can rarely find a dwarf habited sort like Paul Engleheart.

Kew

W. G.

Notes on Wild Flowers.

THE Swamp Rose Mallow (*Hibiscus moscheutos*), still in bloom, is well worthy of cultivation, and in rich soil will grow to a height of over five feet. The plant somewhat resembles the Single Hollyhock, both in the measure of its growth and the shape and appearance of its flowers. We have heard it called the "Wild Hollyhock," which, we think, is a good name for it. The flower is rose-colored at first, changing to a paler hue, and nearly six inches wide. The leaves are two or three inches broad, nearly round, numerous, and form a pretty contrast with the large showy flowers.

The Button Snake-roots or Blazing Stars (*Liatris*) are, several of them, in flower, and their long showy spikes of purplish flowers are very pretty. *L. spicata* is the finest species we have seen. This plant grows about four feet high in cultivation, and the long, loose spikes of lightish purple flowers frequently form more than half the length of the plant. *L. scariosa* is somewhat similar in its appearance, but does not generally attain over three feet in height under cultivation. Another small species, about fifteen inches high, is *L. cylindracea*. All seem to be easy of culture. They like open sunlight and a light loamy soil. *Lobelia cardinalis* (Cardinal Flower) is one of our finest plants for cultivation. Few species equal it in richness of color. In cultivation the flowering spike is frequently over a foot long, and thickly set with its flowers. The plant is usually nearly two feet high, as seen growing naturally along our brook sides, but fully a third taller under cultivation. *Lobelia syphilitica* (Great Lobelia), also in flower, is two to three feet high, with light blue flowers in loose spikes about a foot long. The leaves are about four inches long by half an inch or more wide, and are quite numerous along the stem below the flowering spike. The plant seems to do well in either shade or sun.

The Whorled Milkweed (*Asclepias verticillata*) is nearly past flower. Under cultivation it grows about eighteen inches high,

bearing in numerous small umbels its purple and white flowers. The numerous leaves are long and narrow, tapering to a pointed end. The seed pods are erect, nearly six inches long. The plant is quite pretty and easy to grow.

Cassia Chamæcrista (Partridge Pea) is an annual which, in rich soil, often grows two feet high. The plant is spreading in its habit, branching from the bottom, and bearing in great abundance its bright yellow flowers, which are about an inch wide. But the beautiful foliage of the plant, which is very delicate, is quite as much of an attraction as the flowers. The leaflets, a dozen pairs or so, have an odd habit of folding themselves up at night, and then opening out again in the morning at sunrise. It is easily grown from seed, and is a valuable plant.

Another beautiful annual is the California Poppy (*Eschscholtzia Californica*). The decumbent stems are about eighteen inches long. The foliage is a light green, delicate, and very beautiful. The flowers, which are borne in great abundance, are nearly two inches wide, bright yellow, with a reddish centre, somewhat resembling those of a yellow Calochortus. Few annuals of our choicest collections can be compared with this for beauty when grown on a rich and moist sandy loam.

Many of the Wild Asters or Starworts are now in flower, and they give us much more variety of color, though scarcely more numerous in kinds, than the Goldenrods. One of the finest is the *Aster laevis*, which generally grows from one and a half to three feet high, bearing a loose head of beautiful sky-blue flowers, which are three-quarters of an inch, or more, wide. It grows on sandy soil, and takes readily to cultivation. *A. Nova-Angliae* is a stout species, often seven feet high, very leafy throughout, and bearing a large corymb of violet-purple flowers about an inch wide. The plant is a very showy one when at its best. *A. ericoides*, fully a week later in flowering, has firm, light green foliage, and a profusion of pretty white flowers half an inch wide. This species grows about two feet high, and, planted in beds, forms a solid mass of fine foliage and flowers quite attractive.

The earliest Aster in this section is the large-leaved species *A. macrophyllus*. The curious root-leaves of this plant are very conspicuous, often nearly a foot long by half as wide. One point in which this species seems to differ from most others is that only a small portion of the plants flower. We often find large beds of apparently strong plants, and perhaps not more than half a dozen will be flowering. When in flower the plant is usually about two feet high, and bears a corymb of white, or bluish-white flowers. It is a desirable species, both for its foliage and flowers. *A. cordifolius* is another fine species, quite variable in size and the color of its flowers. Its prettiest forms are very beautiful, and under cultivation it attains a height of three feet or more. *A. undulatus* grows on dryer soil than most species and should be a valuable plant for dry situations. It has pretty light blue flowers, and attains a height of about two and a half feet.

Charlotte, Vt.

F. H. Horsford.

Autumn Work in the Flower Garden.—When any alterations in the flower-garden are contemplated, many of these can always be made in autumn, and whatever is done in the way of shifting plants should not be delayed too long. The fall is the only proper time to move such early flowering plants as German Iris, Pæonies, Phloxes of the Subulata section, Narcissus, Camassias and all others that bloom in the early summer months. Plants lifted carefully at least six weeks before the advent of frost have ample time to make enough young roots to carry them through the winter, as the soil is still quite warm, and wherever it is sufficiently moist, action is by no means suspended. Lilies may now be transplanted as soon as the foliage and stems show signs of ripening, as this is the only time when they take a rest, and but a short one at that. A little later, roots will be starting from the base of the bulbs to carry them through the winter and until such time in the spring as the shoots are far enough advanced to supply their own feeders. Many failures result from planting Lilies in fall, because the bulbs have no chance to establish themselves before all growth is arrested by frost, and they are in a poor condition to meet the demand upon them in spring, when the young shoots should be produced. It is often the case that bulbs remain dormant a whole year from this cause. Any one who has grown Lilies is always in a position to report failures with some one or other of his pets, and this is not to be wondered at when it is considered that bulbs are received from their homes in all parts of the world and all are expected to thrive satisfactorily in the same spot and under the same treatment. Here in the East the Japanese Lilies grow without any trouble, but there are many of the California kinds that require

protection, and this is easily provided. They should be planted with others of the more tender kinds, such as *L. giganteum*, *L. Krameri*, *L. excelsum*, *L. longiflorum*, *L. Dalmaticum*, *L. Szovitsianum*, all near each other, where they may be shaded from the mid-day sun, and when the ground begins to freeze up a frame may be placed over them, filled with dry leaves and covered with shutters to keep out rain and sun-heat. In this way many delicate plants may be cultivated successfully. We never had *Anemone fulgens* so good as when thus treated. In the early part of May the bed was a perfect blaze of color. *Sternbergia lutea*, too, may be grown and flowered well, and many other things that cannot be trusted to the tender mercies of an Eastern winter. The frame should be removed as soon as the shoots are above ground in spring and all danger from spring frosts is passed. If the soil be heavy, and of a retentive nature, the addition of a little sand for the choicer Lilies will be an advantage, and we find powdered charcoal excellent to place around the base of the bulbs themselves. This promotes healthy root-action and assists in keeping away worms and grubs. If the soil is poor and it is necessary to add manure, care must be taken that it does not come in contact with the bulbs, which latter should first be covered with two or three inches of soil. The manure, which should be well decomposed, or, better still, decayed leaf-mould, should then be applied. In a position shaded from hot sunshine, and where tree-roots are not liable to rob the soil, it is not too much to expect that almost all the known Lilies can be successfully cultivated in a very limited space, year after year. The care and time bestowed upon these most beautiful of hardy flowers will be amply repaid by the abundance and richness of bloom and, eventually, by the increase of bulbs.

Passaic, N. J.

E. O. Orpet.

Roses and the Larvæ of the June-bug.—Much complaint has been made among Rose-growers during the present season of the ravages of the cockchafer grub, so-called, the larva of the well-known June-bug, *Lachnosterna fusca*, and, while this is not an unusual complaint, yet it seems to be especially loud this year. More or less damage is caused by this insect to newly-planted Roses, under glass, every season, and the loss is considerable in some large establishments. In several instances brought to my notice during the past month, from two to three hundred plants have been destroyed, while the loss of valuable time during the best growing season is really of more serious importance than the money value of the plants that have been destroyed. This grub seems to do its work in a rather indiscriminate manner, apparently cutting off the plant nearest to it without any regard to its being a strong plant or a weak one, and, unless captured after the first offense, it immediately proceeds to the next plant and continues its work of destruction, sometimes spoiling four or five plants in succession. Its usual method is to cut off all, or nearly all, the roots just at the base of the plant, or else to girdle the stem down near the base. Either plan is very effectual in killing the plant, which only survives the attack for a few days.

The first sign of injury shown by a Rose, after having been bitten by this pest, is usually its wilting under the influence of sunlight, which proves that something is wrong with its roots (providing the soil be in a proper condition as regards moisture), and, when such a manifestation is made by a previously healthy plant, it is well to examine the roots at once, and make a careful search of the surrounding soil to find the grub, which is usually not far away. It is not easy to prevent this loss, although it is safer to plant Roses in a compost that has been prepared for a year or so, because the eggs of the June-bug are deposited in the grass, and, after having been hatched out, the larvæ descend a short distance into the soil. In this way they are carried with the sod to the compost heap, and, if this compost is used immediately after mixing, it is reasonable to suppose that more of the grubs are brought into the houses with it than would be brought if it were allowed to stand for a year when many of the larvæ will have finished their growth and disappeared in the form of perfect beetles. This grub being of comparatively large size (from one to one and a half inches in length), is readily seen among the compost, and should be watched for when the benches are filled or the beds made ready for planting. In this way many may be destroyed before they have a chance to do injury, and the slight additional labor will save many plants, besides preventing the discouragement which is sure to visit the grower as one after another of his young Roses suddenly falls while it is making an apparently vigorous growth.

Holmesburg, Pa.

W. H. Taplin.

Orchid-Culture, Past and Present.—A very interesting paper bearing this title was read by Mr. Harry J. Veitch, of Chelsea, at a meeting of the Royal Horticultural Society, on June 11th last, and is published *in extenso* in a recent issue of the Society's Journal. A perusal of the same is not only interesting, but very instructive, and, among other things, reminds us that the commencement of what may be called the period of modern Orchid-culture dates from only a quarter of a century ago. Prior to that period, cool treatment was practically unknown, and cool Orchids were killed off as rapidly as imported by the incredible folly, persisted in, of cultivating them in hot stoves, in a climate to which they were as great strangers as to our severest winter frosts. It was in 1863 that three different collectors were sent out to New Granada to obtain living plants of the beautiful *Odontoglossums* of that region, which were then chiefly known from dried specimens. A few species had previously appeared in cultivation, *O. bictonense* being the first to reach England alive, as early as 1835; but it was not until the later period, when the conditions under which these Alpine Orchids grow became understood and imitated in gardens, that the Andean *Odontoglossums* became common in cultivation. The same may be said of cool Orchids generally, and what a large proportion of them modern collections contain is patent to every one. If the cultivators of an earlier period could see some of our best modern collections, how great would be their astonishment and admiration.

Half a century ago a considerable number of Orchids were successfully cultivated, most of them, however, found at low elevations in the tropics, and for these, warm houses must be provided at the present day. But a little earlier in the century profound ignorance as to the requirements of an Orchid seems to have reigned, and it is very instructive to observe the gradual evolution of our modern system of culture.

The earliest recorded instance of the flowering of a tropical Orchid in Great Britain dates from over a century and a half ago, but is not mentioned by Mr. Veitch. It appears that Peter Collinson received a dried specimen of *Bletia verecunda* from Providence Island, in the Bahamas, in 1731, and not despairing of life in the tuber, sent it to the garden of one Wager, where it was placed in a warm bark-bed during the winter, and produced its flowers during the following summer. In this single experiment we may see the germ from which modern Orchid-culture has been developed.

The Vanilla appears to have been established in cultivation prior to 1768, being mentioned in the second edition of Miller's Dictionary of Gardening of that date, but of *Epidendrum* the same author remarks that "the plants cannot by any art yet known be cultivated in the ground, though, could they be brought to thrive, many of them produce very fine flowers of uncommon form." Three species sent from America were planted with care in pots and placed in a stove, where they flowered, but soon afterward perished. *Phajus grandifolius* and *Cymbidium ensifolium* were introduced from China about 1778; *Epidendrum cochleatum* first flowered in this country in 1789, in the Royal Gardens at Kew, where also flowered *E. fragrans* in October of the following year. In 1794, fifteen species, chiefly West Indian *Epidendrams*, are recorded as being in cultivation at Kew, "in very great heat, and with fragments of half-rotten bark at their roots." A number of species from temperate regions were introduced previous to this date, but these may here be passed over.

The first Epiphytal Orchids received in England were brought from the West Indies by naval officers and captains of the merchant service, who gave little information respecting them beyond the fact that they grew on trees. Hence they were believed to be parasites like the Mistletoe, as will appear from a note by the editor of the *Botanical Register*, when figuring *Epidendrum nutans*, at plate 17. He there remarks: "The cultivation of tropical parasites was long regarded as hopeless; it appeared a vain attempt to find substitutes for the various trees each species might affect within the limits of a hot-house."

Messrs. Loddiges, of Hackney, who commenced the cultivation of Orchids for sale in 1812, were among the more successful cultivators of the period, and it is interesting to note their methods. The compost was made of rotten wood and moss, with a small quantity of sand. The Orchid-stove was heated by brick flues to as high a temperature as could be obtained by that means, and by a tan-bed in the middle, kept constantly moist by watering, from which a steamy evaporation was rising at all times, without any ventilation from without. Well might it be remarked that it was as dangerous to health and comfort to enter one of these houses as it was into the damp, close jungle in which all tropical Orchids were then supposed to have their homes; and no wonder they seldom lived long

under such treatment. England could not well be anything else than "the grave of Orchids" until a more rational system was adopted. We hope to return to this interesting subject in a future article.

London.

Calypso.

The Vegetable Garden.—Lettuce-seed sown now will give plants in time for setting in cold frames before winter comes, and, if the winter be not too severe, many of the plants can be used before spring, for they will grow if only protected from frost. Spinach, for early spring use, should also be sown now. After the plants are of good size, and before hard weather sets in, a mulch of manure will be beneficial. A few plants of Watercress may be set in a frame where the soil is damp, and, if the frost can be excluded, they will make a new growth, which will prove an agreeable relish in winter.

The Forest.

The Douglas Fir in Scotland.

AMONGST the exotic timber trees which have been introduced into Europe during the present century, the Douglas Fir has attracted more notice than any other species, owing to its remarkably quick growth during early youth. Specimens growing in free positions are believed to have laid on a mean annual increment of as much as three cubic feet, while only one cubic foot, at the outside, could be expected from a Larch tree; and even in a few fully stocked woods the increase appeared exceedingly great.

More than a year ago a Scotch paper drew attention to the oldest pure wood of Douglas Fir, situated at Taymount, in Perthshire, on the estate of the Earl of Mansfield. The plantation in question was spoken of in glowing terms, but only a few scanty measurements were given, so that it is difficult to arrive at any definite idea on the progress of the plantation, whereby it can be compared with that of indigenous timber trees.

Such general statements are often misleading, and therefore a correspondent of the *Gardeners' Chronicle*, no less an authority than Mr. W. Schlich, late Inspector-General of the India Forest Depot, measured, in July last, a sample plot in the Taymount plantation, and also measured, by way of comparison, a sample plot in an adjoining Scotch Pine plantation. The results of these measurements are not only of interest to forest-planters in Scotland, but they well illustrate certain general principles which should be borne in mind by planters in every country who propose to plant forests of exotic trees.

The plantation of Taymount is situated in $56\frac{1}{2}^{\circ}$ northern latitude, and at an elevation of about 200 feet above the level on the sea. The locality may safely be set down as of the best quality for the growth of trees. The rainfall is placed at twenty-eight inches annually. The area of the plantation amounts to eight acres, and was planted in the spring of 1860, in the following manner: Douglas Fir, four years old, nine by nine feet; Larch, four years old, one between every two Douglas Firs, and an additional line between every two lines of Fir, so that the plants stood four and one-half by four and one-half feet, each acre containing 2,151 plants, of which 538 were Douglas Fir and 1,613 Larch. The plants of Douglas Fir were two years' seedlings and two years' transplanted. The plantation took a good start, and the Firs are said to have taken the lead at once. The Larch were gradually thinned out, until the last disappeared before the year 1880, since which time the plantation was one of pure Douglas Fir. The first regular thinning of the Douglas Fir occurred in 1887. Before that thinning about 277 trees remained per acre, the remaining 261 having gradually disappeared during the previous twenty-seven years. Of the 277 trees, seventy-five per acre were thinned out in 1887, so that now, in 1888, the countings showed 202 trees per acre.

On a sample plot of average appearance all the trees were measured at a height of four feet six inches from the ground, and a selected tree was felled and its cubical contents accurately determined. Without giving the tables in detail, it appears that the sample tree could be taken as equal to the average tree in all dimensions, and estimating its growth, the result showed that, leaving out of account the amount of wood removed in previous thinnings, an acre of Douglas Fir had given an annual increase, during the twenty-eight years since the trees were planted, of 133 cubic feet of wood.

By way of comparing these results with the production of an indigenous tree, the trees on a sample plot of one-tenth of an acre—in a very uniform plantation of Scotch Pine, situated at a short distance from the Douglas Fir plantation—were meas-

ured. This Scotch Pine plantation had been established in a somewhat elevated spot, which was formerly of a swampy description. The locality is of second quality only, compared with the locality in which the Taymount Douglas Firs grow. It was drained and planted in 1847—that is, forty-one years—with four years' old plants of Scotch Pine; it has been thinned four times.

The result of the careful survey showed that an acre of Scotch Pine had given an annual production of 122 cubic feet of wood, against a production of 133 cubic feet made by the Douglas Fir. This difference is not great, and it is less important than it appears, when we consider that the quality of the soil in the Scotch Pine wood is decidedly inferior to that of the soil in the Douglas Fir wood.

Unfortunately, Mr. Schlich had no opportunity of measuring a Larch wood in the vicinity of Taymount, but it is well known that, up to an age of forty-five years, at any rate, Larch produces a greater volume than Scotch Pine, so that he does not hesitate to say that, "If grown in a well stocked or crowded wood and in localities of equal quality, Douglas Fir is not likely to produce more solid wood during the first thirty or forty years than the Larch, and probably, also, not more than the Scotch Pine."

The explanation is, that although the individual Douglas Fir develops more rapidly in diameter and in height than a Scotch Pine or Larch, it requires, at any rate in Scotland, much more space; and, consequently, an acre of land will hold only a much smaller number of trees. Moreover, the stem is more tapering than those of the important European conifers.

On the other hand, the growing stock of a Douglas Fir wood consists of much larger trees (though smaller in number) than an equally old Larch or Scotch Pine wood, and this is a great advantage where big timber fetches higher prices than moderate-sized timber. This advantage will, however, to a considerable extent, disappear with advancing age, when the indigenous timber trees of Great Britain reach the size usually demanded in the market.

The Taymount plantation gives some valuable data for comparing the Douglas Fir with other trees in the early stages of its development; but, of course, it gives no information as to its further production. The rate of increment of various European conifers is well known, but of the Douglas Fir, even in its native home, no accurate measurements are available. Mr. Schlich proceeds, however, to gather such additional facts as he can from the following data:

(1) Two Douglas Firs, planted on the same estate, and now fifty-seven years old, are ninety feet high.

(2) Dr. Mayr found the tree in its best estate in the moist valleys of the Cascade Mountains, where the average height of full-grown mature Douglas Firs, grown on soil of the best quality, amounts to 213 feet, with a diameter of six and a half feet, measured at six and a half feet above the ground. In the same locality, on gravelly soil, the trees only reached an average height of 148 feet, and a diameter of two and six-tenths feet. Again, in the Rocky Mountains, in Montana, at the same elevation and degree of latitude as on the west coast, the Douglas Fir reaches, on best soils only, the same dimensions as on the gravelly soil of the Cascade Range Mountains—that is to say, a height of 148 feet, and a diameter of about two and six-tenths feet. The part of the Cascade Range where the Douglas Fir grows has an annual rainfall of about thirty inches, while in Montana only twenty-four inches fall, and Dr. Mayr believes that the development of the Douglas Fir is proportionate to the rainfall.

(3) A cross-section of a Douglas Fir was sent from America for exhibition in Europe; it was then made over to Kew, and by the kindness of the Director was lately presented to the Cooper's Hill Forest Museum. The section shows a total diameter, including the bark, of seven feet nine inches, and the counting of the concentric rings indicates a total age of 515 years. An examination of this tree shows that it was still making good increment at an age of 515 years, which is higher than that usually attained by the European Larch, Scotch Pine, Spruce and Silver Fir. Secondly, it shows that the enormously rapid increase of the diameter during the first twenty-five years is suddenly followed by a much smaller and an approximately even increment during each of the following nineteen periods of twenty-five years. Thirdly, that the sectional area increases, on the whole, steadily. The periodic increment increases up to the age of 400 years, when it commences to fall. Taken by centuries, the fourth century yielded the largest increment. And finally, the rate of growth indicated in the section up to the year thirty resembles that of the average tree in the Taymount plantation in a striking degree.

So far, then, the trees in Scotland may be considered to have done as well as those of the same age, under good conditions, in their native home. Assuming, therefore, that they will continue to increase as rapidly as did the great tree whose section was sent to Kew, the conclusion is reached that under a rotation of seventy-five, and perhaps of eighty, years, the Larch will yield as much solid wood as the Douglas Fir whenever they are grown in regular, fully stocked woods, and in localities of equal quality—with this difference, that the material yielded by the Douglas Fir will consist of a smaller number of trees per acre, with a greater mean diameter per tree.

It may be added that the Douglas Fir would yield a larger amount of wood in a rotation of from 100 to 120 years than it would in a longer or shorter rotation. The difference, however, would not be great, and planters are not inclined to wait so long for returns.

As to the quality of the timber, the wood of the Douglas Fir has a great reputation, and in America its quality is believed to be equal to that of Larch timber. In how far the Douglas Fir grown in Scotland will come up to that standard remains to be seen. The larger sized trees so far cut on the Scone estate have been freely bought at the same rates as those usually paid for Larch, but sufficient time has not elapsed to show the comparative merits of home grown Douglas Fir and Larch timber.

As to the safety of production, it is an undisputed fact that Douglas Fir can, in Scotland, only be successfully grown in sheltered localities, because its leading shoot, and even the lateral branches, are very liable to be broken by wind. This reduces the area suitable for its cultivation very considerably. Then there can be no doubt that the Douglas Fir, in order to yield large volume returns, requires good, fertile, and fresh, or moist, soil—in fact, soil on which any other species will produce a large volume of timber. Such land can, moreover, be used to greater advantage for field crops. What is specially required is a tree which will do well, or at any rate fairly well, on lands which are not suitable for field crops.

Finally, it has been said that the Douglas Fir is not exposed to any disease, while the Larch, for instance, suffers so much in this respect. But it will be remembered that the Larch disease did not show itself in Scotland until about sixty years ago.

No doubt exists now that the Larch cancer is the result of the ravages of a fungus, and Dr. von Tubeuf has lately described a similar one which is parasitic on the Douglas Fir. It is found, as a general rule, that those Douglas Firs were especially attacked which grow in fully stocked areas, so that the branches of the trees interlaced; and in these cases the lower branches were more attacked than those higher up. This means that the Douglas Fir must be grown in thin, open woods, and if so, farewell to any high returns per acre, such as Silver Fir, Larch, or even Scotch Pine, will yield.

Mr. Schlich concludes by saying that there is encouragement to plant the Douglas Fir in Great Britain and Ireland, and he hopes that experiments may be continued. He only writes to sound a warning against extensive plantations until it has been demonstrated that it really deserves to supersede species hitherto cultivated. Great things were expected of the White Pine in Great Britain, and probably the Douglas Fir will not revolutionize sylviculture in the United Kingdom. It is one thing to nurse a single tree in a fine soil and under most favorable conditions, and another to grow trees on a large scale for economic purposes. In the former case only exceptional results are seen; in the latter case averages must be looked for and reckoned with.

[The result of Mr. Schlich's investigations upon the Douglas Fir in Scotland should be carefully considered by all persons in this country interested in planting, especially by those living in the Northern States east of the Rocky Mountains, where it is believed that this tree may prove valuable in forest-planting. Little is known yet, however, of its behavior in eastern America. The young trees which were planted here first were imported from Europe, where they had been raised from seed gathered in Oregon or California. They proved hardy only in very favorable situations. Dr. C. C. Parry visited the Rocky Mountains of Colorado during the summer of 1862, and found the Douglas Fir growing there at high elevations. Seeds from these trees were sent by him in the same year to the Botanic Garden in Cambridge (with seeds of *Picea pungens*, *Picea Engelmanni* and *Pinus Balfouriana*, all discovered by Dr. Parry), and a few plants were raised. The largest of these are now more than twenty feet high, and have pro-

duced cones. A comparatively large number of seedlings have been raised in recent years from Colorado seed, and in one or two places in New England they are being tested now on a considerable scale. The young trees promise well, and grow much faster than White Pines planted in similar soil—a light, dry and very porous drift—but not as fast as European Larch. Such experiments, of course, prove nothing yet, except that the Douglas Fir raised from Colorado-grown seed is hardy in New England, while seeds from the same trees, long subjected to the moister and warmer climate of the Pacific coast, do not produce plants which can support the climate of that part of the country. The facts which Mr. Schlich brings out—that the Douglas Fir must have space in order to develop rapidly, and that it requires shelter to protect its comparatively brittle leader and branches—will no doubt prove as true in the United States as in Scotland; and while enough is not known of this tree to justify any one in believing that it is more valuable than the White Pine or some other native trees, or in planting it in the eastern part of this country upon any large scale, there is enough known to make further experiments with it in forest-planting very desirable. As an ornamental tree, few hardy Conifers, of course, can equal or surpass the Douglas Fir.—Ed.]

Correspondence.

Storage-Reservoirs for Irrigation.

To the Editor of GARDEN AND FOREST:

Sir.—I was greatly interested in the article on "Mountain Reservoirs and Irrigation," but, in considering the danger of fatalities from broken dams, it should be remembered that the conditions under which reservoir-construction is to be undertaken in the arid region are radically different from those which obtain at the East. Remembering, too, that the average annual rainfall in the arid region is less than twenty inches, and that this is spread over the entire twelve months, it will be seen that the danger from such a tremendous downpour as that which caused the Johnstown disaster is quite remote. Excessive and sudden cases of rainfall are of rare occurrence in California. In that portion of the state in which irrigation is required, the average rainfall does not exceed twelve inches annually, or one inch a month. Under such circumstances, a dangerous precipitation is well nigh impossible.

But the builders of the reservoirs now in existence have taken care to guard against any contingency on this account. These reservoirs are never established in water-courses liable to heavy floods. The most expensive affair of the kind in California is the immense reservoir known as Lake Yosemite, in Merced County. This is fed from the Merced River, a stream familiar to all visitors in the Yosemite Valley. Instead of being formed by the damming of that stream, this reservoir is situated at a distance of several miles from it, occupying a depression in the foot-hills. It is supplied with water through a canal 100 feet wide and ten feet in depth, and the flow of water is regulated by a massive and substantial system of head-gates, by which at no time, even when the water in the river is at its highest, can more than is desirable find its way into the reservoir. The lake, as it is called, was formed by the construction of an earth embankment, 4,000 feet long, across the lower side of a depression in the rolling foot-hills. This embankment is 250 feet thick at the base, and tapers gradually until, at the crown, the width is twenty feet. The highest point is some sixty feet above the plain below. The water-face of the embankment is rip-rapped so as to prevent erosion. It is estimated that over 300,000 acres of land can be irrigated from this reservoir, upon which something like two million dollars was expended.

The most remarkable irrigation storage reservoir in the state is that at Bear Valley, San Bernardino County. This occupies the site of an ancient lake, high in the San Bernardino range of mountains. By some convulsion of nature the mountain that walled in one end of the lake was riven, and the water escaped through a narrow and tortuous channel toward the sea. By throwing a dam across this chasm the valley was again tilled with water from the winter rains and snows, which was utilized for irrigation in the valley twenty miles away. The only sources of supply are three or four rivulets, too small to be called brooks. There are never any violent storms which might cause the water in the reservoir to rise at such a rate as to be dangerous to the dam, which is a massive arched stone

structure, with abutments dovetailed into the solid mountain. This dam is remarkable as being the first adaptation of this arch principle in the United States. The gorge where it is located is perhaps seventy-five feet wide at the base, with rocky walls sloping to 300 feet at the summit. The dam is a granite and cement wall, arched up-stream with a radius of 335 feet. It is sixty feet in height, and with the water at the tifty-foot mark, it forms a lake five and a half miles long and from half a mile to a mile and a half in width.

A structure of similar character is the Sweetwater dam in San Diego County. This, too, occupies a narrow gorge, behind which lies a wide valley traversed by a small stream. Such a thing as a flood or dangerous rainfall has never been known here.

It should be remembered, too, that these reservoirs are constructed fully as much to distribute water as to preserve it. It is of the first necessity, therefore, that the means for drawing off the water shall be equal to those for holding it. Consequently, if there should be the least apparent tendency toward overflow, it is an easy matter to open the outlets and at once afford egress for any surplus water that may accumulate during seasons of extraordinary rainfall. The schemes of reservoir projectors do not contemplate the damming of streams which are subject to danger from overflow. Where such must be utilized, it will be after the manner pursued at Mercer, where the flow from the river can be regulated to an inch.

San Francisco.

G. F. W.

Notes.

Mr. Charles Anderson, of Flushing, considers Paul Neyron and Mrs. John Laing the only hybrid perpetual Roses which deserve to be named as autumn bloomers.

The Pecan bears abundantly, and makes a fine ornamental tree in the upper valley of the San Joaquin River, California, and the *Visalia Times* speaks of two trees in that city from seed planted nineteen years ago that are fifty feet high and seem better adapted to that climate than the English Walnut.

In the Jardin des Plantes at Paris stands an old Locust-tree (*Robinia Pseudacacia*), said to be the first one planted in Europe. It was planted in 1636 by Vespasien Robin; and now the old trunk, in its decay, is so mended with mortar and cement, that little of it can be seen; but there is life in the branches, and it may last for years.

The *Pacific Rural Press* speaks of a Bamboo grove on the grounds of General Kirkham, of Oakland, which was started twenty years ago with some plants brought from China. Every year the shoots come up stronger, and some of this year's growth are forty feet high and four or five inches in diameter. They sometimes make the growth of an eight-inch joint a day.

The Atlanta Perfumery Company is preparing to build a factory this winter in the Orange belt of Florida, where such flowers as Orange blossoms, Rose Geraniums, Roses, Yellow Jessamine, Tuberoses, Magnolias, and many other fragrant flowers can be had in large quantities. The plant will be of sufficient capacity to make use of 200,000 pounds of flowers in the season.

Professor W. F. Massey writes to the *Philadelphia Weekly Press* that when the Moravians settled the town of Salem, North Carolina, a century ago, they had the rare foresight to dedicate a large tract of Oak forest as a park forever, and this now contains trees hard to match. The great buildings of the college for girls are embowered among noble trees in a park which, for picturesque beauty, has few equals.

Dwarf White Asters were recommended for winter blooming by Mr. A. Giddings, of Illinois, at the florists' convention in Buffalo. They can be grown among Roses in beds near the glass and will bloom when only four inches high. They yield better than Carnations, and can be grown more profitably, for as soon as one lot of plants is through blooming, another can be had in readiness to take their place.

How much more at home our Pacific coast conifers are in England than in our eastern states can be inferred from a sentence or two in a description of the Pinetum at Hardwicke Hall, which appeared in a recent number of the *Gardeners' Chronicle*. After noticing a specimen of the Atlas Cedar as the most remarkable tree in the collection, on account of its remarkably rich glaucous color, the writer goes on to say: "The next tree to command notice is a Redwood *Sequoia sempervirens*, a perfect specimen, standing at least seventy feet high, and clothed down to the ground with healthy spreading branches and foliage. Near by is a Wellingtonia [which means *Sequoia gigantea*], sixty-five feet high at least, and some

nine to ten feet round the trunk, and several specimens of the Douglas Spruce over seventy feet high."

The Blue Spruce is now the recognized popular name in England for the glaucous form of *Picea pungens*, which has an established reputation as one of the handsomest and, at the same time, the hardiest of ornamental conifers suitable for European gardens. The blue variety differs only from the type in the bluish color which covers every twig and leaf, giving the tree, in its finest examples, the appearance of frosted silver. It has been known in England for a few years only, but now every tree-lover is talking about it, and if he has not planted it longs to do so. A correspondent writes that at Knap Hill Nursery the tree is one of the choicest treasures, and Mr. Anthony Waterer claims to have the finest stock of it in Europe. But, as he says, there are Blue Spruces, and Blue Spruces so-called that are not blue. The Knap Hill specimens stand in long files totally distinct from any other Spruce, the perfection of symmetrical growth and of a uniform silvery hue that captivates all who see them. Apart from its landscape beauty, the tree will doubtless prove good for shelter and screen-planting in England. It possesses what is most desired, and that is a sturdy and vigorous growth, and commences to grow late in the season after damaging frosts are past. We may add that our own nurserymen are beginning to appreciate the value and probable demand for this tree. We were recently informed by one who had visited the nursery of Robert Douglas, at Waukegan, Illinois, that the stock of Blue Spruce there, in large sizes, seemed exceptionally strong and handsome.

A series of charts of exceptional interest and value has been prepared by Mr. J. R. Dodge, statistician of the Department of Agriculture, which present graphic illustrations of certain facts in relation to the farms of the country, and their products. The first chart shows, that, taking the country over, 289 acres of every 1,000 are farm-lands, leaving 711 unoccupied. The most surprising result displayed here is the large amount of unoccupied land in the Southern, Eastern, and Middle states. Of the 289 acres of farm-lands, 153 acres are improved, 103 acres are in woodland, and thirty-three acres are unproductive, although much of the latter is capable of improvement. It is stated that in former censuses only the forest-lands in farm areas have been reported, so that it is estimated that the forest-land, including the portion not divided into farms, would approximate 250 acres to every thousand. The second chart shows the relative proportions of tillage-lands, grass-lands, woodlands, and unproductive lands in the farm area only. The range of woodlands is very wide, ranging from one per cent. in Utah, to sixty-two per cent. in North Carolina. A third chart illustrates the distribution of Corn, varying in the different states from less than ten acres to more than a hundred acres to the thousand. Similar maps show the distribution of Wheat and Oats, representing both acreage and average yield. A series of five maps illustrates the number and value of farm animals, horses, milch cows, other cattle, sheep and swine. The fourteenth chart represents the proportion of population in different states in all gainful occupations related to agriculture. Chart fifteen illustrates the value of farm-lands, showing a range in different states from \$65.16 to \$4.19, the general average of the entire United States being \$19.02. The last chart indicates the relative proportions of proprietors, of tenants who pay rent, and of tenants who pay a share of the produce, from which it appears that seventy-four per cent. of all farms are cultivated by their owners. The rate of yield of the three principal cereals shows so wide a variation as a result of climatic adaptation, different soils, and methods of culture, that the charts illustrating these facts are worthy of special study, while the average values of farm-stock in different sections are equally suggestive of differences in breed, degree of improvement, and the effect of distance from market. The results here set forth in this graphic way are certainly worthy of such a presentation.

Catalogues Received.

WILLIAM BULL, 536 King's Road, Chelsea, London, S. W., England; Tuberos-rooted Plants and Bulbs, etc.—DINGEE & CONARD Co., West Grove, Pa.; Bulbs, Winter-blooming Roses. Lilies, Plants, Seeds, etc.—B. A. ELLIOTT Co., 54 Sixth Street, Pittsburgh, Pa.; Bulbs and Plants, with chapter on "Fall Garden Work."—THOS. JACKSON, Forest City Nurseries, Portland, Me.; Evergreens, Trees, etc.—E. H. KRELAGE & SON, Haarlem, Holland; Dutch Bulbs.—LAKE SHORE NURSERIES, L. W. Carr, Manager, Erie, Pa.; Fruit and Ornamental Trees.—DR. H. SCHROEDER, Bloomington, Ill.; Grape-vines, Fruit Trees, Roses, etc.—JAMES M. THORBURN & Co., 15 John Street, New York; Bulbs and other Flowering Roots.

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The Proper Use of Public Parks.

LARGE open spaces of public land within the limits of compactly built cities offer a constant temptation to persons who feel that they hold a joint ownership with their fellow-citizens in such property; who feel, too, that a portion of this property is needed for some purpose in which they are specially interested, and which appears to them of vital importance. Urban parks will never be free from the danger of assaults upon their integrity, and of perversion to purposes destructive of their highest usefulness, so long as any considerable body of citizens remains uninstructed as to the fundamental reasons which justify their existence and control their design. It would be hardly just to charge with utter selfishness the owners of trotting horses who desire to cut a speed-road through Central Park. They know that such a track would minister to their chosen recreation, and they fail to comprehend that it would defeat the chief end of the park, which is to furnish another and a nobler recreation for everybody else. The same can be said of those who have endeavored to convert the Meadows of Central Park into a military parade-ground, and of almost all other persons who have been eager at one time or another to condemn the park, or some portion of it, to illegitimate use. The storm of indignant protest which was aroused by the first suggestion that Central Park should be selected as the site for the Exposition of 1892 seemed a hopeful sign that public sentiment was becoming more enlightened in this direction; but, unfortunately, lamentable proof has since been given that there are still men of intelligence and public spirit who are willing to see the park turned into desolation for years and probably forever for the sake of a temporary show. It is a discouraging fact that so small a fraction of the population of the city really comprehend the special function in our civic economy which the park is designed to fulfil, and understand that when, for the advantage, real or assumed, of any class or sect, or cause or interest, it is diverted to some use which interferes with its legitimate office, the entire community suffers a wrong.

The fact that every man in a city has a right to its park, as a park, implies, that no one has a right to it as anything else than a park. This view is not held by certain labor

organizations in Boston who insist on using Franklin Park as a place for holding mass meetings, and who resent the refusal of the authorities to surrender the park for this purpose as an abridgment of the right of public assemblage. Of course, this last charge would have no foundation even if a piece of public ground, admirably situated for the purpose, had not been offered, as it was offered, to the labor organizations for their proposed meeting. The pity of it is that these men fail to discern that they have an especial interest in saving the park from any intrusion that even remotely threatens to impair its efficiency, or limit its capacity, of furnishing recreation for themselves and their children. Franklin Park was designed to offer the most practical and natural and perfect relief from the confinement and pressure and wear that are inevitable where men and women are crowded together under the strain of city life. As a direct antithesis to all this, the park furnishes the freedom of spacious meadows and open skies, the contact with pure nature, the tranquilizing influence of pastoral scenery, and invitations on every hand to rest or play. The millionaires of Boston have less need of the recreation offered, for they can spend the entire summer in their villas, on the mountains, or by the sea. But it is for those who have no country seats, and who take no vacations, and for their children, that this delightful picture of rural peace stands ready to furnish rest and healing, both to the mind and body. The men who are striving to reduce the hours of labor are precisely the ones who should avail themselves of these privileges during their hours of recreation. Of course a meeting or a demonstration in favor of some movement is utterly out of harmony with the spirit of the place. It would bring into the park the very conditions from which the park was designed to offer a relief and an escape—the jostling throng, the commotion, the stress and heat of excited discussion. It is plain that such assemblages are incompatible with restfulness and peace. Their avowed purpose is agitation, and this means essential antagonism to the purpose of the park.

It follows without argument, that if the representatives of one movement or cause are allowed to use the park for meetings, other bodies are entitled to a like privilege, and the play-ground will become the chosen spot where reformers of all sorts can indulge in a vociferous advocacy of their pet projects. A body of worthy clergymen who form the Evangelical Alliance are even now seconding a demand to permit preaching in the park, and this would encounter, besides the objections already mentioned, the special ones which arise from the sensitiveness of many persons and classes in matters of religion. To permit the use of the park for purposes that would be offensive to any considerable number of those who resort there would be a manifest injustice. Wandering sectarian preachers are none too gentle, as a rule, when they are characterizing other creeds than their own, and they can easily succeed in making themselves disagreeable. A large proportion of the working people who most need the park are Catholics, and why should they, for example, be forced to hear their faith attacked in their own pleasure-grounds? And if one sect is allowed to preach, the same privilege must be granted to all others. The spectacle of a dozen sects conducting services at the same time might give pleasure to the hoodlum element, but it would hardly minister to the enjoyment of those who were seeking the reposeful influences of rural scenery.

But urban parks, as we have said, will never be secure against destructive invasion so long as such dense ignorance prevails as to their appropriate purpose. Casual remarks of several wealthy and accomplished gentlemen of the committee to select a site for the world's fair in this city prove that they have not the slightest feeling for the beauty of natural scenery, nor the slightest appreciation of its value in a city park. They propose to obliterate what is altogether the most valuable and lovely portion of Central Park and speak of the part they hope to confiscate as "waste ground," and talk of "improving" it by

cutting down the trees, and making a desert of its stretches of greensward. The future of the city parks in this country is by no means secure—nor will it be, until the people generally understand that these parks have a function to fulfil which is quite as distinct as that of churches and schools and libraries, and until it comes to be a general and unquestioned belief that these pleasure-grounds are absolutely indispensable to the well-being of those who are subjected to the complex conditions of modern city life.

Drives and Walks.—III.

IN a preceding chapter we discussed the laying-out of a road on a place where the lawn is large enough to be crossed by it. When is this the case? Only when the lawn is so extensive that the drive will not be conspicuous from the house, or, at all events, from the principal side—when a wide space in front of the house can be left undisturbed by its intrusive, artificial line. That is to say, a drive should really never cross a lawn, although it may divide one lawn from another that can be treated as an almost independent picture. As a feature in a picture a road or walk is always to be deplored; but as a frame which encircles a picture it may be made inoffensive, and sometimes, with its bordering plantations, actually advantageous. Too wide and open a prospect is not desirable any more than one too cramped and crowded; while plantations are often needed to justify the course of the road, they are also needed to adorn it to the eyes of those who pass over it. Trees and shrubs may explain its curvatures, and it may explain the presence of shadowing foliage and attractive lower masses of green. Each helps the other by giving it a reason for existence, and both together may be beautifully brought into the middle distance at the side of a landscape picture, framing the foreground and affording glimpses, more attractive than a wholly unobstructed view, into the landscape beyond.

To preserve a wide expanse of lawn in front of a house is in itself sufficient excuse for carrying the road to one side. If a minor curve is justified by the wish to preserve a fine tree, so a general deflection from the direct line of approach is justified by the wish to secure that broad stretch of green which is the most beautiful of all possible adjuncts to a house, which is the indispensable foreground in any natural picture where utter wildness of aspect is not desired. A carefully clipped and tended lawn is the first thing to be secured where there is any comparatively level ground; where the house is anything but the simplest cottage, and where the rest of the place is to be "kept up" by the gardener's hand. If place and purse are so modest that the expense of turfing and clipping cannot be incurred, then a stretch of meadow left in its natural condition is essential; and in either case it is equally necessary that, to produce the right effect of breadth and peacefulness, the grass should be kept as free as possible from roads and walks.

To secure a good lawn where it can be most enjoyed—to keep the approach from cutting into two parts what ought to be an harmonious picture opposite the chief windows—it is best not to have the entrance front of the house and the lawn front the same. Even though the highway may lie opposite the front where the lawn must be made, the approach ought, if possible, to be carried to a door which lies in another side. There will be no look of caprice in such an arrangement, for where the front door is, there, of necessity, the road must go. It will not suffice to carry the road to one side, leaving an agreeable expanse of lawn, and then bring it along close by the house to a door in the lawn-front. This is a very common arrangement but a very bad one. If a road crossing the lawn in full sight of the chief windows and piazzas is offensive, still more so is a road running between the house and the lawn, forming a barren streak in the immediate foreground of the picture, and preventing that union of the house-foundations with the grass which it is so important to secure. Worse than anything else, however, is the wide sweep we constantly see, where, between house and lawn, a road returns upon itself. No one would ruin a fine painted landscape by pasting a strip or great circle of gray paper over the lower part of the foreground; yet this is just what hundreds of owners do with strips and circles of gray gravel in their natural landscapes. And how much pleasanter is it for the foot to step from door or window or piazza directly to the grass than to be obliged to cross a stretch of dusty or muddy road!

In these last paragraphs we find another reason why, as was

said in a former paper, the house should not be planned or placed until the roadways have been mapped out. A want of consideration in placing the main entrance may easily ruin the chance, not only for a good approach, but for a good lawn as well. Neither architect nor owner can always tell where it will be best to make the lawn any more than where it will be best to run the roads. The front-door is the end of the approach, and not to consult the landscape-gardener with regard to its position is to strike, without his consent, the keynote which must govern his whole arrangement.

What has been said with regard to the length of roads applies also to their width—the less there is of them in either direction the better. A drive where vehicles meet should be wide enough to allow them to pass without danger to themselves or the borders, but anything in excess of this should be studiously avoided; and if a turning-place must be provided near the house, the oval should be made as narrow as convenience will allow, or the road should be carried around a plantation of some sort. Here again, however, the plantation should not be a flower-bed. It should not look as though it had been put in to fill up a sweep which had been made too large; it should not look as though it existed because of the road. The road should look as though it took the encircling curve because there was an obstacle to its turning short upon itself which it was desirable to preserve. And the exact character of this obstacle should be regulated by surrounding things, and especially by those which lie opposite the door. If it is well to shut out something unattractive, then a shrubbery or low-growing tree may fill the space; or, if it is well that the eye should have free passage, then a tree with higher branches may be chosen.

A Cypress Avenue at Verona.

THE avenue of Cypress trees shown in our illustration, on page 464, forms the most conspicuous feature of the garden of the Villa Giusti, in the city of Verona. The villa itself, a Renaissance building, is not of great architectural importance, nor are the gardens very extensive, covering, perhaps, an acre and a half of ground. But they are beautifully laid out in the true Italian style, and there is nothing in all Italy finer in its way than this Cypress avenue. The trees are probably some four hundred years old, and most of them are in fine condition, although one of those shown in the picture died a few years ago. At the end of the avenue is a series of marble terraces, each affording a more beautiful view than the last of the lovely, ancient city with its wide river, Roman amphitheatres and soaring mediæval towers. Beyond the balustraded top, as we see, still other Cypresses are planted. In Goethe's "Italian Journey" he speaks with enthusiasm of the situation of the Giusti gardens and of their unrivalled Cypresses, and fancies that the pyramidally-clipped Yews of northern Europe may have been imitations of such admirable natural forms. Yet the Romans had clipped the Cypress itself to form "verdant walls" in their gardens, and cut it into the most fantastic shapes—representing, for instance, fleets of ships and hunters following their prey.

The genus *Cupressus* includes a number of species which are natives of southern Europe, Asia, Mexico and California; and the vernacular name "Cypress" is also given to other coniferous trees which are not true Cypresses, the most familiar example being *Taxodium distichum*, the deciduous or Bald Cypress of our southern states. The tree shown in our illustration is the best known of all the true Cypresses. It is the one constantly referred to by ancient authors and constantly used in modern poetical imagery—the symbol of grief, gloom and death, as the Oak is of strength, the Laurel of triumph, and the Myrtle of festivity. It is *Cupressus sempervirens*, peculiar for its fastigate or pyramidal shape. Its branches grow in an upright direction close to the stem, giving the tree a tapering, pointed outline, which is even more conspicuous among trees of ordinary habit than the shape of the Lombardy Poplar. The branchlets, growing in frond-like forms, are set thick and close together, and covered with very small, smooth, shining, scale-like leaves of a dark yet yellowish-green. These are evergreen, remaining on the tree for five or six years. The cones are oval, about two inches in length, and borne singly on short stalks. The usual height of the Cypress in its native homes—Greece and the islands of the Archipelago, Turkey and Asia Minor—is fifty or sixty feet, although it sometimes grows to a height of 100 feet. It is hardy in the southern counties of England, yet flourishes in Algerian gardens. Nor is it particular as to situation, growing sometimes in moist river-bottoms and sometimes on dry rocky precipices. Its best development occurs, however, "in soils which are deep and sandy,

rather dry than moist, somewhat sheltered, and at no great elevation above the sea."*

The Bible tells us that the Cypress grew in the Holy Land, and associates it with the Cedar in dignity—"I am exalted like the Cedar of Lebanon and like a Cypress on Mount Sion." The Egyptians knew it well, the Assyrians also, and the Greeks and Romans. It is now found in an apparently wild state in Italy; but Pliny assures us that it was not native to his country but had been introduced from Greece and first planted near Tarentum.

The Cypress, like the Lotus, was an emblem of immortality in all ancient times. But the interpretation put upon this common significance of the two plants seems to have varied as widely as their aspect. As a symbol of life after death, the Lotus was held sacred to Osiris, the god of generation, but as a symbol of the same thing the Cypress was consecrated to the dead and held sacred to Pluto and Proserpine. Ideas of joy and hope were associated with the Lotus, ideas of sorrow and bereavement with the Cypress. The reason of the difference is not hard to find. The Lotus is beautiful, graceful and gay in aspect, the Cypress is solemn and dignified and never seems more appropriately placed than when, like the Yew of England, it stands in a place of tombs. It was chosen as an emblem of immortality because it was an evergreen, and also because it would immediately rise again to an upright position if bent down by the wind or by manual force. Its association with ideas of death was explained by the fact that, if cut down, it throws up no suckers from the root. But such significations were always explained among the ancients by some poetic legend, and with reference to the mournful meanings of the Cypress, Ovid tells us that a youth named Cyparissus, a favorite of Apollo, having shot, by accident, a pet stag, grieved so deeply that he prayed he might visibly mourn forever. He was thereupon transformed into a Cypress-tree, and Apollo,

"Sadly sighing, cried:

'Be then forever what thy wish implied,
Be moaned by me, in others grief excite,
And still preside at every funeral rite.'

All Oriental nations still plant Cypresses in their burial-grounds, and the Turks place one at either end of a grave. They are so numerous, writes Loudon, "at Scutari that the cemetery there resembles one vast forest of Cypress. This magnificent burying-ground extends for miles in length; and among high and turbaned tombstones, gold-lettered inscriptions, and graves ornamented with flowers, the tall evergreen Cypress has a very striking effect." As we remember this cemetery, however, it is anything but magnificent in effect. It is, indeed, of vast extent, and some of the tombs, when examined, are very beautifully carved. But they are crowded so close together that it seems as though one body must often encroach upon the resting-place of the next; hundreds of the tall stones are out of the perpendicular, giving a painful look of neglect and decay, and the Cypresses, too, are pressed so close together that the dignity of their forms is less conspicuous than the deep and mournful gloom caused by the density of their shade. The Cypress is not a tree to plant thus in groves. It looks its best when seen in isolated examples or when arranged in avenues, like the one portrayed in our picture. But its dark and spiry outlines, rising everywhere from the court-yards of the houses, give great individuality and beauty to the general aspect of oriental towns. Constantinople, as seen from the harbor, covering its hills with its masses of white walls and its domes and minarets, would be far less beautiful were the general whiteness not relieved by innumerable lofty Cypress-trees, now standing singly and now forming little clumps or long lines, high above the house-roofs.

In mediæval Persia the Cypress was especially honored. Its pyramidal outline was thought to resemble a flame, and it was, therefore, planted near the temples of the fire-worshippers. A legend, which Firdusi versified, tells that the first Cypress came direct to Zoroaster from Paradise, and was planted by him in front of the temple at Kischmer, in Khorasan. When it was cut down by the Mohammedan caliph, Motewekkil, it was believed to be 1,450 years old. In India the Cypress is one of the most conspicuous of cultivated trees, standing, as usual, near tombs, or forming avenues similar to the one at Verona. In China, too, we read* that ancient grave-yards are laid out in squares and contain "tablets innumerable, Cypress-trees, gates, walls and bridges." The tomb of Confucius lies north of the city of Kio-fou-hien, "at a distance of about a mile; a fine avenue of old Cypress trees leads direct from the

north gate to the burial-ground;" the grave itself lies in a "forest of Oak, Cypress and other kinds of trees, enclosed by a high wall;" and everywhere in the neighborhood is "the unfailing Cypress." The grounds of the chief temple in the city itself are likewise filled with Cypresses, and one of them is said to have been planted by Confucius himself. "Its gnarled and aged trunk bears evidence of its great age;" but if it was, indeed, planted by the sage, it must be no less than 2,540 years old!

One of the most remarkable Cypresses in the world stands—or still stood not long ago—at Soma, or Somma, in Lombardy. According to some accounts it was planted in the year when Christ was born, but others declare that it was a tree in the time of Julius Cæsar. It is 121 feet in height, and twenty-three feet in circumference at one foot above the ground. Francis I., of France, drove his sword into this tree in his rage at having been defeated at the battle of Pavia; and Napoleon respected it sufficiently to deflect the line of one of his great highroads rather than do it harm. Near Shiraz, in Persia, stands a Cypress which is said to have been planted by the poet Hafiz or to have sprung up on his grave. At Chartreux are some famous Cypresses which were planted by Michael Angelo. The trunk of the largest, when measured in 1817, girthed about thirteen feet. Many writers have celebrated *Los Cypresses de la Reyna Sultana*, which form an avenue in the palace-gardens of the Generalife at Granada, and are connected with the history of the massacre of the Abencerages by the last Moorish king of that province. They are supposed to have been large trees at that time—1490—and were still flourishing in 1832. It would be interesting to know what is now their condition.

Modern folk-lore tells us that the Cypress brings ill-luck, especially when it comes to us in dreams. The wood of the Cypress is very durable, and in many different ages has been used for coffins. Thucydides says that Greeks who died for their country had their ashes preserved in Cypress-chests. Pliny refers to a statue of Jupiter in the Capitol, at Rome, which was made of Cypress-wood, had existed for 600 years, and was still in perfect condition. He adds that the doors of the temple of Delphi, likewise of this wood, had the appearance of being quite new when they had hung for 400 years. In his own time the wood was much used for rustic purposes, and, as plantations of Cypress could be cut every thirteen years for poles, vine-props, etc., they were esteemed so valuable that they were given as marriage portions, and hence the tree itself was sometimes called *dos filiae*. Plato had his code of laws engraved on Cypress-wood, and, in the fifteenth century, A.D., Leon Alberti found the wood of an ancient ship which had been submerged for 1,300 years, as he declared, to be chiefly of Cypress and still perfectly sound. The doors of old St. Peter's, in Rome, were of Cypress, and in admirable condition after they had lasted 1,100 years. Mediæval popes were often buried in Cypress coffins.

The balsamic odor of Cypress-wood and of the growing tree is constantly referred to by ancient writers, and it is said that oriental physicians used to send consumptive patients to the Island of Crete, where the Cypress grew in great abundance, on account of the healing qualities of the air, as in modern times they are sent where Pine forests abound.

Notes Upon Some North American Trees.—XI.

CARYA.—The first author to separate the Hickories from the Walnuts and to place them in a genus by themselves was Rafinesque. His first attempt was made in 1808, in the *Medical Repository* (v., 352), in which in a single paragraph he simply enumerated after the word *Scoria* the specific names, in parenthesis, of five Hickories. It has been suggested (Britton in *Bull. Torrey Bot. Club*, xv., 275) that *Scoria* was simply a misprint for *Hicoria*. This may well have been, but it is not important, as no characters having been indicated by Rafinesque at this time for his proposed new genus, or any reasons assigned for separating the Hickories and Walnuts, *Scoria* or *Hicoria* of the date 1808 cannot be considered. Rafinesque, however, in the "Flora Ludoviciana," published in 1817, clearly defined, on page 109, the characters which separate the Hickories from the Walnuts, under his account of *Hicorius amara*, and it is evident that he was the first to propose in print a separate genus for these trees, the *Carya* of Nuttall not having been published until a year later (1818); and it is just and correct therefore to discard the now familiar *Carya* of Nuttall and

* Loudon: "Arboretum."

* Loomis: "Confucius and the Chinese Classics."

take up the equally appropriate *Hicorius* of Rafinesque, for there can hardly be a question that the name should be written as Rafinesque wrote it when he defined the characters of his genus, and that an earlier generic name without characters cannot be considered. I propose, therefore, to follow in the main, with the substitution of *Hicorius* for *Hicoria*, the nomenclature which has been carefully elaborated for this genus by Dr. Britton (*l. c.*), although the rejection of *Hicoria* will add another to the heavy load of synonyms with which these trees are encumbered.

241. *CARYA OLIVÆFORMIS*, Nutt., will become *Hicorius Pecan*, Marshall's specific name (*Arbustum Americanum* published in 1785), Pecan being the first published and four years older than Wangenheim's (*Amer.* 54, t. 18. f. 43) *Juglans Illinoensis*.

242. *CARYA ALBA*, Nutt., becomes *Hicorius ovatus*. The different species of Hickory were not distinguished by Linnæus, but his herbarium shows that the tree which it has become the habit to call *Carya tomentosa* was really what he meant by his *Juglans alba*, and that the oldest post-Linnæan specific name for the Shell-bark is that of Miller (*Dictionary* ed. 8. 1768) *Juglans ovata*.

Carya microcarpa of Nuttall was considered in the Census Catalogue a synonym of *C. alba*. This was probably a mistake, but there still exist doubts about the true position of this tree to be cleared up. Dr. Britton (*l. c.*) would retain the Nuttallian species and places his *Hicoria microcarpa* in a section with the Pig-nut. His specimens gathered on Staten Island, where this tree is not rare, seem to me to belong to a not uncommon form of the Pig-nut with small compressed globular nuts, which were familiar to the younger Michaux (*Silva*, i, 196, t. 38) and to Emerson (*Trees and Shrubs of Massachusetts* 198). But it is not quite clear that it was this small round nut that Nuttall had in mind when he wrote the characters of his *Carya microcarpa*. He described the nut as "partly quadrangular;" and in the figure in his *Silva*, the exocarp is represented as thick, while the nut although small is strongly four-angled like a Mocker-nut, as his description, "nucē subglobosa subquadrangulata", implies, as does the following sentence, "by the leaves it appears to be allied to *C. glabra*, but the nut on a small scale, is that of *C. tomentosa*, or the common Hickory." Some further investigation of the Pig-nut group of our Hickories made in the field, especially in the neighborhood of Philadelphia where Nuttall found his tree, is desirable, and necessary to clear up the doubtful points of their specific limitations. It was this small fruited Hickory that Marshall described as *Juglans alba odorata* in the "*Arbustum Americanum*" as Nuttall has pointed out in the *Silva*. So that if it is found that the species must be kept up, the name for it would appear to be *Hicorius odoratus*.

243. *CARYA SULCATA*, Nutt., becomes *Hicorius sulcatus*.

244. *CARYA TOMENTOSA*, Nutt., becomes *Hicorius albus*.

245. *CARYA PORCINA*, Nutt., becomes *Hicorius glaber*, this species having been first described as *Juglans glabra*.

246. *CARYA AMARA*, Nutt., becomes *Hicorius minimus*, this species having been distinguished first by Marshall (*Arbustum Americanum*) as *Juglans alba minima*.

247. *CARYA MYRISTICÆFORMIS*, Nutt., becomes *Hicorius myristicæformis*.

The Nutmeg Hickory was discovered west of the Mississippi River much earlier than has been generally supposed. A specimen preserved in the Torrey Herbarium of Columbia College shows that Fremont on his third expedition found it at Camp 24, "near the Creek," on the 3d of July, 1845. The known range of this species was greatly extended last year by Mr. Pringle, who found a few trees in one of the cañons of the Sierra Madre in the vicinity of Monterey, Mexico.

248. *CARYA AQUATICA*, Nutt., becomes *Hicorius aquaticus*.
C. S. Sargent.

The Shell-bark Hickory.

THE Hickory is purely an American tree. The eight species which are known all belong to the southern half of the North American continent, with the headquarters of the genus, as represented by the greatest number of species in any one locality, in the valley of the Red River, in Arkansas, with one species pushing far south along the Mexican Sierra Madre. No other country or region of the earth can boast of an indigenous Hickory-tree, although it is quite within the bounds of possibility that one, and perhaps several species may still be found in the unexplored mountain districts of central China, so similar are the floras of our eastern states and of eastern Asia in actual composition, and so closely related in their descent from remote common ancestors. The Hickories, at least some of the species, are among the most valuable trees in the world. There has never been a boy or girl brought up in any part of the country east of the Missouri River who has not early learned the value of the pecan, or the hickory-nut, or the mocker-nut; and the wood which some of these trees yield has no equal, and certainly no superior, for certain purposes. There is no wood at once so tough and strong and true. It is the Hickory-wood in its handle which has carried the American axe round the world, driving, wherever it is known, all other axes out of the market; and it has made possible those light carriages, which in turn have made possible the American trotting horse, one of the marvels of these modern times, and probably the best example of what can be accomplished, by careful breeding and persistent selection, in the development of domestic animals for a special purpose. No other tree is known whose wood is tough enough and strong enough to stand the strain imposed upon the American trotting-sulky, and without the modern sulky and its heavier forerunner, neither breeding nor training could have produced that race of horses which every American looks upon in his heart of hearts with joy and admiration. As a nation we owe much to the Hickory-tree, and we have good and just reason for being proud of it. It is a tree known to many people; next to the Oak and the Pine, more Americans know the Hickory-tree when they see it than any other of our trees. That is, they know, generally, the Hickory, without distinguishing the different species, which is hardly surprising, since botanists themselves are often perplexed over questions concerning the proper limitations of these species. Nor are these questions ever likely to be settled quite satisfactorily, for it is probable that several of the species are inclined to hybridize one with another and so produce those individuals of doubtful characters which are the despair of people who expect to be able to fit exactly every plant they encounter with the printed description of it in some book.

The Shell-bark Hickory is considered, generally, the most valuable of the genus. The nuts, of course, are not esteemed as highly as pecans, and they are, perhaps, rather inferior to and considerably smaller than those of a western representative of the genus, (*Hicorius sulcatus*), the wood of which is equal to that of the Shell-bark. Still, the Shell-bark, perhaps, is the tree which people have in mind, generally, when they think or speak of a Hickory-tree; and the peculiarity of the bark which separates into great thick, loose scales, gives to this tree a distinctive appearance which makes it easily known and recognized.

The Shell-bark, as it is now seen in the eastern States, is generally an obconical, square-topped tree, with rather small branches, produced low down on the trunk. Such trees have grown generally since the land was first cleared for settlement and agriculture, and there are not now many people living here at the east who, unless they know the forests of the Mississippi Valley, and more especially those found on the higher Alleghany Mountains, have an idea of what a large Hickory-tree is, growing as it grew naturally before the white man disturbed and changed the natural condition of this country. Our illustration of a fine tree in

southern Indiana will give an idea, at least, of the dimensions to which this tree can attain under favorable conditions; and brings out admirably the peculiar character of the distinctive bark, to which habit is due the popular and familiar name of the species. The Shell-barks in this particular region, Mr. Ridgway notes (*Proc. U. S. Nat. Mus.*, 1882, 77), are sometimes 150 feet high, with trunks four or five feet in diameter, and bare of limbs for seventy or eighty feet; and even larger trees can be found in the western and still almost untouched forests of eastern Tennessee and western North Carolina. But these large trees are doomed, and before many more years have passed every Hickory-tree of sufficient size and proper quality will have been sacrificed to supply the ever-increasing demands which the industries of men make on this tree. The area of the region in which the Hickory grows to perfection is really small in comparison with the demand for it; and when no substitute can be found for a particular wood it must in time be exterminated however abundant the natural supply, unless measures are taken to increase and perpetuate it artificially. And it would appear that of all our trees the Hickory is the one which should be planted wherever suitable land can be spared for it; and it should be protected and cherished, in view of the ever-increasing demands the world is making and must continue to make on this tree.

Entomological.

A New Enemy of the Elm.

(*Gossyparia Ulmi*.)

IN the last (August) number of *Insect Life*, Mr. L. O. Howard has an interesting paper, accompanied by some excellent figures, on this new Elm-pest, belonging to the Coccid or "scale insect" tribe. The article is entitled "A Newly-imported Elm Insect," and it gives a good summary of what is known of the life history of the insect which is considered as having been introduced from Europe on European Elms, and which has been found in several places in New York State and also about Boston and in Washington. Near Boston it was first noticed in the Arnold Arboretum, in the summer of 1887. Since then it has increased very much, and has been found quite abundantly in many places in the vicinity of the city. Although first found on the Slippery Elm (*Ulmus fulva*), it has latterly been more frequently observed on the American Elm (*U. Americana*) than on any other species. It also attacks *U. racemosa* as well as the European species, *U. campestris* and *U. montana*.

The accompanying illustration from a photograph will be of assistance in recognizing the pest, and will give an idea of its appearance at one stage of its existence. The photograph was taken about June 20th, which is the season when the coccids may be most readily detected, and it represents fully grown females on the bark of a young Slippery Elm. The round of their existence may be described as follows:

These females are viviparous, and, in this vicinity, reproduction begins about June 20th. All the females do not mature at the same time, so that the young continue to come forth for a couple of weeks. The young larva is elongated, oval in shape, and of a clear yellow color, and, under the microscope, a number of spines on the back and sides may be seen, as well as the six-jointed antennae. As soon as they escape from the parent body the young begin moving actively about upon the trunk and branches, and sometimes collect in great numbers on the under side of the latter. Most of them soon find their way to the leaves, where they fix themselves and become quiescent, feeding upon the juices for four or five weeks, or, in some cases, for a much longer time. On some trees, which have no pubescence or bristles on the young shoots or twigs, many of the insects settle about the crevices of the buds, etc. On the leaves they are often found on both the upper and lower surfaces, either in the crevices made by, or close along the sides and angles of, the midrib and principal veins. On *Ulmus Americana* and *U. racemosa* they are found most abundantly upon the under surface, and in other species they occur on the upper or lower surface according to the amount of pubescence which prevails. They are less numerous where it is densely bristly. Late in July and during August they cast their skins, assume a permanent reddish or brownish color, and become active once more. The main color is often much obscured by a fine and easily-removed gray or white waxy powder, which is secreted by, and carried upon, the many spines with which the back is covered.

Nearly all of them return to the branches and trunk, where they settle themselves in crevices of the bark. Here they remain during the autumn and winter. If the days are warm in late April and early May they begin to move again, and soon afterwards changes of skin take place and small white cocoons are made, or, as Mr. Howard says, "the females cast their last skin and the males form their cocoons."

They issue forth within a week or ten days. Two forms of males have been noticed; the first, about two millimeters (say .08 of an inch) in length, has rudimentary or unexpanded wings, but appears to be perfectly developed in other respects, and the other, which comes forth a few days later, has broad, perfectly developed wings, and also differs from the imperfect male in having a more slender body and two long, slender, white filaments projecting from the anal segment. Soon after this the females fix themselves for the last time to the bark of the trunk or branches and continue to suck the sap of the tree and increase considerably in size, especially in diameter.

A white waxy substance is secreted, which afterward becomes so abundant as to form a sort of cushion beneath and around the sides of the insects, giving them the conspicuous appearance seen in the illustration. Here they remain, and in the latter part of June the living young begin to swarm forth; the mother insect gradually becomes smaller, shrivels and dies, and, after a time, the waxy cushion becomes dull and wears away, although traces of it may remain for many months.

During all the feeding period of their existence the coccids throw



Fig. 129.—*Gossyparia Ulmi*.—Full-grown females.

out a sort of "honey dew," in very minute drops, which, falling upon the trunk, branches and lower leaves of the tree causes them to become blackened, and many ants, wasps, flies and other insects are attracted to the sweet food. When dry this may be scraped from the leaves in sooty-like flakes.

Trees that are much infested with these insects make their presence known at a distance of several rods by a peculiar sweet, somewhat pungent, though not unpleasant, odor. An odor much like it may be noticed when drying green leaves of *Ulmus fulva*. On old trees the insects cannot get nourishment through the thick, corky bark of the trunks, and so ascend to the higher parts and branches, where they are not easily discovered. In some cases they may be a cause of the unhealthy appearance of trees. When abundant, they greatly injure the vitality of young trees if they do not destroy them.

No systematic experiments with insecticides have as yet been tried, but an application in June of whale-oil soap and kerosene, made pretty strong and applied with a stiff brush, appeared to kill all that were thoroughly washed, but some on the small branches escaped, so that enough were left to thickly colonize the tree again within a year or two. Thoroughly spraying the trees with kerosene emulsion, at a season when the insects are active and tender, might lead to more satisfactory results, but the chances are that some would escape.

It has been noticed that a few of the insects sometimes remain on the leaves until they fall in the autumn, and in this way they could be carried from one tree to another. When active they may easily be carried to widely-separated localities upon the feet of birds.

Arnold Arboretum.

J. G. Jack.

Foreign Correspondence.

London Letter.

AT last we have bright sunshine and summer warmth again, and, in consequence, autumn flowers of all kinds have come out amazingly during the past week or so. Owing to this the last August exhibition at the Royal Horticultural Society's meeting was exceptionally large and interesting. It was remarkable, also, for the large number of novelties submitted, and no fewer than two dozen certificates were awarded. The chief feature of the meeting was a magnificent collection of *Gandavensis* Gladioli from the celebrated nurseries at Langport, which is undoubtedly the headquarters in Europe for these splendid flowers. There were about two hundred spikes shown, representing all the colors through which the Gladiolus ranges, and every spike was massive and set with large flowers of faultless shape. In some instances I measured spikes fully eighteen inches long, with only two or three unexpanded buds. But, unhappily, Messrs. Kelway's splendid success is not a reflex of Gladiolus-culture throughout the country. Failure in fact is more common than success, and no one can deny that the highly-bred Gladioli of the *Gandavensis* race are delicate in constitution, requiring exceptional treatment and favorable conditions of soil and climate. Though I have seen them grown in private gardens as fine as the Langport specimens, the prevalent complaint is that they are disappointing. But a new era in the culture of this flower is at hand, and in a few years success will be more frequent, and this will be brought about by the intermixture of hardier blood with these delicate strains. M. Lemoine's recent triumphs with the *Purpureo-auratus* race have convinced Messrs. Kelway at last of the importance of these new hybrids, for they have begun to raise them at Langport, and at this exhibition they showed us one fine example, at least, of their work. This variety is one called Leonard Kelway, in which we see the characteristic features of *Gandavensis*, the large spike and open flower combined with the growth and habit of *G. purpureo-auratus*. It is of wonderfully rich color, some of the petals being a deep maroon-crimson, others rose-pink brightening to scarlet. Now that Messrs. Kelway have made a fair start, we hope to see next season numerous new hybrids of the same stamp, which will be most welcome. They showed a large number of new sorts of the ordinary *Gandavensis* type, but as they reached perfection with these years ago, one cannot appreciate the difference between the old and the new; now and then there is a distinct "break" in color, but neither of the two certificated were exceptional in this respect. They were called Duke of Fife, a brilliant crimson, flaked with white, and Vulso, a pale salmon-pink with white centre. In both, the flowers were quite up to the florist's standard, and the spike was long and massive.

Turning from the Gladioli to the Dahlias we find novelties in every section, but in most cases it is a difficult matter to intelligently describe how they differ from old sorts, especially in the large, double, show kinds. There was a large collection of these from the famous raisers, Keynes & Co., of Salisbury, and four were selected as worthy of awards of merit. These were Crimson Globe, brilliant crimson—almost scarlet; Reliance, yellow-buff, flaked and tipped with crimson; John Hickling, a warm yellow, and Alice Emily, orange-yellow marked with carnation-red. All these were, of course, the acme of size and form. Among the Cactus section, which seems to be now more popular than any other, there were some very beautiful new sorts, and one named Panthea, a large spreading flower of a vivid flame color, won an award. The others that pleased me much were Asia, a delicate blush-pink; Empress of India, maroon-crimson; Lady Marham, cherry-crimson; H. Patrick, the best white Cactus; Honoria, the best yellow; Mrs. Hawkins, yellow, flushed with pink, and Amphion, buff and reddish-brown. The only single sort certificated was named F. L. Temple, in compliment to an American nurseryman now travelling in England. His namesake is like the old Paragon, the best of the earliest sorts, but larger, and the deep maroon and crimson edges seem brighter. It was shown by Mr. Ware, of Tottenham.

Among other certificated plants were three good Orchids, two of which were varieties of the popular *Loelia elegans* which flowers at this season. One variety was from the Duke of Marlborough, at Blenheim, and was named The Duchess. It is very distinct from the ordinary form, and beautiful, the sepals and petals being rosy-purple, and the broad, middle lobe of the labellum rich crimson, fading to almost white, while the lateral lobes are quite white. Another form called Cook's

variety is at once recognized by the smaller flowers, their symmetrical shape, and the brilliant crimson hue of the labellum. These two were the best of a number of varieties of this *Loelia* exhibited, which exemplified clearly what a wide range of variation exists in the cultivated forms of this beautiful Orchid. The other certificated Orchid was the old *Angraecum Chaillu-anum*, discovered thirty years ago by the great African explorer Du Chaillu. It is still rare, and by certificating it the committee stamp it as a good Orchid. It is small in growth, and produces a long spike of greenish-white flowers with long narrow sepals and attenuated spurs. Messrs Veitch showed, for the first time, a new species of Phajus from the Philippines, which has been named at Kew *P. Philippensis*. It is interesting, but not a striking beauty, the flowers being small and poor in color. Some fine examples of *Satyrion* (Terrestrial Orchids from South Africa) attracted notice, as they are so seldom seen in a flourishing, much less flowering, state. *S. carneum* has a dense spike of pink flowers, and *S. aurantiacum* has flowers of a rich orange-yellow.

A beautiful old half-hardy bulb from the Cape, known as *Watsonia rosea*, was certificated because of its value as a garden plant. It has Gladiolus-like growth, and a tall and slender spike, thickly set with open flowers of a clear rose-pink color. Mr. Ware exhibited it in splendid condition, showing what a fine plant it is when well grown. Mr. B. S. Williams was awarded a certificate for a new species of *Carludovica* belonging to the *Cyclanthaceæ*, and allied to the Palms, which they resemble. This new species is *C. palmifolia*, and is of graceful growth, with tall recurving fan-like leaves. It will make a first rate decorative plant. A new *Sarracenia*, named *S. decora*, was shown by Messrs. Veitch. It is a hybrid between *S. variolalis* and *S. psittacina*, and has curved pitchers about six inches high, richly colored with deep red, and variegated with white and green veins. Another form of *Pteris serrulata*, with crested fronds, called Densa, was shown by the market Fern grower Mr. May. It is very dense and compact in growth, and as crested as curled Parsley. The committee did not hesitate in awarding a first-class certificate to it. The same grower won a certificate for a new *Bouvardia* called Double Hogarth. It is precisely like the single Hogarth in color and growth, and the flowers are very double. Another was shown, but it was inferior to President Cleveland. Mr. Ware won an award for a pale straw-colored variety of the Iceland Poppy (*Papaver nudicaule*). It is called Sulphureum, which appropriately describes its color. The only new early *Chrysanthemum* was a shoot from the yellow *Précocité* with flowers of a deep bronzy-yellow. It is called Maud Pitcher, and being dwarf and compact in growth, and a free flowerer, is regarded as a good thing, and therefore was certificated. From a large number of varieties of Java Rhododendrons, from Messrs. Veitch, the committee selected for an award one called Ophelia, a lovely variety, with large flowers of perfect shape, and of a pale clear pink color. The importance of these beautiful green-house shrubs is being fully recognized now, and people have found out that they are among the most reliable plants for yielding an almost perpetual supply of the loveliest flowers one could wish, and, no doubt, their popularity will spread to American gardens. There was a large gathering of hardy ornamental trees and shrubs, but the only novelty was a golden tinted variety of the old *Taxus adpressa*. It came from the Handsworth nurseries under the name of Variegata. It is decidedly golden, and I can imagine what a big spreading tree of it will look like in future. It is a first-class novelty, and the committee, by awarding it a certificate, showed that this was their opinion of it. The new Clematis, Baron Veillard, was again shown, and though a freely-flowered specimen was shown, the committee did not seem to appreciate the color, which is a purplish-mauve, hardly bright enough for a Clematis.

London.

W. Goldring.

Cultural Department.

Fertilizers for Ornamental Plants.

IN floriculture, the application of fertilizers may be made with three purposes in view: (1) effect on bloom; (2) effect on foliage; (3) effect on seed, bulb or other parts for propagation. The first and third purposes generally go hand in hand, and, if we secure the first, as a rule the other is attained.

Much space in the agricultural and horticultural journals is devoted to the recommendation of a plenteous application of manures to plants, but rarely do we find any testimony from experience except in the most general way. The past winter and spring I had under test in the university green-house some interesting work with manure for the purpose of ascertaining,



Fig. 130.—The Shell-bark Hickory.—See page 460.

in a measure, the effect of special and general manures on foliage plants and on flowers. In the first place, two lots of *Coleus*, one being red and the other green, received special application of mineral fertilizers. Five hundred milligrams (about 7.7 grains) of each of the following fertilizers were applied to a plant at intervals: (1) nitrate of soda; (2) sulphate of iron; (3) acid phosphate; (4) muriate of potash; (5) a complete fertilizer. The last three had been analyzed in the laboratory, and were good specimens of fertilizers; the other two were standard brands.

In beginning the experiment, six plants were selected for each manure as nearly alike as possible, excepting that three were red and three green. The plants were small, not having more than two nodes each; they had been cut back twice, and were in three-inch pots. They occupied a bench on the south side of the green-house, and had good sun exposure. Water from the same source was used in watering each set of plants. The soil the plants were grown in was as even in character as I could secure. The most striking effect from the fertilizers was seen in the application of nitrate of soda. The

plants treated with this became either very dark red or green in color and assumed a robust growth of unmistakable character. The complete fertilizer had an effect almost as marked, and produced deep color and strong growth. To my surprise the sulphate of iron did not give the depth of color that other experiments would seem to have warranted us to expect in this case. The plants appeared strong and healthy, but there was nothing unusual in their color. I think that the muriate of potash ranked third in effectiveness. The acid phosphate was not effective. The color of the foliage remained light, and the plants did not make a growth equal to those treated with the soda, potash and complete fertilizer. The iron and phosphoric acid had much the same effect.

These fertilizers made themselves felt for a few weeks, when their influence appeared to wear off, and all the plants began to once more take on a similar foliaceous coloring. Again the applications were made, and once more the same effect of the different plant-foods was made manifest. Future experiments were repetitions of the first two; whenever these fertilizers were applied the same results followed.

To me, the most pertinent application of what I saw in this, was the benefit to be derived from the use of sodium nitrate in bringing out strong foliaceous coloring, and especially in plants with bright-colored leaves. If the beauty of a *Coleus*-bed lies in its color of leaf, its effectiveness, in my opinion, may be materially heightened by the use of proper fertilizers.

In another direction I experimented with manures on roses. I procured sixteen two-year-old *La France* Roses of as nearly the same size as possible. These were separated into four lots of four plants each. Before planting, the soil was carefully washed from the roots of each plant. Lot one was planted in pure, washed river-sand, and fertilized once a week with liquid cow manure. Lot two was planted in sand like one, and treated once a week with liquid horse manure. Lot three was planted like lots one and two, and fed *Floralis* (a preparation procured from J. M. Thorburn & Co.) once a week. Lot four was planted in our regular rose-potting soil, and fertilized weekly with liquid cow manure, such as was used with lot one. All of these plants were placed in eight-inch pots.

First and most important, the plants grown in ordinary soil thrived best and produced the greatest number of buds.

At this writing they will average larger to a noticeable degree than will the others. The effect of the *Floralis* was injurious at first, but because too strong in application, though directions were followed; as a result one plant was killed, and the foliage removed from all. However, with reduced application, three renewed their growth and, before the season was over, yielded a fair showing of buds. In both lots where cow manure was used, more Roses were secured than from the others. The flowers were extra fine in all cases, but I have not at my disposal, the number of blooms produced by each lot.

The reason why sand was used in three lots was to see if the effect of manure could be better shown, where the soil was comparatively clear of fertilizing matter at the start. In each case, the amount of liquid manure applied was as nearly of the same quantity and quality as I could make it. The manure used was comparatively new and free from straw. This work is still in progress, and will be further reported on, so as to be accessible to those interested.

I cannot close without referring to another fertilizer test, on a more practical basis, if you please. A portion of one of our



A Cypress Avenue at Verona.—See page 458.

green-house benches is planted with Roses. The soil consists of turfy loam well mixed with solid cow manure. Late last winter our gardener, a rather intelligent negro, informed me that he had heard that sheep manure would make the plants show their color, and begged me to secure him some. In a short time a quantity was obtained and made into a liquid and

applied twice a week to the roses by Andy. Certain it is, our Roses did unusually well last spring. I shake my head in a questioning way as to the responsibility of the sheep manure for this, but Andy only laughs, and says: "Sho', P'fessor! Didn't I tell you that sheep manure 'ud do it?"

University of Tennessee, Knoxville.

C. S. Plumb.

Fern Notes.

SPECIMEN Ferns should now be in their best condition, as in most instances the growth will be fully developed, and showing the characteristics of the perfect fronds, whether fertile or barren. And, when the fronds are fertile, it will be well to select some from which the future stock of young plants may be raised. In this selection of fronds it will be found most satisfactory to cut them as soon as the spore-cases begin to open, because when taken in this condition a fair supply of spores are usually obtained; whereas, if they are allowed to remain on the plant until the spores begin to drop, much of the best of the crop is frequently lost. But owing to the great differences in the arrangement and appearance of the spores on different species of Ferns, it requires the exercise of some judgment in gathering them to ensure success, and in this operation as in most others connected with the growth of plants, experience is the best teacher.

It seems hardly necessary to repeat that the fronds gathered for seed should be wrapped in clean paper and put in a dry place for ten days or two weeks, at the end of which period the spores may be shaken out and sown, or else stored away in small phials for future use. The month of September is a good time to sow Fern-spores for an early spring crop, for though the seedlings do not make rapid growth during the winter, they will progress far enough to be in good condition for an early start in the spring.

Good use may be made of an odd corner in the green-house by planting out a few Ferns for cutting. They may be either on the bench or underneath it, but it is preferable to grow them on the bench, as they are better under control, and the fronds are stiffer and have more substance than those grown beneath where the light is less distinct. In growing Ferns for this purpose it is best to plant them in a comparatively stiff soil, as the fronds thus grown are harder and consequently stand better after they are cut.

The following species and varieties are well adapted for this purpose: *Adiantum cuneatum*, *A. Wiegandii*, *Pteris serrulata*, *P. Cretica magnifica*, *Onychium Japonicum* and *Nephrolepis pectinata*, and all of them may be readily grown in a green-house temperature. Water should now be given quite early in the day, and the moisture kept off the foliage as much as possible by free ventilation. As much air at night as the weather will permit should be given, because when kept too close some of the foliage is sure to damp off.

Among the easiest to be injured by moisture on the foliage are the Golden and Silver Ferns (*Gymnogrammas*), several of which grow best under stove treatment, while some few varieties flourish in a green-house. Of those most susceptible to injury from excessive moisture on the fronds, three or four are among the finest varieties, for instance: *Gymnogramma Peruviana argyrophylla*, *G. Laucheana magnifica*, *G. Laucheana grandiceps* and *G. Wetenhalliana*, the latter being considered by many persons one of the finest of the genus, although it is not always easy to handle. While speaking of *Gymnogrammas* we should not neglect *G. schizophylla*, a charming basket Fern with very delicate, feathery foliage, and possessing a notable peculiarity among its relatives of this genus, its fronds being proliferous, and producing young plants on or near the apex of the mid-rib.

In the treatment of many of the stronger-growing Ferns an occasional watering with liquid manure of medium strength will be found beneficial after the plants become pot-bound, tending to keep up the rich green of the fronds, but unless the plant is quite pot-bound it is just as well without any special feeding, and if the drainage of the pot is defective it is very easy to overdo the application of stimulants in this manner. Probably the best manure to use for the above is cow-dung, it being not so likely to injure the roots, though at all times discretion should be used in its application. It is useless to give liquid manure to a weak, over-potted Fern in the hope of inducing it to break into growth, and it should be remembered that this liquid should never be given to a Fern while it is very dry, else more harm than good will result.

Those pests of the Fern-grower, slugs and snails, are usually present in considerable numbers at this season, and especially so in old green-house structures, and should be carefully hunted for at least once a day. The use of Cabbage and Lettuce leaves as traps for the slugs is about the simplest remedy, and, by a regular examination of these leaves morning and evening, many of these troublesome enemies may be destroyed.

As the time for the various horticultural shows is near at hand, some thought will be given by growers to Ferns for exhibitions, and preparations will be made for these competitions.

It should be remembered that the tasty arrangement of an exhibit is always a point in its favor, and to this should be added clean pots and correct and neat naming of the specimens shown, the latter being absolutely essential to a good exhibit. In the preparation of the plants for this purpose it will be found necessary to stake up the fronds of some species; but in doing this as few stakes as possible should be used, and due consideration should be given to the natural form of the plant, so that its gracefulness may be retained. A stiff and formal arrangement of the fronds of a Fern is an abomination from an artistic standpoint, and should be utterly condemned.

Holmesburg, Pa.

W. H. Taplin.

Orchid Culture, past and present.—This subject is of such interest that I venture to offer a continuation of the notes sent last week.

The profound ignorance which prevailed on the subject of Orchid culture during the early days of the present century is well illustrated by the following extract from the *Botanical Register* for 1817, under plate 220: "Air plants," for such were Vandas, Aërides and Saccolabiums then called, "possess the faculty of growing when suspended so as to be cut off from all sustenance but that derived immediately from the atmosphere. Plants of other genera of this tribe, and even of a different tribe, are endowed with a like faculty; in none, however, can such insulation be considered as the state of existence which suits them best, but merely as one they are enabled to endure, as a carp is known to do, that of being suspended out of water in a damp cellar." On reading this, one cannot help thinking of the days when birds of paradise were supposed to be altogether devoid of legs and to spend their whole lives upon the wing.

The part which the Horticultural Society of London took in obtaining information on the subject may here be mentioned. Owing to the want of success which had attended the cultivation of Orchids, a stove was set apart for their exclusive culture, but we read that "the first experiments were unsuccessful; the plants were lost as quickly as they were received." This led Lindley to inquire more closely into the conditions under which Orchids grew in their native countries, and thus to supply data for more successful cultivation. These data were chiefly obtained from the lowlands of Brazil and from India, and from them Lindley concluded that high temperature, deep shade and excessive humidity are the conditions essential to the well-being of the plants. These conclusions, published in 1830, he subsequently had reason to modify, but they appear to have been generally followed for many years afterwards.

Various travelers, who had seen the plants growing at considerable altitudes on tropical mountains, gave utterance to monitory warnings against the folly of subjecting Orchids, which naturally grew in a temperate climate, to the stifling heat of an Indian jungle, and these views were gradually adopted by a few gardeners of intelligence. Cooper, at Wentworth, adopted a lower mean temperature, and admitted fresh air into the house. Paxton, at Chatsworth, added an improved method of potting to secure sufficient drainage, and occasional watering of the paths and stages of the house, so as to secure a moist atmosphere. In 1838, Lindley wrote, "The success with which epiphytes are cultivated by Mr. Paxton is wonderful, and the climate, in which this is effected, instead of being so hot and damp that the plants can only be seen with as much peril as if one had to visit them in an Indian jungle, is as mild and delightful as that of Madeira."

One of the causes, however, which entirely revolutionized the cultivation, not only of Orchids but of all kinds of exotic plants, was the substitution of heating by hot-water pipes for the old system of hot-air flues, with its attendant evils of smoke and other noxious vapors escaping through the cracks and fissures of the flues into the atmosphere of the house. This change had been gradually effected at a still earlier period, but deserves to be mentioned as one of a combination of circumstances which gradually brought about a more rational treatment of Orchids generally. To us, who are familiar with the modern system of cultivation, the wonder seems that the change should have been brought about so very slowly. But the fact remains that, up to about 1860, the numerous beautiful Alpine Orchids of New Granada were killed almost as fast as they were imported by the barbarous treatment they received, and which Lindley, towards the end of 1859, confessed to be "a deplorable failure."

There yet remain a number of refractory subjects. Mr. Veitch enumerates *Cattleya citrina* and a few *Loelias* and *Epidendrums* from the Mexican highlands, the *Barkerias*, some Brazilian *Oncidiums*, several fine *Dendrobiums*, the *Bolleas*, *Pescatoreas* and others, as examples of plants not yet rendered amenable to cultivation, but which gradually dwindle

away and finally perish outright. The causes of failure he attributes to our imperfect acquaintance with their native surroundings, or the difficulty of approximately imitating in our houses the climatic conditions under which they grow. Doubtless this view is the correct one, and the enormous advance made during the past quarter of a century inspires the hope that many of those which still remain refractory subjects will yet prove amenable to cultivation as the conditions under which they grow become better understood. Let us hope so.

London.

Calypso.

Vegetables under Glass.—Market gardeners usually have a plant-house, and during the fall and the early winter it is practically empty, with the exception of the cuttings in the forcing benches and the stock plants to be kept over winter. It is possible to use this vacant space for two or three months, especially with vegetables for salads, without detriment to the plants. I have a span-roof house thirty-three feet long and twelve feet wide, heated with a smoke-flue under the benches, which are four feet wide on each side of the house, with a path down the centre. The soil used for vegetables is loam, eight inches thick, on benches; into this is dug fine horse manure. Lettuce should be set six to eight inches apart on the benches. A good variety for this purpose is the Grand Rapids Lettuce, a new kind which does well in green-house benches; Lettuce will not make perfect heads in the cool winter months, but for home use very nice plants can be raised. The house should be fumigated once a week with tobacco smoke, to kill the green aphids that would soon destroy all growth if not kept down.

Water-cress grows nicely in the bench, from slips of plants in their natural home. They should be dibbled in the benches about four inches apart each way, and, of course, watered well. A luxuriant growth of tender cress can be had in about six weeks, and when this is broken off a new growth will start, and this can be repeated as long as wanted. Mint roots will grow here nicely. Chives also do well, and fresh cuttings can be put in as often as they are removed. Seeds of French Breakfast Radish, sown in rows five inches apart, will produce edible roots in about six weeks from the time of planting.

If you have no garden Dandelion growing, go to the fields and gather roots of the common variety, digging them up full length, if possible, or at least not breaking them off within six inches of the leaf. They should be placed in boxes of earth with the tops uncovered, and not too closely cut. It is better to defer the digging till the ground is ready to close up for winter, and the roots can be kept in the box till February, in a place not cold enough to allow the earth to freeze, but cold enough to prevent the plants from making any growth. They should be kept damp, but not wet. About four weeks before Dandelion greens are wanted, the roots should be set in the benches in rows, and the growth will be a matter of surprise and pleasure. They grow quickly, especially when the house is kept warm. They will yield but one cutting, and the roots must then be thrown out. Parsley roots can be set in the benches in the same way, and will give cuttings all winter.

W. Springfield, Mass.

W. H. Bull.

Chrysanthemums.—This is a busy time with fanciers of Chrysanthemums, who must now be looking forward to the storing of plants inside at the first indication of frost, to the final training of specimen plants, and the thinning of the buds, besides the general care incident to the opening of another campaign. I have my specimen plants in quarters where they can be covered with sash in ten minutes. It may be that we shall not have frost enough to hurt the buds before the middle of October, but it is wiser to be on the safe side. The final housing of specimens will depend upon the conditions of the weather. Early-flowering kinds may be left out-of-doors a week longer than the later kinds, provided they can be protected during frosty nights. The final touches should be given to specimen plants as early as possible, for after the buds are set, and the wood begins to harden, all tying looks rough and unkempt. The thinning of flower-buds is of the greatest importance for specimen bloom. Three flowers are deemed sufficient on a single-stemmed plant, while on specimen plants three flowers should be left on each leader. Even when plants are grown in the ordinary way the flower-buds should be severely thinned. Of plants on which I am growing flowers for market I take from eight to twenty buds from each shoot, according to the variety. It is a mistake to think that thinning reduces the amount of color-effect. On the contrary, it augments it. All plants will require judicious watering when first taken in from out-of-doors. For the first two or three days it is best to be on the dry side, as, seemingly, the plants are much affected by their sudden confinement.

Weak liquid manure of any kind should be given at every other time of watering.

Carnations.—It is time that Carnations for winter-flowering were housed, and the planting, whether in pots or on open benches, should be done well and firmly. Any light, friable soil seems to suit the Carnation. A thorough watering should be given as soon as the planting is complete, and then on very sunny days the plants should be slightly syringed two or three times, the last time early enough to allow the plants to get dry before dark. The watering, after the first soaking, should be done very carefully, so as not to have the bed saturated for a week at a time. It is well to remember that each day, from now until the 1st of February, evaporation grows less and less. Carnations should be staked neatly as soon as potted or benched. The ties should be neat, and they should not be very tight around the body.

Pearl River, N. Y.

John Thorpe.

Caryopteris Mastacanthus.—In the first volume of GARDEN AND FOREST (p. 20) Max Leichtlin calls attention to this beautiful and interesting plant of the Verbenaceae family. To the same enthusiastic botanist and collector of new and rare plants the Arnold Arboretum is indebted for a specimen of the plant which is just now, and will continue to be as long as frost does not interfere, the most attractive flowering shrub in the collection. This plant was kept in a pit last winter, so that its hardiness has not yet been tested here, but it is well worth a little trouble and care. The small lavender-blue flowers are borne in large clusters at the axils of the opposite leaves, and as the branches grow, new flower-buds continue to develop with each pair of leaves, so that the plant would bloom for a long period if not checked by frosts. It was originally found in China by Robert Fortune, but it is also a native of Japan. If introduced from its most northern habitats it may be as hardy as *Vitex incisa*, which does very well here, without artificial protection, in some favorable situations.

J. G. J.

Correspondence.

Forests and Civilization.—VIII.

To the Editor of GARDEN AND FOREST:

Sir.—Since the publication of my report on forestry matters in Pennsylvania was begun in GARDEN AND FOREST, I have had many letters from all parts of the country inquiring whether cutting off the woods had any effect in aggravating the recent great floods in that state, or in causing the disaster at Johnstown. Some of the writers think the catastrophe should be made use of at once as a most impressive lesson regarding the consequences of forest destruction, and various things which have been written since the occurrence indicate that some vital considerations have not been adequately recognized. We have reached a stage in the discussion of forestry subjects in this country when discrimination, moderation of statement, and dependence upon actual investigation by competent observers are more and more desirable.

It is certain that the destruction of forest conditions over any considerable portion of a water-shed causes the water from rainfall or melting snows to reach the channels of the streams in a shorter time. The water runs down the slopes more rapidly, and there is, consequently, more of it at any particular point in the course of the stream at one time, and the stream is higher than it would be if the water descended more slowly to the river-bed from the hills. This is one of the most important principles of the subject of forestry, and it should be familiar to all intelligent persons. Its truth may be easily ascertained by direct observation in any mountain forest region, where considerable areas have been entirely denuded by the effects of pasture or fire following the removal of the trees. But cutting off the forest does not, in itself, destroy forest conditions. If the ground is protected from fire and from pasture the forest-floor is not destroyed, and the trees will soon grow again. Water will not run any faster down a hill-slope which is still covered by the sponge formed by the network of living root-fibres, decaying leaves, and the accumulation of vegetable matter usually found on the floor of a forest, merely because the trees have been cut off. Forest conditions are still maintained if the land is so protected that another generation of trees has a chance to grow. It is not the cutting off of the trees that causes mischief, but the breaking up of the forest-floor, and of the succession of the forest, by fire or pasture.

During my recent examination of the mountain forests of Pennsylvania I had excellent opportunities for observing the effects of very heavy rainfall, and of comparing the rate of descent of the water over hill-side areas covered with forests,

or where forest conditions prevailed, with the rate on areas of equal slope where the forests had been removed, and the tract denuded by fire or pasturage. I went into the woods several times while it was raining heavily, and again after the rain had ceased. I had made similar careful observations here in the Adirondacks many years ago. In both regions I found that on denuded hill-side areas the water descended to the brooks and rivers much more rapidly than where the forests were still standing, or where, if they had been cut off, the forest-floor was still intact. After a heavy rain the denuded areas became dry much sooner than those of similar slope on which forest conditions had been maintained. The rate of descent of the water over hill-side areas of equal slope is in exact proportion to the smoothness and impenetrability of the surface.

As all the water-sheds of the Pennsylvania mountain forest region have been partially denuded, the floods resulting from unusually heavy rains are certainly somewhat more sudden and disastrous than they would be if forest conditions had been maintained over the whole drainage area. But there were sometimes great floods while the forests were yet unbroken, and there would be now if they covered the whole country as of old. The relation of forest destruction to recent freshets cannot be determined even approximately without much more careful and thorough observation than the matter has yet received. The entire drainage area of a stream, lake, or reservoir would have to be examined with scientific accuracy, and the proportion of forest areas and of denuded lands ascertained. Such investigations, if conducted by competent men, would probably make plain the necessity for some proportion of forest in every large water-shed or drainage area in mountain regions, and the places at which forests would be most needed for the protection of the streams and valleys could also be determined.

Until the methods of scientific investigation are thus applied to the subject, it can hardly be discussed intelligently or fruitfully, except in a very general way. Such application of scientific methods to the study of forestry subjects in this country would require a considerable advance in thought. While forestry was wholly a matter of theory for us here, it was necessarily only something to talk about, a topic for essays and addresses, and, of course, anybody could talk or write on the importance of the general subject. The method of treatment at this stage was inevitably somewhat vague and sentimental. All the illustrations were drawn from the history of the countries of the old world, and there was a natural tendency to assume that we might adopt the methods and ideas of European forestry, and put them into operation without taking the trouble to study actual facts and conditions here. This stage of library and office forestry was inevitable, but it was always plain to thoughtful Americans that it was only a stage, a degree of progress or advance, and that we should pass beyond it whenever we began to apply the methods of scientific observation to the subject in our own country.

The fact that our government is a democracy, that all the people participate in it, makes the psychological element the most important factor in this, as in all of our national problems. Everything depends upon the character, intelligence, temper, and degree of civilization of the people. Nothing greatly in advance of these can be done or established here. This is often deplored by men who wish to bring about various special reforms, yet it is not only a natural but a wholesome feature of our national condition and life. No institution which is not the product and expression of our national character can be successfully planted in our soil. If introduced from without, brought hither from alien lands, it could not be made vital or permanent. It would be artificial, parasitic, and of transient duration. The propagation of ideas, after we have the right ideas to propagate, the education of the people by the diffusion of knowledge, thus becomes the chief instrument and means for all that we have to do in this country for the advancement of our civilization, and the permanence of our national life. Many reformers are far too much disposed to rely on legislation and on government action without sufficient attention to the preparation of the public mind for the work of sustaining the laws and aiding in their efficient administration.

Real knowledge and sound practical judgment regarding forestry interests here can result only from direct, patient, and continuous observation and study of the subject, in all its aspects and relations, as a feature of the life of our own country. The labor and time required to gain such knowledge, through familiar acquaintance with the woods and streams of our country, must be paid for. Each of our principal states should have a competent officer or agent, whose work shall be out of doors, not in an office at the state capital, and who shall acquaint himself and the people with the condition of the

forests and streams of the state, and with their functions and value in all their relations to the life, civilization, and welfare of its inhabitants.

Paul Smith's, N. Y.

J. B. Harrison,
Cor. Sec. American Forestry Congress.

The Potent Pollen of the Navel Orange.

To the Editor of GARDEN AND FOREST:

SIR: The experience of Rev. Lyman Phelps, noted in No. 79 of GARDEN AND FOREST, will doubtless prove a stumbling-block to those scientists who do not believe in the direct influence of pollen upon the forthcoming fruit. That such a difference of opinion should exist among biologists indicates a *terra incognita* in the realms of botany as worthy of exploration and mapping out as the heart of Africa.

Discarding the theory of chance, there would seem to be only two ways in which so-called sports can occur—one by atavism, or reappearance of ancestral traits, and the other by the influence of foreign pollen upon the fruit, and through this upon the wood. So what we call sports are generally the freaks of pollenization.

Perhaps no family of plants is more readily affected in this way than the Citrus, and the infancy of Citrus culture in this country may account for the ignorance of many of our botanists respecting phenomena often observed by intelligent and studious Orange growers. The same phenomena are familiar to the Orange and Lemon cultivators of the Old World. A letter from one of them, published several years since in the *Florida Dispatch*, strongly condemns the intermixture of all varieties of Citrus trees in one plantation as tending to produce numbers of unsaleable hybrid fruit. And this caution is given, not as an unestablished hypothesis, but as a fact well known to all. My own experience in Florida, however, would not, from a commercial standpoint, warrant such extreme caution. The venerable Col. Davey, of Orange Mills, Florida, stated that he had sometimes seen perfect lemons on Orange trees, where both had been planted together, and I have seen fruits, closely resembling an orange, produced on Lemon trees. There could be no reappearance of ancestral traits here, and these so-called sports can only be attributed to the pollen, since it is presumable that, had no Lemon trees existed near by, a lemon would never have grown upon an Orange.

No sweet oranges differ more widely than the Brazilian Navel and the Maltese Blood. Geographically and structurally they are, in a measure, the antipodes of each other. If the pollenization theory be false, then, whenever a Blood orange bears the Navel mark, it would internally and externally maintain the characteristics of its kind. Contrary to this, when Navels and Blood varieties are planted together, the Blood oranges bearing the Navel mark are often scarcely distinguishable in shape, flavor and texture from the Brazilians. How could a Maltese orange be metamorphosed into a Brazilian except through the influence of pollen? When we reflect also that there are distinct varieties of Navels, and their almost exact counterparts occasionally appear upon other trees, the evidence becomes overwhelming. So much for chance examples—deliberate experiments do but confirm what chance suggests. Rev. Mr. Phelps carefully crossed the Mandarin orange with the Navel. Mandarin oranges of the typical shape appeared with the broad seal of the Navel impressed upon the apex. When Navel trees exist in any considerable number in a grove, the peculiar mark appears freely upon other trees, and I have in mind in my own grove several young trees of a hybrid Mandarin, not a Navel, on which, this year, every fruit is stamped with the broad seal. And yet some microscopists argue a lack of energy in Navel pollen, from its often too profuse shedding of bloom, when this pollen is so marvellously prepotent as to leave indubitable traces wherever it falls.

We may go still further and note that not only is the fruit directly affected by foreign pollen, but also the wood of the same growth, in its young state, at least. Some curious hybrids, in which the traits of both parents were strongly apparent, have been created by using buds from this cross-fertilized wood. The same principle prevails, perhaps to a less extent, among other genera of plants, and variations of Roses, called sports—I think the American Banner is one—not unlikely came about in the same way. I have before me an apple, with a broad stripe of deep crimson Baldwin peel, extending from stem to apex, which grew on a McLellan tree planted among a lot of Baldwins.

Can the doubting Thomases explain how that Baldwin streak came there?

Federal Point, Fla.

E. H. Hart.

To the Editor of GARDEN AND FOREST :

Sir.—I have read with interest Mr. Phelps' notes on the immediate influence of foreign pollen affecting the orange, and I am led to ask if he has a Washington Navel tree that from its own inherent nature or peculiar surroundings produces pollen so abundantly as to impress the fruit of surrounding trees to the extent he mentions? If so, he has a valuable tree to experiment with. The Washington Navels on Indian River are notorious for being poor bearers, and ringing, girdling and cutting has been resorted to, in vain efforts to induce greater fruitfulness. I concluded last winter from an examination of the blossoms, that the trouble was due to the fact that the blossoms were all pistillate, as I failed to find a single flower producing pollen. I also tried to fertilize hundreds of flowers by hand, using pollen from other varieties, carefully applying it to the stigma of the Navel blossoms, with complete failure, though the attempt was continued at intervals for two weeks. It is quite possible that the Navels here may produce an occasional flower with a grain of pollen which fertilizes its own pistil, but that they are able to furnish enough to visibly affect other trees is a revelation which I was unprepared for. Standing as these Navels do, surrounded by trees producing abundant pollen-bearing flowers, in bloom at the same time, and yet persistently failing to produce the least fraction of a crop, all this, together with my own unsuccessful attempts at cross-fertilization, seemed to indicate a lack of affinity on the part of these trees for the pollen of other varieties. The subject is an interesting one, and worthy of further experiment and careful, scientific study. If we could secure for the Navel the fruitfulness of other varieties it would have no rival. As for its influence on surrounding trees, I can only say that I have rarely seen an orange with the Navel mark in our Indian River groves, although Navel trees are abundant among them.

E. Williams.

Montclair, N. J.

Notes.

Bambusa Metake has proved hardy in Mr. Hunnewell's gardens at Wellesley, Mass.

At Penny Hill Park, near Bagshot, England, is a specimen of the Japanese Umbrella Pine (*Sciadopitys verticillata*), which is nineteen feet high, and has a circumference of branches of forty-six feet at three feet from the ground.

Mr. E. S. Carman reports that the Berckmans grape, a variety with compact clusters, resembling the Delaware in color and quality, but a little larger, has ripened perfectly on his grounds this year, while the Delaware lost its leaves early, so that the berries failed to ripen.

The members of the Forestry Commission appointed by the Governor of New Hampshire under the joint resolution of the Legislature, published in GARDEN AND FOREST a few weeks ago, are Joseph B. Walker, of Concord; J. B. Harrison, of Franklin, and George B. Chandler, of Manchester.

It is estimated that the wine product of California will not exceed 12,000,000 gallons this year. This is a reduction of 8,000,000 gallons from early estimates of this year's vintage. The reduction is due partly to damage by sunburn and mildew, but more especially to the fact that the drying of wine grapes will absorb probably 2,000,000 gallons, while 4,000,000 will go into the still. The state will probably produce 1,000,000 gallons of brandy this year.

It should not be forgotten that arsenic will kill bees as well as the curculio and the larva of the codling moth, and, therefore, Apple-trees should not be sprayed with insecticides before the blossoms fall. This is not an imaginary danger, for reports from many bee-keepers show heavy losses of bees in all stages, the imago, as well as the larva and pupa, being destroyed. This loss is not confined to the apiarist, for the bee, by aiding to distribute pollen, is a recognized help to the fruit-grower.

A correspondent of the London *Garden*, who accompanied the Scottish Aborigicultural Society during their recent journey to Sherwood Forest, mentions an Oak, which, in 1724, had an arched opening cut in it, that the then Duke of Portland might be able to win a bet by driving a coach and six through "a tree on his estate." The Duke won his bet, but destroyed the Oak, which, however, every year gives proof of its vitality by sending forth a thick crop of leaves on its shored-up limbs. The tree is forty-five feet high, its girth is thirty feet at five feet from the ground, and thirty-one feet round the base.

In Kirk's recently published "Forest Flora of New Zealand" three species of *Fuchsia* are mentioned, although the genus is

otherwise restricted to America. The most remarkable of the three is *F. excorticata*, which sometimes attains a height of forty-five feet, with a gnarled trunk up to three feet in diameter. The Central American *F. arborescens* is the only species that equals or approaches it in dimensions. *F. excorticata* has medium-sized flowers, at first of a greenish color streaked or blotched with purple, and finally of a dull red, with very small, almost black petals. The tube of the calyx is very much constricted immediately above the ovary, and there is a second constriction a little higher up. That this *Fuchsia* yields "one of the strongest and most durable timbers in the colony" will be news to most people. But, as the trunk is often crooked or gnarled, it is difficult to procure logs exceeding eight or nine feet in length, and its commercial value is therefore greatly diminished. Mr. Kirk says the wood is hard, dense, compact, and even, and deep brown in color, relieved by streaks of a paler shade, and short, narrow, waved, black markings. When much waved, it is of a highly ornamental character. Further, it is almost indestructible even by fire, except in a closed furnace.

The curculio has destroyed the plum crop in many places this year, notwithstanding applications of London purple in the form of spray. Carbolized plaster, applied in the proportion of one pint of crude carbolic acid to fifty pounds of plaster, has not been efficient, as it has proved in former years, to repel the insect. This failure is explained by the frequent rains, which have washed away all applications. In view of this experience, Professor A. J. Cook, in a paper read before the Society for the Promotion of Agricultural Science, comes to the conclusion that in case of very frequent rains the jarring method will not only be cheaper, but much more effective against the curculio. Again, as our wild fruits are more cleared away we must have plums in our orchards to protect the apples from the curculio. When apples are seriously stung they become so gnarled and deformed as to be worthless. It will pay, then, to set Plum-trees near by or among the Apple-trees. Then we will escape mischief among our apples, and will only need to spray our apples once, to destroy the codling moth, and can treat the Plum-trees three or four times with Paris green or carbolized lime in case we have only occasional showers, or can jar the trees when the rains are very frequent. If the carbolized plaster is preferred, it should be thrown freely over the trees, so as to strike every plum on the tree, which is being treated.

Professor J. B. Smith, entomologist of the New Jersey Experiment-station, in a recent bulletin, tells the farmers and gardeners of the state how they can help him in his investigation of insect pests. His first counsel is to be prompt, instead of waiting till the damage is done and the pests have disappeared, and he adds: "Do not waste time in describing insects. Send specimens, and send plenty of them. If an insect is really injurious, it is as easy to get a dozen as it is to get one, and it makes it a great deal easier for the entomologist. He wants two or three to put in alcohol, so that he will know them next time; the others he wants to bring to maturity, or to describe or figure so as to complete his knowledge of them. Such specimens, if dead, should be packed in some soft material, as cotton or wool, and put into a stout tin or wooden box. They go by mail for one cent per ounce. Never send insects loose in a letter! The postal clerk always smashes them flat, so that they are never of any use as specimens, and frequently not recognizable. With the specimen send also, so far as possible, a sample of the kind of injury caused by it—a bored twig or root, or gnawed stem, fruit or leaf—anything to show how the insect works. If at all possible, send the insects alive, along with a supply of their ordinary food sufficient to last during the journey. Pack them in a tight box, and do not punch air-holes into it. Insects need very little air, and the tight box keeps the food moist. Send with the insect an account of what you know of it; how it works—whether on leaves, twigs or fruit; whether above ground or underground; how long you have known it; how much damage it has done; what experiments looking to its destruction have been made, and what the result has been. Such facts are often not only of the highest scientific interest, but also of the greatest practical importance."

Catalogues Received.

JOSEPH BRECK & SONS, 51, 52 and 53 North Market Street, Boston, Mass.; Dutch and Other Bulbs.—JOHN R. & A. MURDOCH, 508 Smithfield Street, Pittsburg, Pa.; Fruit Trees, Plants, Lilies, Holland Bulbs, etc.—W. C. STRONG, Waban Nursery, Newton Highlands, Mass.; New and Choice Trees, Shrubs, Roses and Vines.

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A Crisis in the History of Central Park.

THE Central Park of New York is one of the most interesting creations of American genius. No other city in the world has within its borders a work of landscape-art which equals it in originality of conception, in simplicity and beauty. It is worthy of the noblest civic pride, and it especially deserves affection and jealous care, because no other public work of the city approaches it in dignity or value. If New York is to have a great Exposition in 1892, nothing in the display could be more attractive to visitors than this park arrayed in all its summer loveliness. Nothing more distinctively or characteristically American can be imagined than the upper portion of the park, where the broad, free sweep of hill and valley permitted a more natural treatment of the original features of the land than was possible among the frequent narrow ridges of rock in the portion south of the reservoir. The gently undulating meadows, with their perfect turf; the projecting point of rock, with its clustering Pin Oaks; the recesses in the wood border, where the limits of the green-sward are lost in shadows; the sense of mystery and spaciousness which is given by the skillfully broken line of foliage which encircles the whole; the natural forest which sweeps up the long slope toward the northern boundary: all these constitute a picture of pastoral rest and peace which has no rival in the heart of a great city.

It is this most delightful portion of the park, and as much more of it as they may consider necessary, which the Committee on Sites have voted to cover up with carpentry. Even if it were probable that the wounds thus made could be healed within a reasonable period, this would mean the obliteration of the most beautiful bit of scenery on Manhattan Island at precisely the time when all the world is invited here, and it would advertise the vandalism of a city which failed to appreciate its noblest possession. But the hope that only temporary damage would be inflicted by such an invasion is a delusion. There can be no difference of opinion among persons familiar with park work as to the probable extent of injury to the park, if the proposed buildings, with their necessary approaches and surroundings, are placed on the North Meadows. Not one of them will dissent from the view of Mr. Olmsted, who writes:

"I am positive that no such structure could be provided for without involving a devastation that could never be repaired. I do not believe that it could be done without an enormous waste of the value of the park for the purposes to which it has been dedicated, and for which it has been prepared at great outlay." But we are not left to conjecture in this matter. Mr. Russell Thayer, who was Chief Engineer and Superintendent of Fairmount Park at the time of the Centennial Exposition, has written these words of warning, which are of singular value, because they are a record of actual experience:

In my opinion, it is impossible to erect the large structures required without destroying great numbers of the finest trees in the park, and, at the same time, doing almost irretrievable damage to the present shape of the grounds. Foundations will be required for all the structures, which will completely alter the present contour of a great portion of the present beautiful surface of the park and make it almost impossible ever to restore it to its present condition. The greater portion of the drainage system of the park would, of course, be destroyed, and, in many places, it would be necessary to level off the small hills and fill in the valleys in order to provide proper grades for the floors of the larger buildings. Besides the destruction of the greater portion of the trees, which would unavoidably interfere with the proper laying out of the buildings of the Exhibition, most of the shrubbery in the portion of the park devoted to the object would necessarily be destroyed. In fact, it may be stated that the greater portion of Central Park would be so changed after this Exhibition had been held therein that it would not be recognized as a public park. . . . The section of Fairmount Park occupied by the Centennial Exhibition was, previous to that event, almost totally unimproved, the greater portion being merely farm-lands. And even there, after the removal of the hundreds of buildings which composed the Exhibition, the grounds were a perfect desert of clay and gravel, upon which not a blade of grass could be made to grow for several years. Therefore, I am obliged to state as my candid opinion that, if the Exhibition is held in a highly cultivated park like the Central Park, the damage thereto will be almost incalculable.

The park is still young, but it has taken thirty years to grow into the beauty which now invests it, and a generation would be needed to restore it after the Exposition converted it into a desert. Oaks and Hickories, Chestnuts and Beeches, like those which were growing in the natural wood before the park was planned, can be replaced only after years of patient waiting. But what ground is there for hope that any resolute effort would be made to restore the park. If there is not enough public spirit in the city to preserve it now, when in the prime and freshness of its beauty, what encouragement would there be to begin over again, with the very surface of the ground scarified and blasted, until not one of its original features could be recognized? Even if any attempt at restoration were made it would soon be abandoned for some new invasion, because the clamor for space to be used for one purpose or another will grow louder as the population becomes more dense. The probabilities are that if the park is thrown open to this celebration, it will be left an entirely different and inferior work, and that its most impressive landscape features will be obliterated forever.

We cannot believe that the city is to suffer such a wanton spoliation, or that the park is doomed to ruin long before it has attained its mature beauty or has approached the full measure of its usefulness. When the intelligence and public spirit of New York have been appealed to on capital occasions, they have never failed to repel any assault that threatened the park with serious injury. They have erected barriers of precedent all around it against every form of destructive intrusion, and, foreseeing that these barriers might be prostrated before some sudden gust of passion or of enthusiasm, they have deliberately enacted a law to meet such emergencies. Beyond all doubt the present dangers to Central Park are more grave than any it has heretofore encountered. Its very existence as a park is in jeopardy. But the people of the city can be trusted to redeem their solemn obligations to hand down this peerless pleasure-ground without impairment to posterity.

Drives and Walks.—IV.

IT has been said that it is far better that no approach or other drive should cross the lawn in front of a country house. But, of course, the arrangement which is ideally best cannot always be made. In many cases where the road can be kept away from the immediate vicinity of the house-front, it will have to pass it at a greater distance. The road may then be masked by low plantations, which will, at least, be less disagreeable to the eye than the line of gravel. But plantations will often be undesirable as obstructions in what ought to be a simple extended view, or a broadly treated landscape. It is better, when possible, to sink the road, or to raise the lawn in a gentle slope towards it to such a degree that the eye will not perceive it, so that the stretches of lawn on its hither and further sides will seem to unite without a break.

If the place is so large that the house is not seen until after one has entered the approach-road, attention should be paid to the first view thus afforded. There is much in initial impressions, and a house may never redeem itself wholly in a visitor's eyes if it fails to do itself justice when they first light upon it.

With regard to walks, the same general principles hold as with regard to drives. There should be no more of them than are needful; they should neither be so straight as to lack beauty, nor so meandering as to lack ordinary directness and they should be as narrow as convenience will permit, for gravel streaks are not charming objects in themselves, and the greater their breadth the more they decrease the apparent size of the place. They should not be so narrow that two persons cannot pass with comfort, except in retired situations, where pedestrians will certainly be few; but anything in excess of this should be studiously avoided. A walk six feet wide, where one of three would have sufficed, will dwarf its surroundings to a much greater degree than most owners realize.

A lawn can be injured almost as much by foot-paths as by drives when they cut across it. A properly kept lawn is as delightful to walk upon as to look at, and, in our dry summers, the days are few when it will be too wet even for a lady's shoe. Of course, there may be cases when some distant object—a summer-house that is constantly used, a boat-house or tennis-court—will so constantly attract the feet that, unless a walk be provided, a ragged path will be worn across the grass. Then, a made walk is naturally better, for anything is better than a look of untidiness and neglect in grounds which ought to be carefully kept. But it should, if possible, be carried around the lawn, and, if this is not possible, its presence should be accepted as a disagreeable necessity.

Paths should never be made across a lawn, simply to give access to flower-beds, for the flower-beds themselves have no business there. A lawn is a place for grass. Its object, whether it be large or small, is to afford a simple sheet of verdure to delight the eye with its reposeful breadth and to supply a proper foreground for the plantations beyond it. To spot bright beds about is to ruin its peacefulness and its unity. There are thousands of country-places in America, from large estates to suburban villas, which would be immeasurably improved could all the flower-beds on the lawn, all the fountains and vases, and all the paths—leading nowhere but back to the house again—be once and for all turfed over. Flowers can usually be introduced in sufficient quantities in other ways—scattered among the shrubberies or arranged in massed beds behind the house or in borders disassociated from the lawn. Or, if they are the prime consideration and the place is not large enough for a lawn and a flower-garden both, it is better to give up the lawn altogether and arrange in front of the house an old-fashioned garden with as many beds and walks and Box-hedges as the space will allow. Such a design is consistent and sensible and may be made very pretty, while the more common device of trying to unite a lawn and a flower-garden is illogical and can never result in anything but an artistic monstrosity.

If there is a lawn, large or small, care should be taken that no walk, as well as no drive, runs between it and the house. Let the grass come up to the house-foundations, and unite the two by planting a few vines and shrubs. Then the house and its site will be connected and harmonized; the walls will seem to spring from the soil almost like a natural growth, and the picture seen from the lawn will be as charming as that which the lawn presents when seen from the house. Whether there are mere door-steps, or a porch, or a piazza, no path is needed, for this entrance should be used only by those who wish to stroll upon the lawn or to cross it to some spot not otherwise accessible. And even on those sides of the house where a path is needed

it should not be allowed to run close to the walls. Sufficient space should be reserved for planting against the walls, and thus, if the further side of the path is properly planted too, from a little distance the eye will see only the masses of verdure which connect the house with the landscape about it.

Although curving roads and walks are best in a place of any size, straight ones should usually be preferred in a small villa-lot. Then every inch of space is valuable, and, of course, a straight path occupies less ground than a winding one. The straight lines formed by the house and the street cannot be for a moment forgotten, and it is, therefore, good art to accept them as the basis of the whole scheme and make the paths within the gates correspond with them. Then, too, there should be no drive at all unless there be a stable behind the house. In this case it is best to leave the front free and carry the road in at the end of the lot to a door in the side of the house whence it may continue to the stable-yard. Place for a lawn is thus reserved in front, and the line of gravel will be least conspicuous from the principal windows. But it is better, when there is no stable, to sacrifice comfort a little in the interests of beauty—to leave the carriage in the street and let but a narrow pathway approach the house. The sacrifice will be a small one, and the gain in the aspect of the place as a whole may easily be great.

The suggestions in these chapters have not been made with the idea of making "every man his own landscape-gardener." On the contrary, they have been written to show how many things must be considered in the building of the simplest country-house, or the designing of the smallest place; and how desirable it is, therefore, that the aid of an artist should be called in at the outset.

Native Shrubs of California—II.

Cercocarpus betuloides, Nutt. (Low & Gray, Fl. i. 427), bears some likeness to the shrubby birches, but has sparser foliage, and, consequently, little beauty to recommend it. This prevailing shrub or small tree of the Coast mountains of the Pacific states is, however, of much botanical interest and possibly of considerable economic value. Known to the mountaineers and miners by the name of Wild Mahogany, its wood is the heaviest and hardest we have; and the leafy twigs have a sweet birchy flavor, rendering them choice food for cattle in late summer and autumn when the annual grass-crop has failed.

Under the name of *C. parvifolius*, with which species it has been confounded by those botanists who have seen dried twigs only, this shrub is credited with a range in California from San Diego to Lake County, or through the southern and middle parts of the State; but it is equally common southward on the Lower Californian peninsula, and northward on the Siskiyou Mountains in Oregon. That it is a good species, better than Nuttall the author of both of them knew, I indicated some years since, in my paper on Santa Cruz Island.* The larger, proportionally broader and nearly glabrous leaves, on which characters Nuttall seems to have relied, are indeed insufficient; they are inconstant. Small-leaved states of *C. betuloides* are often met with; but, over and above a certain constant difference in the general bearing or habit, easily seen at a glance, but not easily defined, the stem and bark of the two are strikingly unlike. *C. parvifolius*, which, by the way, occupies an entirely different region of country, *i. e.* the Rocky Mountains and adjacent interior districts, not reaching any part of California or Oregon, has a dark-colored, thick, persistent and fissured bark. *C. betuloides*, on the other hand, often much larger every way than the best developed states of *C. parvifolius*, presents, at most seasons of the year, a clean, smooth trunk with gray bark, and this outer bark is deciduous, falling away in irregular flakes in early autumn. On this character alone, *C. betuloides* will rest securely as an excellent species. By the pioneer collector, Mr. Douglas, and by the authors of the Botany of Captain Beechey's Voyage, the small-leaved state of *C. betuloides* was mistaken for the real *C. parvifolius*, and thus began that confusion of the two species which has continued, in our books, to the present.

During my vacation journeyings of the past summer, I, for the first time met with the curious *Fremontia Californica* (Low, Plantæ Fremontianæ, p. 6. t. ii) in its native wilderness. Particularly attractive to all botanists as being nearly related to the celebrated Hand Flower Tree of southern Mexico, eminent systematists considering it as nothing more than a second species of *Cheiranthodendron*, I had not, from the numerous herbarium specimens I had seen, inferred its highly ornamental character. The foliage, as in most shrubs of our arid mountain districts,

* Bulletin Calif. Acad. ii., 396.

is sparse and small. When the Rev. Mr. Fitch, the first after General Fremont to observe the shrub, described it to Dr. Torrey as having very much the appearance of an ordinary Fig-tree, he must have had in view the mere outline and texture of the leaves. In these points only are the leaves like fig-leaves; for they are commonly only an inch in diameter, and rusty tomentose beneath. The bark of both main stem and branches is, indeed, smooth and much like that of the Fig-tree, but darker, even blackish on the older trunks. But the beauty of the *Fremontia* is in the crowded profusion of its red and yellow Hibiscus-like flowers. Each wand-like branch, at flowering time, is simply a long, solid wreath of bright yellow, tinged with a rusty red; and the arrangement of the branches—the head of the tree—is as far from the conventional as the structure of the flower is unique. Growing along the steep and jagged rocky slopes of the mountains, the dark, smooth trunk will rise erect, while all the long-flowering branches, not rarely six or eight feet long, will hang on one side, it may be; or they may spread out in several directions, forming a flat-topped, or umbrella-like body; but the bush or small tree, not rarely twelve feet in height, is always attractive if in bloom and the flowering season is not brief. Or rather, the showy corolla-like calyces, of great firmness of texture, remain fresh a long time, and finally wither, almost without change of color, and remain attached to the growing fruit for some weeks.

Attaining its best development among the arid hills which shut in such almost rainless and overheated regions as the Mohave Desert, it is not likely that the *Fremontia* could be made well at home in gardens even in the milder regions of the east. In its more northerly habitat, the upper Sacramento valley in California, it is smaller and less beautiful by far than under the comparatively rainless skies of the southern interior. But any lover of shrubs, at once odd and beautiful, having once enjoyed the sight of this one in flower, will wish he might add it to the ornaments of home.

University of California.

Edward L. Greene.

Notes Upon Some North American Trees.—XII.

254. *QUERCUS OBTUSILOBA*, Michx.—A much older name than that of Michaux (1801) for this tree is that of Wangenheim (Amer. 78, t. 6., f. 15, 1789).—*Q. stellata*; but Marshall's *Q. alba minor* (1785) is older still, and if such names of Marshall's as *Juglans minima* and *Juglans odorata* are to be taken up there seems no escape from *Quercus minor* as there can be no doubt of the identity of the species to which he applied this name.

The variety of this species with almost entire or undulate somewhat angled thin leaves is common on the sandy west coast of Florida, reaching at least as far south as Tampa, where it grows into a tree twenty to thirty feet high. The oldest name for this plant appears to be *Q. parvifolia* of Chapman; so that it would become if it is considered a variety of the Post-Oak, with which it is connected by intermediate forms, var. *parvifolia*.

255. *QUERCUS UNDULATA* var., GAMBELLII, Engelm.—This is the common deciduous-leaved White Oak found in the mountain cañons from western Texas to southern New Mexico and Arizona, northern Mexico, Colorado and Utah. It is very closely related to the eastern *Quercus alba*; and Mr. Edward L. Greene, whose opportunities for studying this tree in the field have been great, insists (West American Oaks, 23,) that it cannot be considered a form of the shrubby evergreen *Q. undulata*, with which it was united by Engelmann. Forms occur, or appear to occur, in the herbarium which seem to lead to a union more or less close of all the Oaks of the interior of the continent; but with Oaks, and indeed, with nearly all trees, a judgment of specific differences and limitations based primarily on studies in the field is the best, and in this case I am glad to have impressions gathered from an examination of dried specimens only, confirmed by Mr. Greene's field observations, and I shall follow him in restoring the *Quercus Gambellii* of Nuttall.

263. *QUERCUS OBLONGIFOLIA*, Torr.—Mr. Greene proposes (*l. c.*) to separate from this New Mexico and Arizona tree the evergreen White Oak of southern California, under the name of *Quercus Engelmanni*. The California tree is larger, with larger leaves, often retuse or emarginate, larger striate acorns and much thicker cup-scales; and in the herba-

rium it is not difficult to distinguish the two plants, which it will be best, probably, to keep separate. It is less evident, however, that Mr. Greene's proposition (*l. c.* 29) that *Q. grisea*, Liebm., is a variety of *Q. undulata*, Torr., to which he would refer also Torrey's *Q. oblongifolia*, can be sustained. The connate cotyledons of *Q. grisea* would seem to separate this from the other Rocky Mountain and north Mexican White Oaks; although *Q. oblongifolia* may well be an arborescent form of the polymorphous and generally shrubby *Q. undulata*. But these are matters which cannot be settled at this time and which only protracted field observations can determine satisfactorily.

267. *QUERCUS VIRENS*, Ait.—Aiton's name (Hort. Kew, iii., 356), published in 1789, must give way to Miller's older one (Gardeners' Dictionary, ed. 8.), published in 1768—*Quercus Virginiana*.

QUERCUS TOMENTILLA.—This evergreen White Oak is closely related to *Q. chrysolepis*, from which it is readily distinguished by the stellate pubescence of the young shoots and foliage and by the prominent primary veins of the leaves. It was discovered by Dr. Edward Palmer in 1875, on the Island of Guadalupe off the coast of Lower California, and has recently been found by Mr. Greene on the Island of Santa Cruz, and last year by Mr. Brandegee on Santa Rosa: and it must now be included in the North American Silva. Its position is immediately after *Q. chrysolepis*.

QUERCUS MOREHUS, Kellogg.—Mr. Greene proposes (*l. c.* 3) to take up this species first described by Dr. Kellogg (Proc. Cal. Acad., ii., 36). It is a small tree, thirty feet high, widely distributed in the California coast-ranges and in the Sierra foot-hills, but nowhere common. It is nearly intermediate in character between the deciduous leaved *Q. Kelloggii*, the common Black Oak of the Pacific coast forests, and the evergreen *Q. Wislizeni*, and it has been suggested that it may have been produced by a cross between these two species—a view which Mr. Greene does not share, and which he believes to have been impossible. I have no knowledge of the plant beyond what has been gained from the examination of a single herbarium specimen in fruit, and from Mr. Greene's description.

277. *QUERCUS FALCATA*, Michx.—There are, perhaps, three older names for the Spanish Oak than that of Michaux published in 1801. It has been sometimes thought that the *Q. rubra digitata* and *Q. rubra montana* of Marshall had reference to this species, but there is a vagueness in the descriptions which leaves some doubt as to just what tree he had in mind. It will therefore be safe to pass by these names entirely and take up the *Q. cuneata* of Wangenheim (Amer. 78, t. 5, f. 14, a), published in 1789, or fourteen years before Michaux's name. Wangenheim's figure represents a leaf of the trilobed form of the species—the *Q. triloba* of Michaux.

288. *QUERCUS CINERIA*, Michx.—The reference of this species to the *Q. humilis* of Walter, which is several years older than Michaux's name, is too uncertain, without an examination of Walter's herbarium, which is preserved in the British Museum, to make any change of name for this species possible.

QUERCUS LEANA, Nutt.—This tree has generally been considered a natural hybrid, between *Q. imbricaria* and *Q. coccinea* or *Q. tinctoria*. It is now known in several widely scattered localities, from the neighborhood of Washington, D. C., to Missouri; and there seems no reason, whatever its origin may have been or however recently it may have appeared, why, if *Q. heterophylla*, which many excellent observers have always considered a hybrid, is included as a species in the American Silva, *Q. Leana* should not be included also. It should follow immediately after *Q. imbricaria* with which its relationship is obvious.

QUERCUS MACDONALDI, Greene.—This is described as a small deciduous tree by Mr. Greene (West American Oaks, 25) who discovered it on Santa Cruz Island, California, with

a variety *elegantula* from the southern part of the state. I have not seen specimens of these trees, and have no knowledge of them beyond that derived from Mr. Greene's descriptions.
C. S. Sargent.

Abies Fraseri.

AN interesting feature of the forest-flora of North America is the multiplication of species of Fir (*Abies*). The American forest, if we include Mexico with its single Fir-tree and consider *Abies concolor* as truly distinct from the Fir of the north-west coast (*Abies grandis*), contains ten species of these trees; while in the rest of the world there are known only eleven species, even allowing that some doubtful ones like *A. Cephalonica* and *A. Appolinis* of the Orient are really specifically distinct from the widely-distributed *A. pectinata* of Europe—a view which has not been held by the most competent observers of these trees. Europe, in addition to *A. pectinata*, possesses a second species (*A. Pinsapo*), confined to the Spanish Sierras, and to some of the high mountain-ranges of north-western Africa. In the Asia Minor and Caucasian region there is a group of four closely allied species or varieties, including the two we have already mentioned and *A. Nordmanniana* and *A. Cilicica*. The forests of the Himalayas contain one species with two rather distinct forms, while another Asiatic species (*A. Sibirica*) is widely distributed through the more northern parts of the Continent. In Japan three species are known. The true home of the genus, therefore, if the multiplication of forms indicates that a genus is more suited to flourish in a particular region than in another, is western North America, where Firs are found upon all the mountain ranges from the Arctic Circle to the high peaks of central Mexico.

Two species occur also in eastern America, *Abies balsamea*, very widely distributed over all the boreal parts of the continent and extending far north from the Atlantic to the Pacific, the only Fir in the Northern States, and *A. Fraseri*, found only upon a few of the highest slopes of the Alleghany Mountains of Carolina and Tennessee, so that, next to the Californian *A. bracteata*, it is by far the most restricted in its distribution of the American species, which usually range over wide areas.

Our illustration upon page 475 shows a characteristic forest of this tree as it appears on the Carolina mountains at an elevation above the sea-level of about 5,000 feet. This particular forest covers the high slopes of the Black Mountain range, a lateral spur from the Blue Ridge near Asheville in North Carolina. The highest point of the range and the highest land in North America east of the Rocky Mountains, Mount Mitchell, appears in the distance.

Abies Fraseri is a small, short-lived tree, rarely growing to a height of more than seventy feet, with a trunk in full-grown individuals sometimes two and a half feet in diameter, with bright cinnamon-red bark, becoming gray as the trees begin to reach maturity.

It is not easy to distinguish at a glance, and without the cones, this species from the northern Balsam. The two trees resemble each other in foliage and in habit, and the appearance of the bark in old specimens is very much the same. The structure of the leaves, however, as Dr. Engelmann has pointed out, offers characters which serve to separate the two species, those of *A. balsamea* being almost destitute of the hypoderm cells which appear on the upper side of the leaf of *A. Fraseri* in an almost continuous layer. The two species, however, are at once distinguished by the cones. Those of *A. Fraseri* are shorter and more oval in outline, with largely exserted and reflexed bracts, while the bracts of the mature cones of *A. balsamea* are included in the scales, or rarely with their points only protruding. The white bands, composed of stomata on each side and parallel with the mid-rib, found in the lower surface of the leaves of all Firs, are much broader (with eight to twelve rows) in the case of *A. Fraseri* than in that of *A. balsamea* (usually with six rows)—a character which

may be relied upon generally to distinguish sterile plants of the two species.

Abies Fraseri was first made known by the Scotch botanist and traveler whose name it bears, John Fraser, who made several journeys to North America between 1780 and 1810 for the purpose of collecting seeds and plants for London nurserymen. Although Michaux, with whom he traveled in Georgia for a short time in 1782, refers to him several times with great contempt as "un certain Mr. Fraser," no one man has contributed more valuable plants to English gardens; and in the list of his introductions, which is published in the *Companion to the Botanical Magazine*, ii., 300, appear the names of some of the best garden plants found in North America, among them *Rhododendron Catawbiense*, parent of all the race of the hardy Rhododendrons of modern days. Michaux must have confounded the Fir of the southern mountains with the northern species, and it does not seem to have been introduced into European gardens until 1811. It is very well figured in the "*Pinetum Woburnense*," published in 1839, from a specimen then sixteen years old in the Duke of Bedford's collection; but it is very doubtful if there are now any old plants anywhere in cultivation. This tree is short-lived, and the plants of Fraser's introducing must have passed away long ago, while of late years seeds of *A. balsamea*, collected in Pennsylvania or in Canada, where specimens are occasionally met with, in which the tips of the cone-bracts are slightly exserted, have been very generally sold as *A. Fraseri*; and it is only within the last dozen years that the Arnold Arboretum has been able to distribute a supply of seedlings of the Carolina tree among the lovers of conifers in the United States and in Europe.

Abies Fraseri has little to recommend it as an ornamental plant; and, economically, few American trees possess so little value. It is perfectly hardy, however, in Massachusetts, and some of the plants in the Arboretum, although scarcely six feet high, have already produced cones.

C. S. S.

New or Little Known Plants.

Aster Herveyi.

THIS very rare plant, of which a figure is now first published upon page 413 was discovered a few years ago by Mr. E. W. Hervey on the borders of an Oak wood near New Bedford, Massachusetts. It was found subsequently by Professor Sargent in Tiverton, Rhode Island, growing on the gravel fill of a new road; and again within a few years by Mr. C. E. Faxon, in Muddy Pond woods, and near Blue Hill, in Norfolk County, Massachusetts.

*Aster Herveyi** is a slender, low plant, growing to a height of one or two feet, with numerous loosely corymbose heads, with lilac or violet rays half an inch long. Like nearly all the North American Asters, it takes kindly to cultivation, and makes an excellent autumn-blooming border plant. The *Biotia commixta* (D. C., "Prodromus," v. 265), an old inhabitant of gardens of unknown origin, is, according to Professor Gray, a robust cultivated form of this plant.

Foreign Correspondence.

London Letter.

I WROTE last week of the splendor of our open-air gardens since the outburst of warm sun after the long period of rain. Not less remarkable, just now, is the indoor garden also, which, after its usual dull season at the height of summer, has begun to assume its wonted gay aspect in autumn, and during the past week I have had the opportunity to see some fine examples of glass-house gardening. At the present moment the plant of plants undoubtedly is that lovely Chilean climber, the *Lapageria*, which is to be found now in almost every green-house throughout the land. In one place I saw a plant covering the entire roof of the green-house, and the

**Aster Herveyi*, Gray, Manual Bot., Northern U.S., 5th ed., 229; syn. Flora, i., 2, 175.

Fig. 131.—*Aster Herveyi*.—See page 472.

shoots were thickly wreathed for several feet with the crimson bell-like flowers of the one sort, and the waxy, pure white blossoms of the Alba variety. There are now several named varieties of the typical *L. rosca*, which vary more or less from the original and from each other. The finest, as regards color, is unquestionably that known as the Nash Court variety, which is now being distributed. The flowers are very large and of

perfect shape, while the color is a rich rosy-crimson. Another sort, called *Superba*, is also very fine, and last week Messrs. Fisher, of the Sheffield Nurseries, who make a specialty of the plant, showed two varieties, named *Floribunda* and *Maculata*, the first, a large-flowered and rich-colored sort, said to be exceptionally floriferous, the other, with flowers of pale rose-crimson, conspicuously veined and spotted with white. These are

among the best varieties, but there are many decidedly bad sorts obtained from seed, being poor in color and small in bloom. Some clever people have hybridized the pure white Alba with the red, the progeny being a mongrel race, neither white nor red. The white still maintains a high price in nurseries, chiefly because its propagation and growth are not rapid, and the finest form of it is always in great demand. The climate of an English green-house seems to suit the *Lapageria* to perfection, due probably to the almost perpetual moisture, for the plant abhors strong heat, dryness and strong sunlight. It is not too much to say that the *Lapageria* is the most popular and most valuable green-house plant introduced during the present century, and it is doubtful if the Veitchian travelers will ever send home a rival to it.

Orchid-houses, so long almost flowerless, are now bright with several early autumn flowers, and none is more beautiful than the Blue Indian Vanda (*V. carulea*). I saw some magnificent plants of it this week in full flower in an ordinary green-house, where the plants have plenty of ventilation and not too much heat, and this is the secret of growing this Orchid well. Many stifle it, with other Vandas from the hot tropics, the result being that the Blue Vanda always looks sickly and rarely flowers well. There are many forms of this Vanda, and there is a wide difference between the finest and the poor forms, the latter having small flowers, almost white, while the best variety has flowers four inches across, of a deep Tyrian purple, tessellated with white veins, and this form, which is a gem among Orchids, I know, exists in one of your famous American collections—that of Mr. Corning, near Albany. Other Orchids in flower and worth notice, would, of course, include the handsome old *Odontoglossum grande*, still the noblest of the genus, and a plant which can be grown to perfection without the aid of a specially constructed Orchid-house; indeed, the best specimens I have seen lately were growing in a green-house with other kinds of plants. The new *Vanda Sanderiana* is not heard so much about now, and there is no disguising the fact that, as a rule, it is a difficult plant to manage successfully. At Kew, where there is a good specimen in flower just now, it is growing admirably in company with other eastern tropical Orchids. There is something very fascinating about the large flat flowers, with their strange combination of color, rose-pink and olive-brown, though they do not captivate visitors so much as the splendid *Cattleya Dowiana aurea*, which for the past week or more has been in perfection. It is not often that this Orchid is seen with four flowers on a spike, and the fact is worthy of note, as it shows how finely the plant is grown at Kew. Another very remarkable Orchid in flower at Kew is an exceptionally fine variety of *Miltonia Moreliana*, which is far finer than the rare *Arorubens*. The flowers are three inches across, the sepals a deep claret-purple, the broad labellum rosy-crimson, reticulated with darker and paler veins. It is known as the Kew variety, and is the envy of all Orchid-fanciers who have seen it during the past month and in former years. Orchid sales are for the moment quiet, but I notice that the wonderfully fine collection of Mr. Partington, at Cheshunt, is to come under the hammer next month. It is well known that some of the finest Phalænopsis in the country are in this collection; and it will be a good opportunity for Americans to secure grand plants. Mr. Watson gave you a description of them recently, and they astonish almost all who see them for their large size and extraordinary vigor.

The cool conservatories at Kew contain numerous out-of-the-way plants in flower that deserve to be more popular, and one of these is a Cape bulb, *Cyrtanthus hybridus*, which, I believe, was raised some years ago in Sir Trevor Lawrence's garden. To describe it, it must be compared with the beautiful old *Vallota purpurea*, or Scarborough Lily, but its flowers are smaller, more funnel-shaped, and more blossoms are borne on the dwarfed spikes. The color is somewhat different, being of a softer scarlet. As it flowers at various seasons of the year it is more valuable as a garden-plant than the *Vallota*, which only flowers in autumn. Another beautiful Cape bulb is a new variety of the well-known *Tritonia aurea*, which has been introduced by Mr. J. O'Brien. It differs from the original in having the petals marked with a large crimson blotch, which, on the bright orange ground, is very effective. There is, also, at Kew, a very robust variety of *Tritonia*, having spikes from three to four feet high, carrying flowers three inches or more across of a richer color than the ordinary sort. It is an invaluable plant for the green-house in summer, and, as it has already found its way into various gardens, it will probably supplant the old form in course of time.

The Neilgherry Lily (*Lilium Neilgherrense*) is one of the leading features at Kew, for, in one of the green-houses, there

are many plants in flower—more than I have seen together before. It is a noble and beautiful Lily, a good deal like *L. longiflorum* in growth and flower, the latter being about eight inches long and of a soft, creamy-white color, which, to artistic souls, is more enjoyable than what they call the cold white of the *Lilium longiflorum*. The Neilgherry Lily has always been considered difficult to grow and flower well, but at Kew they seem to have hit upon its peculiar requirements, as, indeed, they have with every other kind of Lily during the past year or two, as every kind is grown here now better than I have seen them anywhere, although, a few years ago, it was said by Lily experts that it would be hopeless to expect Lilies to thrive on the dry, gravelly soil at Kew. The success achieved proves what may be done by ignoring empirical practice and striking out a new line, as the directors have done here in Lily culture. The other green-house Lilies in flower now are chiefly forms of *L. speciosum* or *L. lancifolium*, though they are quite hardy, and grand masses of them are in flower in the open air. Besides the large, dark-flowered varieties, like Hovey's Melpomene, there are some beautiful effects obtained with the white Krætzneri, and a group of it, intermingled with the blue African Lily, *Agapanthus umbellatus*, produces one of the most beautiful and striking combinations in the green-house—a mixture well worth imitating. Krætzner's white is so much superior to the ordinary white that it is superseding it. The old form is almost always suffused with pink, but the other is pure, and may be readily recognized by the greenish-white ribs on the petals.

Picking out the good things in flower in the stoves at Kew, this week, I should note *Passiflora kermesina* as one of the very best small stove climbers in cultivation. It has for some time past been crowded with its lovely cherry-crimson flowers, while its growth is always elegant, and it is of the simplest culture. *Pleroma macranthum*, also known as *Lasiandra macrantha*, is also a very beautiful and reliable green-house plant for covering a wall, pillar or roof. It now carries a profusion of large flowers of the richest purple imaginable. A new composite from Mexico is likely to prove a good green-house plant. It is herbaceous, with a tuft of deeply-cut leaves, from which arises the tall, slender flower-stalks, with flowers three or four inches across, of the brightest orange-scarlet. The flowers have a single row of florets, very long and narrow, and these reflex prettily, as in the beautiful *Mutisia decurrens*, from South America, which grows and flowers against an open-air wall here. The new plant is named *Gerbera Jamesoni*, and I notice that the chief nurseries are working up stocks of it. It is a cool-house plant, of easy culture, and its flowering season extends over a long period. I know no other composite of exactly the same bright color.

London.

W. Goldring.

Cultural Department.

Autumn in the Garden.

ALL things considered, the past season has been extremely favorable for hardy flowers, having spared us that most arduous of tasks—persistent watering to supply a deficiency of moisture during the heated term. Every one who has a garden, whether he work in it himself or not, knows the disastrous effect of an extended drought, when, one by one, the flowers begin to flag, unless constantly revived by the garden-hose and frequent stirring of the soil. To neglect this at such a time, whatever the cost of labor, is simply to mar the appearance of the garden for the remainder of the season. The plants may partially revive with the coming rain, but they will have lost that freshness which care might have preserved.

The effect of a generous rainfall the past summer has been apparent in an earlier and more profuse blossoming, together with a stronger growth of stalk and foliage in the case of the majority of flowers. In no plant is this more visible than in the Japanese Anemones, now a carnival of rose and white florescence. For one season, at least, the Japanese Anemone has drunk its fill of moisture; and, wherever placed, this graceful plant is a cynosure and a delight. Charming when dotted amid the shrubbery and borders, it should be far more generally utilized in beds and masses, especially the white variety. The white Phlox, when well grown, approaches but does not equal it, though it is earlier to appear. One of the numerous charms of the Japanese Anemone is its late-flowering habit; the chill autumn equinox comes and goes, but the Anemone still blossoms on. The rose-purple variety, or rather the type, is not so pleasing on first unfolding, but its color improves as its flowering advances and becomes, later on, a distinct and exquisitely beautiful shade which is supplied

by scarcely any other flower except the autumn Colchicum. It is a color we could not spare from the October garden, and in its later stage the flower vies in delicate beauty with its statlier white sister. The Anemone is not over fastidious as to soil, and should be placed both in sun and shade, or partial shade, to lengthen its flowering season.

Fitting companions to the Anemones are several species of the perennial Sunflower, notably the double *Helianthus multiflorus* and *H. orgyalis*. The larger forms, like *H. tuberosus*, are too coarse for the flower-borders proper, or the shrubbery of the foreground. On no account, however, should they be

the grounds. Where a thick, tropical-looking screen is desired during summer and fall, the Eulalia has few equals. *Erianthus Ravennæ*, a tall growing, reed-like perennial from southern Europe, resembles it, but does not equal it for ornamental purposes. Both flower during October, the large plumes of the latter resembling those of the tender Pampas Grass. During July and August *Eulalia Japonica variegata* is always handsome. Less robust than the type, and more sensitive to wind and heavy rains, it is apt to become beaten down in autumn. The smaller variety, *E. J. Zebrina*, its foliage marked crosswise with bands of white and green,



Fig. 132.—The Home of *Abies Fraseri*.—See page 472.

banished, but be placed in the rear garden, or set against a distant shrubbery, where their golden lights may shine. Among the extensive Sunflower tribe there are few species more showy during late summer than the large *Silphium perfoliatum*—a steadfast bloomer throughout August, and handsome enough during its blossoming period to merit a post of honor anywhere. The Sunflowers, it may be said, were born without cultural directions. Nevertheless, in the case of the double Multiflorus, occasional division is of great benefit to the vigor of the plants and the numbers and size of the flowers.

Attractive objects during autumn are the Eulalias, or tall Japanese Grasses, the type being the most robust. This may be used with fine effect on either side of a gate or entrance to

holds itself more erect, and is one of the most distinct and ornamental of rushes or grasses.

A fine combination for a bed might be made with a few specimens of the type for the centre, surrounded by the smaller silver-leaved Zebrina. A bed of purple-leaved Cannas, with their scarlet, Strelitzia-like flowers, fringed with the white Japanese Anemone, would also be worth looking over to see in one's neighbor's garden. And, for a change from the tiresome Geranium-bed, why not a bed of fragrant yellow and white Iceland Poppies, which are so easily raised from seed sown the summer before they are required, to be succeeded by the Salvia's flame. Or, if Geraniums must be used, a bed of the salmon or light-colored kinds, even if they be not quite

so free flowering, to vary the monotony of General Grant, which so often figures as the centre-piece—sometimes even of a clam or oyster bake—upon the lawn.

The first of October finds the large Phloxes mostly past. The trade catalogues abound with so many long lists of varieties that it may be well to specify a few that have been tried and not found wanting. Brilliant and handsome as are the big Decussata Phloxes, they are not without objectionable colors, particularly the rose and rose-purples, while of two varieties, almost similar in the color of their flowers, one may be a much less vigorous grower or have much smaller trusses than the other. Of the whites, *Viège Marie* and *Queen of the Whites* are among the best, the former the tallest and more robust grower and the latest to flower. Of the light reds, *Réve d'Or*, *Gambetta*, *l'Avenir* and *Lothair* are distinct and beautiful, the latter one of the most brilliant of its class, and among the most brilliant of hardy flowers. *Isabey*, a variety recently sent, much resembles it, and appears to be equally vigorous. *Parrai*, a new variety, is the finest of the rose-colored kinds, both in truss and color. Intermediate between white and rose, two old varieties, *Richard Wallace* and *Premier Ministre*, are unexcelled, while *Oberon* still remains the most gorgeous deep red.

Just now the perennial and annual Asters appear, to contribute a needed color—purple and its various shades—a compliment to the hardy Sunflower's gold. Even the common Aster of the fields and road-sides is well worth growing amid the shrubbery and the wild garden, while the China Aster, in its more varied hues, lends an almost spring-time gayety to the garden during late September and October. It is, moreover, very desirable for cut-flowers. Usually, the mistake is made of too early sowing. Sown the latter part of June in shade, in the open ground, the annual Starwort will come into bloom at a time when it is really required. A touch of white frost only accentuates its colors, and, weeded of its objectionable shades, it is among the most desirable of garden annuals. Neither should the old-fashioned *Dahlia* be overlooked by any who have an appreciation for color; it helps to woo the slanting sunbeam and lengthen the shortening October day.

The Angelica-tree, or Japanese *Aralia*, is at present a tropical-looking shrub on the lawn, with its large tripinnate leaves, spiny stems and grand crown of white blossoms. Unfortunately, this is rather tender, requiring protection during winter. The gay flowers of the *Roses of Sharon*, too, an occasional second flowering *Bee-larkspur*, and purple *Clematis*, and the colored fruits of many of the ornamental shrubs are now conspicuous and contribute their quota of color.

But the beauty and pleasure of the garden at this season will depend largely upon the care it receives, and no little work is called for in cutting out the withered branches and removing the withered leaves, as well as keeping walks and borders free from weeds, and the sward properly shaven. We weed and hoe, and stake and "edge" in summer—we neglect the garden in autumn, when, with proper care and judicious planting, it may present an aspect of almost equal beauty. Can all the golden days of summer create a flower more chastely fair than these lovely, nodding Wind-flowers of October, with their spotless petals surrounding the pale-green stigma and feathery-golden stamens; and shall I let this sweetest tribute of the latter year rear its beauty amid neglected surroundings!

While referring to autumnal flowers the question of spring, versus fall planting may be briefly considered. As a general rule, fall planting is to be commended, provided it be done early, the plants thus being enabled to take hold of the soil before winter sets in and obtain a start for the following year. Of course, there are not a few plants which are set out to disadvantage in autumn, though this will depend somewhat on whether the winter prove severe, or whether the plants receive winter protection. So, also, will successful spring planting be determined largely by the weather, as all successful planting will depend upon the condition of the plants when set out. Plants poorly packed and sent from long distances are expensive to experiment with at any season and at any price. Late-flowering plants, like the Wind-flowers and Monks-hoods must be set out in spring; the hardy *Coreopsis* and most of the *Helianthæ*, also, do best when transplanted at that season. *Heilebores* should be moved early in the autumn, and *Pyrethrums*, *Ranunculus*, *Iris*, *Bee-Larkspurs*, *Pæonias*, the large Oriental Poppies, the *Decussata Phloxes*, and most of the *Campanulas* are best transplanted in early fall. Besides being a suitable time for the moving of most perennials, early autumn transplanting has the advantage of seeing the plants established, of more intelligent placing in the borders, and, finally, of a fact accomplished when the first garden Snow-drop proclaims the spring returned. *George H. Ellwanger*.

Rochester, N. Y.

Stove Plants in Flower at Kew.

Ixora macrothyrsa.—This is a most superb plant for the stove. It is unlike all other garden *Ixoras* in the size of its flower-heads, strong plants producing heads fully nine inches across and as full as a Hawthorn blossom. The color is bright, glowing crimson. A plant at Kew has been in flower three weeks, and its blooms are still as perfect as when they first opened. For large stoves no *Ixora* equals this one. The treatment of most of the plants of this genus includes severe pruning every spring and the stopping of the most vigorous shoots, with a view to obtaining compact plants with numerous short branches, each of which will bear a cluster of flowers. But *I. macrothyrsa* must not be treated in this fashion. The branches must be allowed to grow unchecked, and, with liberal treatment, they should become three or four feet long. The longer and stouter the branches, the larger the heads of flowers will be. After flowering, the strongest branches should be cut back hard, and when they have broken again they must be repotted and treated liberally. As a rule, the shoots do not become strong enough to flower until they are about two years old. The garden name for this plant is *I. Duffii*.

Gustavia gracillima.—Although introduced and flowered by Mr. Bull for the first time in 1875, yet this plant appears to have flowered only very rarely. It flowered at Kew in 1883, and is again in bloom in one of the stoves there. It is about four feet high, erect, unbranched, with linear, bright green leaves, and even when not in flower is ornamental. The flowers are developed in clusters on the ripened part of the stem, and they have scarcely any stalk; they are about four inches across, and composed of eight broad, overlapping petals, surrounding a broad disc-like cluster of yellow, purple-tipped anthers. Several other species of *Gustavia* are cultivated at Kew, and have flowered on rare occasions. A considerable number of the section of *Myrtaceæ*, to which *Gustavia* belongs, have flowers of large size and exceptional beauty, but they do not flower under cultivation here. Such are the Cannon-ball tree (*Couroupita*), *Barringtonia*, *Lecythis*, etc., plants which are easy to grow but fail to flower, probably through lack of intense sunlight. *G. gracillima* is a native of the United States of Colombia.

Ataccia cristata.—The very remarkable and ornamental plant grown in gardens under this name belongs to a small, natural order nearly related to the *Amaryllids*. When well managed it flowers freely and presents a picture of more than ordinary attractiveness. It has dark, purplish-green, ovate, thin leaves a foot or so long, with a petiole about four inches long. The flower-scape is erect, about one and a half feet high, stout, angled, purplish, and bearing on the apex four large bracts, two of which are parallel, erect, five inches long, and suggestive of the large dorsal sepal of *Cypripedium Lawrenceanum*; the other two, which are placed beneath the flowers, are boat-shaped. The flowers are purple, one inch across, and composed of six reflexed calyx-lobes, no petals, a ring round the mouth of the shallow tube, and a short, thick, six-furrowed stigma. In addition to the perfect flowers there are also numerous whitish filaments, six inches long, springing from the base of the bracts, and these filaments are really abortive flowers. It is difficult to describe the plant so as to convey an idea of its ornamental character. It should be grown in a moist stove, and potted in fibrous peat and sphagnum with a sprinkling of sand and charcoal. It likes abundance of water all summer, and less in winter. Plants three feet through and bearing thirty flower-scapes have been grown by means of this treatment.

Kew.

W. Watson.

Notes From a Northern Garden.

GRAPES have matured much earlier and more fully this year than usual. We are apt to forget about the seasons, but for Grapes I think this is the earliest here since 1870. Our standard for a warm season is the perfect maturity of the Concord, which is quite rare.

MOORE'S EARLY, or, as I find it sold in Boston streets, the "Early Concord," ripens fairly here, though it is less early than Champion. The season of Moore's Early, Salem, Delaware, Israella and Eumelan are so close together that it is impossible to give either the precedence. In a season that is steadily warm from May to October, the Brighton is very early—even earlier than any above named; but in a summer with "cold spells," like this and last year, it does not even color.

THE CHAMPION GRAPE I have always regarded as the earliest and the poorest of all cultivated sorts—unfit for any but culi-

nary use. But this year it is suprisingly sweet—so much so that I at first thought I must be mistaken in the sort. It is very hardy and productive, and, if it were generally as good as I find it this fall, would be a profitable Grape for the far north. I think a vineyard of it would yield more bushels than a potato patch of the same size.

THE THRIPS increase annually on my vines, but although the foliage appears to be considerably injured, especially on the Delawares, the crop is not noticeably lessened. But I think the vitality of the vines must, in the end, be impaired. The thick, dark foliage of Moore's Early seems to be invincible to this insect.

THE SHIAWASSEE BEAUTY APPLE rises higher in my esteem year by year, as I become better acquainted with it. This season, when there are but few apples, and of these few most are ruined by insects, Shiaswassee is large, fair and perfect. A seedling of the Fameuse, it is yet quite distinct, being larger, more flattened, more brightly red, and distinctly more acid, though with the true Fameuse flavor. The tree is very hardy, having endured several of our severest winters; and above all, in point of comparative merit with its parent, it is free from the fungus spotting so ruinous to the Fameuse.

A NEW APPLE PEST, known in Vermont as "the Railroad Worm," because in its first inroads it followed the tracks, is doing immense damage. At first it attacked only early and sweet varieties, but now does not discriminate, except, perhaps, by preference for the softer-fleshed sorts. This minute insect enters through the skin when the fruit reaches maturity, and bores a net-like track through and through the apple, converting the flesh into a brownish spongy mass, with unaffected pulp in the intermediate spaces. Its presence is indicated in the mature fruit by dark depressed lines upon the surface; but this disfigurement bears but a slight proportion to the actual injury, which results in utter worthlessness, even in apples showing but slight external marks. I call the insect "minute," because, though cutting the apples in search of it at various stages, I have never found it, and should have supposed it some sort of fungus had I not been assured that it is a worm.

Newport, Vt.

T. H. Hoskins.

[The insect referred to is evidently the *Trypeta pomonella*, Walsh, known many years in some of the Western states, but which has not been reported as injurious in this section. The fly, for it is a true fly, is not more than one-fourth of an inch in wing expanse, of a rather deep brownish-yellow color, shining, and with prettily banded wings. The eggs are laid on the apples, usually on the thin-skinned varieties, and the maggots bore in every direction, as described above. In length it does not exceed one-fifth of an inch, and it is of a greenish-white or yellow color. When full-fed, in early September, or even earlier, the larva leaves the apple, drops to the ground, and burrows a short distance under the surface, where it changes to a pupa, emerging about midsummer of the following year. No practical remedies, so far as we are informed, have been suggested, as it has not proved so seriously injurious heretofore as to make special study necessary.—Ed.]

Orchid Notes.

Lælia Perrinii.—This elegant and free-blooming Orchid is not grown so extensively as its merits deserve. With ordinary treatment it grows strongly, and, what is more, produces its flowers at a season when there is the least number of varieties blooming. *L. Perrinii* has stout, deeply-channelled, clavate bulbs, and a single deep green leaf of a leathery texture, and about one foot long. The flowers, from three to six, are about five inches across, and rosy-purple, while the front lobe of the lip is of a purplish-crimson, the throat being white. This species was introduced from Brazil in 1831. It will grow best in an intermediate-house, with a good exposure to sunlight and abundance of air when the weather is favorable. Some pale varieties have been introduced recently, but are still very rare. These are Alba, with pure white flowers; Nivea, white, with the lip margined with rose, and Irroratus, rosy sepals and petals and nearly white lip.

Lycaste (Paphinia) grandis is the rarest and largest-flowered of a singular genus of Orchids now included in *Lycaste*. It is of a very compact habit, scarcely exceeding six inches in height, with ovate-clustered bulbs and thin plicate leaves. The scapes are pendulous, and to show the flowers to advantage the plants should be grown in baskets or small, shallow pans. The flowers are about six inches across, the lanceolate

sepals and petals being chocolate-brown, barred and edged with cream color. The claw-like lip is blackish-purple, with the front lobe cream-colored and surmounted with a tuft of hair. This plant, with its congeners, needs a good deal of heat, and it should never be allowed to become dry. Very little potting material is required, and that may be a mixture of fibrous peat and moss. It was introduced from Brazil in 1884, and a few seedlings from one of the first introductions will soon be in bloom with us.

Odontoglossum Bictonense was the first species of the genus to reach England alive. It has an extensive range through Mexico and Guatemala, and was introduced from the latter country in 1835. Though it may not be compared to its superb and larger-flowered congeners of later introduction, still, when in fine condition, the many-flowered, branching racemes are by no means unattractive. It is of very robust habit, with oblong-flattened bulbs, surmounted by two to three undulated deep green leaves. The stout, erect racemes are often branched, and bear many greenish-yellow flowers, prettily spotted with brown. The cordate-acuminate lip is usually pink, but there are a great many varieties, the most distinct being one with a pure white lip. This Orchid prefers the intermediate-house, in well-drained pots of peat and moss, abundance of water during growth, and a decided rest by withholding the water to a certain extent during winter.

Kenwood, N. Y.

F. Goldring.

Oncidium varicosum Rogersii.—The extraordinary flowering qualities of this *Oncidium* has rendered it very popular, and we now find it grown extensively. Its strong, well-branched spikes, which attain a length of three and four feet, make their appearance at this season, and are laden with massive flowers of great brilliancy; the sepals and petals are small, barred and spotted with brown; the lip, however, is a rich golden-yellow, broad, flat and, in some instances, beautifully undulated, and furnished with a claret-colored blotch in the centre. Spikes carrying from eighty to one hundred flowers are of common occurrence, and even comparatively small plants will produce this number when properly managed. It is, however, advisable to cut the spikes from such plants as soon as the flowers are fully expanded, so that their strength may not be exhausted and prevent their blooming the following season. Like most *Oncidiums*, they delight in an abundance of air during growth and a position as near the light as possible. Very little compost is necessary about the roots, but good drainage is very essential. Baskets are better than blocks. They do not dry out so rapidly during our hot summer weather.

Sophronitis grandiflora.—This is one of the gems of our dwarf Orchids and very easy to cultivate. It occupies very little space, and produces its rich scarlet blossoms at this period with the young growths. The individual flower measures from two and a half to three inches across, and is round, well formed and of good substance, remaining on the plant five or six weeks in good condition. Its cultural requirements are simple, and, if placed firmly in baskets or pans where plenty of light and air is available, it will grow and flower very freely. While growth is being made, it should occupy a cool position, for if grown too rapidly it will not bloom. When the flowering period is over, water may be withheld to thoroughly ripen the bulbs. During the winter months it should be grown in a temperature of fifty-five to sixty degrees. One of Mr. Hicks Arnold's cool houses, in New York, was recently ornamented by a well-flowered group of these Orchids.

Summit, N. J.

A. Dimmock.

Aponogeton distachyon, the Cape Pond Weed, is a pretty and very desirable aquatic plant for the decoration of the greenhouse in winter, not only for its quaint form, but also for its delicious fragrance and the pure white color of its flowers, or, correctly speaking, bracts. The foliage also is most beautiful, being borne on long stems to enable it to float and present its bright, shining, green surface as a foil to the flowers. As it is strictly a winter-flowering plant we have found it difficult to change its season, so as to flower it in summer. If this could be done, the *Aponogeton* could be easily naturalized, and it would prove hardy here in the East, but in the more favored states, as to winter climate, the *Aponogeton* may be easily planted out in streams or ponds and will take care of itself and increase very rapidly. We usually take the roots out of the old soil in September, and plant them in pots suitable in size to the strength of the plant, and then immerse the pot to about twelve inches below the surface, when in about seven days flowers appear simultaneously with the foliage, and at once fill the structure with their fragrance. In this way unsightly cisterns, or other receptacles of water, may speedily

be made to have an interest of their own. It should be added that the soil should be well enriched with well decomposed cow-manure. About one-third of this with the rest of ordinary garden soil, with a sprinkling of charcoal added, will be found a suitable compost for the purpose. If it is desired to increase the stock, this is easily and rapidly done by means of seeds, for after the flowers have been in full beauty for a month the bracts begin to turn green, and seeds are formed, and when these are ripe the bracts dissolve and the seeds sink at once to the bottom and germinate in about seven days. These will form small bulbs the size of a pea the first season, and will flower the second year of their growth, and these increase in size with the strength of the bulb or tuber. After the plants have flowered for six months they manifest a desire to rest, and when this is the case they may be allowed to gradually die off. We then, for convenience sake, keep them out of the water, but never allow them to become dust-dry, just keeping them moderately moist until fall, when they are started again. We are acquainted with no more suitable plan for planting in aquaria or any similar situation. O.

Passaic, N. J.

The hybrid *Montbretias* seem to increase in attractiveness every year, and one can hardly help feeling grateful to the French growers who first obtained them by intercrossing *M. Pottsii* and the old *Tritonia aurea*, or *Crococma aurea*, as it is otherwise called. It was M. Lemoine, of Nancy, who first effected this cross, calling the progeny *M. crocosmiaeflora*. The hybrid combines the vigorous growth and abundant flowering character of *M. Pottsii*, with the large flowers and richer color of the *Crococma*; while, as is often the case with hybrids, it possesses a more vigorous constitution than either parent. The flowers are about half as large as those of the *Crococma*, but of a much richer color, being almost entirely scarlet, and many flowers are borne on each stem that overtops the narrow foliage. The habit most resembles that of *Montbretia Pottsii*, and so rapid is its growth that a small plant will, in a season or two, spread into a mass several feet across, instances of which may be seen at Cheswick and Kew. The hybrid is, moreover, very persistent in bloom, lasting for several weeks, and it does not suffer from excessive rain. The graceful flower-spikes are invaluable for cutting, though they do not last long in vases. There is a bright yellow variety named *Boule d'or*, and other fine varieties have been raised by M. Lemoine.

Kew.

W. G.

The Forest.

The Forest Pavilion at the Paris Exposition.

WE have already given some notes on the forestry exhibit made by our own government at the Paris Exposition, and we are glad to add some account of the display made by the French government in the same direction. The following description of the pavilion and the principal forest-material which it contains is the translation of part of a letter to the *Independence Belge*, which was kindly furnished us by a lady much interested in forestry. Next week we hope to publish the more important part of the article, which explains how the actual work of the *Administration des eaux et forêts* is exhibited in photographs, dioramas, models, etc.:

Among the marvels of the Exposition is the pavilion of the Executive Department of Forestry on the Trocadéro, constructed entirely of the trunks of trees. Leaving the broad walk and following a foot-path through the turf, we come to a little hillock of natural rock covered with Ivy and creeping-plants, and, mounting a few steps, hollowed in the rock, or made of natural pieces of wood, we reach the verandah which surrounds this picturesque pavilion.

The peristyle is formed of high columns, which are magnificent trunks, carefully selected, and straight as arrows. Each species is represented by a perfect specimen and all are disposed so as to bring out soft harmonies and contrasts of color.

There are Oaks of various forms, Hornbeams, Elms, wild and cultivated Cherries, deeply-ribbed Locusts, Poplars, black and gray, Firs, with reddish bark, Maritime Pines, with purplish scales, Spruces, Lindens, Ashes, glittering Birches, Beeches, with bark of the finest texture, and Service trees, with a covering like a coat of mail. Every specimen carries its certificate of birth in a label fastened to the bark. Most of them are centennarians, and many are 150 years old.

The walls are covered with a mosaic formed of natural wood, bark and tresses of ligneous fibre; the ceilings are also

composed of original designs in wood, carved and sawn; the capitals, cornices and balconies are of branches, knotted and twisted, as if they were carved; the roof is made of shingles, with the gray and violet shades of slate, and the effect of the whole is charming.

Under the verandah, where Jasmine, Clematis and Ampelopsis climb, rustic seats are hollowed out of tree-trunks, and those who love the forest, and can understand all its poetry and charm, find an indescribable pleasure in resting here in the shade of this rustic colonnade, where they can inhale the aroma of the trees away from the dazzle and bustle of the exhibition.

The interior of this monument of skill is a rectangular saloon, lighted from above, and surrounded by columns which support a gallery. These columns, too, are superb tree-trunks, arranged in pairs of the same species, so as to form frames for as many panels, on which are collected the different articles made out of the various woods.

Near the Chestnut-trees are gathered staves, tubs, pails and floorings; the Larches have churns and bowls; the Alders, kegs for cement, wooden shoes, guitar-handles and tops; the Beech has sabots, heels and soles of galoshes, porringers, bread-shovels, pack-saddles and saddle-bows; the different Pines have baskets, wood for packing-cases, lamp-lighters, bungs for barrels, together with felt and bagging; the Fir has wash-tubs, date-boxes, oars and carved toys. Between the Linden-trunks we find well and capstan ropes, wood for brushes and hoops; between the Maples, tool-handles, teeth for rakes, spigots, fans; the Wild Cherry has pipes, fine sabots, canes and parasol-sticks; the Pear-tree, carved furniture, chests, veneering; the Walnut, gun-stocks and carriage-panels. Near the Ashes are collected yokes, mast-hoops, shafts, flail-handles, rakes, naves of wheels; near the Oaks are casks, barrels and flooring; around the Cork Oaks are hung soles, rosaries of corks and life-buoys. These collections, arranged as trophies and heraldic devices serve as entertaining object-lessons.

In the centre are the machines which saw, hew, split and work wood and convert it into marketable and useful form. A fountain gushes from among the rocks and Ferns, and here and there are suspended stags'-horns, boars'-heads, skins, furs, while deer, squirrels and other denizens of the forest, carefully stuffed, are grouped around.

On the first floor are arranged the glass-cases containing the herbariums and forest-tree seeds; here, also, are carbonized woods, collections of injurious insects, parasitic fungi, and a complete forestal bibliography.

Recent Publications.

Timber and Some of its Diseases. By H. Marshall Ward. Nature Series. Macmillan & Co., London and New York. 1889. Small 8vo, pp. 295, fig. 45.

This work is based on a series of short articles published in *Nature*, to which the author has added a chapter on the theories advanced to explain the ascent of water in tall trees. This chapter, which fills nearly a third of the whole book, is an admirable summary of what has been written on a very important, but perplexing, subject. The author states in the preface that it will perhaps be regarded as too technical for the general reader, which is probably true, but it is of great interest to the student. Had it been possible to give a more detailed account of the anatomy and microscopic structure of the tree-trunk in the opening chapters, there would have been no reason why the general reader who seeks genuine information, rather than mere entertainment, should not find this important chapter not only intelligible, but interesting. The author does not accept the theory of Sachs that the water ascends in the trunk by imbibition, or absorption by the walls of the vessels, nor does he accept without modification the view of Boehm, R. Hartig, and others, that it passes upward in the cavity of the vessels by capillarity and osmosis. The subject, however, is too complicated to be discussed here, and it need only be said that Professor Ward accepts the views of which Godlewski is the most forcible expounder, that the upward current of water is not due to the action of the vessels, including tracheids, alone, but that the living cells of the medullary rays also play an important part in the process, and that the respiration of the protoplasm in these cells is the force to which the upward flow is essentially to be attributed, while capillarity and osmosis play a secondary part.

As it is, the remainder of the book, which is devoted to a description of some of the diseases of wood, is somewhat overshadowed by the prominence given to the subject just mentioned. The account of the diseases caused by *Agaricus*

melleus and several *Polypori*, the canker of Larch-trees, due to *Peziza Willkommii*; Pine-blisters, caused by *Peridermium*; damping-off of seedling-trees, due to *Phytophthora omnivora*, is a simple and clear summary of the researches of R. Hartig, Wolf and others, enriched by notes of observations made by the writer himself. The work is to be recommended to all who wish to obtain a scientific knowledge of the bearings of fungus growth on tree-culture.

College Botany, including Organography, Vegetable Histology, Vegetable Physiology and Vegetable Taxonomy. By Edson S. Bastin, Chicago, G. P. Engelhard & Co., 1889, pp. 451, figs. 579.

This work is a revised and enlarged edition of the "Elements of Botany," published in 1887. The principal changes consist in the enlargement of the chapters on the use of the microscope and reagents, the revision of the portion on Vegetable Taxonomy, and the addition of a chapter on the "Succession of Vegetable Life." The Thallophytes are in the present edition treated under the head of algæ, fungi and lichens, instead of being classified by their mode of reproduction as was the case in the earlier edition. The appearance of a second edition of this work so soon after its original publication indicates that experience has shown it to be well adapted to the class of students who desire a general treatise on botany in a compact form.

Periodical Literature.

There is an interesting article on "Floods and Their Causes," by Dr. Felix L. Oswald, in *Lippincott's Magazine* for August, in which the conclusions coincide with those which have been so often insisted on in these columns.

Dr. Oswald says that while men have been disputing about metaphysical subjects, the very basis of organic life has been disappearing from under their feet; that for nearly 2,000 years the inhabitable portion of the earth has decreased at the average yearly rate of 3,500 square miles, and that in historical times some 7,000,000 square miles along the shores of the Mediterranean, once highly fertile, have been changed into worthless deserts. He quotes Mr. Marsh's declaration, that "another era of similar devastations would make the earth an unfit home for its noblest inhabitant, and threaten the depravation, barbarism and, perhaps, the extinction of the human species," and adds that the evil is chiefly due to river-floods produced by the agency of man, and that these floods are caused almost exclusively by the disappearance of arboreal vegetation, and especially by the destruction of the land-protecting highland forests. He thus describes the results:

"Summer suns scorch the unprotected soil, hot winds absorb its last vestige of moisture and fill the air with clouds of loose dust; the slopes of the naked mountains are torn up into deep ravines, and their mould, carried seaward by every rainy spring, is deposited in the form of festering, miasma-breeding coast-swamps. Springs fail, rivers shrink to feeble streamlets, which, at last, become too shallow even to supply the irrigation-canals by which the starving peasants hoped to relieve their distress. And all that misery is aggravated and perpetuated by the ever-recurring ravages of the winter floods. The melting snows, now no longer absorbed by the sponge-like carpet of moss and tangled roots, run off the hill-slopes like rain from a tile-covered roof, and by their accumulation tend to deepen the gorges of the rocky ravines, which in a few hours pour down, in a mad waste, the moisture which once supplied the springs of a thousand mountain brooks. Swollen by the turbid floods of countless simultaneous torrents, the lowland rivers roll down vast masses of detritus, and, by the inevitable laws of gravitation, cover the fields of their upper valleys with the heavy particles of that diluvium, sand and coarse gravel, while the fertilizing slime is carried down to add its stimulus to the rank morasses of a malarious delta. Thus shoaled by yearly accumulations of sand-banks the river-beds rise higher and higher above their former channels, and in every spring, when more than usually heavy snows are thawed by sudden rains, the uplands send down a deluge which no dams can resist, and which often in a single hour demolishes barriers which thousands of workmen have reared by the labors of many years.

"This brief summary outlines an experience which has repeated itself a thousand times, from the barren slopes of Mount Lebanon to the naked terrace lands of the western Pyrenees, and which will not fail to enforce its terrible lessons on the inhabitants of the western Continent, if the forests of our highland regions should be surrendered to the land-blighting axe."

Dr. Oswald believes that deserts can be redeemed only by

tree-culture. "Dikes are apt to prolong, rather than avert, the mischief of inundations, as the city of Sacramento, California, had a chance to ascertain at its cost; effluent canals degenerate into morasses, and reservoirs, besides being liable to get shoaled by the accumulation of detritus, constitute a constant menace to the inhabitants of the lower river valley."

It is good to see the truth of the relations of mountain forests to irrigation, and to the fertility of the soil of the country, presented in a popular form. The subject is an important one for the people of the United States, because some influential men who advocate the construction of a vast system of artificial storage reservoirs for irrigating purposes, refuse to recognize the value of the mountain forests as natural storage reservoirs and distributors of the water supply, and hold that it would be just as well to destroy them entirely. If this is ever done the lesson will be a most costly one, and will be learned too late to be of any avail.

Correspondence.

The Palm-house at Allegheny City Park.

To the Editor of GARDEN AND FOREST:

Sir.—The finest specimens of Banana plants I have ever seen are in the Palm-house connected with the park in this city. The house was finished in the fall of 1888; the Bananas were planted during the latter part of November. A group of *Musa Sapientum* has now six stems, two of which are maturing large bunches of fruit. The original stem has just been cut down after ripening a bunch of 100 perfect fruits. The stem, at two feet from the ground, is fourteen inches in diameter. The largest plant in the group is twenty-seven feet high, the smallest is twenty-one feet. The spread from outside to outside is twenty-five feet; the leaf-blades, independent of the petiole, are eight feet long and twenty-six inches wide, and altogether the effect of the group is magnificent. Specimens of *Musa Cavendishi* are ten feet high and as many in width, with leaves a yard wide. A bunch on one plant contains no less than 264 perfect fruits. Let me add that unless one has been fortunate enough to eat a banana that has ripened on the plant he has no idea of what a perfect banana is. There are groups, also, of *Musa rosacea* most beautiful in contour. The general effect of these groups are as tropical as possible. The plants are all set out in deep, rich soil, and are abundantly supplied with water at all seasons. Another plant bearing fruit very freely is the Lyre plant, *Philodendron pertusum* or *Monstera deliciosa*. This is rambling over the rock-work, and is a very characteristic piece of verdure. In the same house is a splendid specimen of *Cycas circinalis*, spreading eighteen feet and twelve feet in height. This plant, two months since, produced a perfect flower scape, and has now thirty-six new fronds nearly developed. *Ficus imperialis*, a plant with heart-shaped leaves, eighteen inches across, is seen in a specimen twelve feet high and of great beauty. *Dracæna fragrans* towers up twenty feet, and is well furnished to the ground. A *Pandanus reflexus*, probably the largest plant in the country, is standing on a pedestal three feet from the ground. The leaves touch the ground, and the extreme points are over ten feet high, and the spread of the plant is eight feet. Good examples of the Dove Orchid are in flower, bearing from three to seven spikes, with from twenty to thirty flowers on each.

The entire group of glass houses here were given to Allegheny City by Mr. H. Phipps, Jr., and are open to the public every day. Mr. W. Hamilton, the superintendent, informs me that as many as 2,000 persons visit the green-houses on Sunday alone.

Allegheny City.

J. Thorpe.

Helonias bullata.

To the Editor of GARDEN AND FOREST:

Sir.—A neighbor took me to see a "new plant" which had been found on his land this spring. It proved to be *Helonias bullata*. It is growing on the banks of a small mountain stream in the midst of a "Laurel thicket." There are, probably not more than a hundred plants in the lot, and what seems strange to me is that, although I have searched the same stream up and down for miles and all other like situations in this region, I can find no others.

The location is at an altitude of about 4,000 feet. It is near Short Off Mountain, in Macon County, North Carolina. Does any one know that this plant has been found in the Alleghany Mountains before?

Highlands, N. C.

Frank Boynton.

Notes.

A cluster of grapes weighing five pounds was lately taken from a Vine of the Golden Chasselas variety in Contra Costa County, California.

One of the green-houses in the park of Allegheny City, 150 feet long by eighteen feet wide, is now being filled with Chrysanthemums for display in the late autumn.

Downing's Ever-bearing Mulberry produces ripe fruit for nearly four months in California. In the middle of September the trees were still filled with berries in all stages—from the blossoms to the ripe fruit.

About thirty papers have been promised for the meeting of the Forestry Congress in Philadelphia, and the prospect is fair not only for an entertaining session but for some practical treatment of the more important problems of forestry.

The white-flowered *Desmodium Japonicum*, which comes into bloom at this season just after the showy lilac blossoms of the *D. penduliflorum* have faded, is very beautiful just now and is a most valuable plant for its late blooming qualities.

The published statements that the Plum curculio has at last made its appearance in California are happily without foundation. It seems that Fuller's Rose beetle, which has been very destructive in Los Angeles County, on Evergreen Oaks, Camellias, Palms, etc., was mistaken for the Plum-weevil.

Gordonia pubescens has flowered this year at the Arnold Arboretum, growing in the open ground. The plant was bent over and covered with soil last winter. Though not hardy at Boston it might do well when trained against a sheltering wall. A few of its beautiful flowers would well repay a little trouble and care.

The large rosy fruit of the *Magnolia Umbrella* still makes that tree conspicuous as it has been for several weeks. This is one of the smaller of our native Magnolias, and its large tropical-looking leaves and creamy-white flowers in spring would make it a desirable tree for planting, even without the autumn beauty of its fruit.

The Eaton Grape was grown from seed of the Concord in 1869. The vine is vigorous, the clusters large, the berries nearly an inch in diameter, with a dense blue bloom. On the trial-grounds of the *Rural New Yorker* it ripens just before the Concord. It is juicy, but not of the highest quality. Mr. Carman considers it well worthy of general trial.

A correspondent of the London *Garden* makes the following judicious remarks on the subject of judging vegetables at exhibitions: "Some judges are apt to give weight to exhibits which are out of season, as, for instance, very late Asparagus, which should not have been cut, or very early Celery, which, useful enough for flavoring, would not be asked for as salad during summer weather. Really good products, presenting substantial crops in season, are much to be preferred."

A correspondent of Mr. Peter Henderson recently sent to him, from France, a cluster of grapes upon which some of the berries were green, some black, some half green and half black—the colors divided sharply by a meridian line—and some were striped green and black. This seems like another example of the influence of strange pollen. But a letter which accompanied the grapes stated that all the clusters were mottled in the same way, and had been every season since it began to bear, some nine years ago. The vine is a seedling of unknown parentage.

It is somewhat surprising that two such popular plants as the Dahlia and the Chrysanthemum should have been introduced to English gardens the same year—1789. The Dahlia Centennial has been celebrated with much gusto, and a grand show at the Crystal Palace, and the Chrysanthemum growers are making great preparations for a still more enthusiastic demonstration. A London correspondent writes that by the middle of September the early Chrysanthemums were seen everywhere. The most popular of these early flowers were George Wermig, Madame Desgranges and Précocité—all good.

The September number of *Harpers' Magazine* contains some striking illustrations of forest-trees and forest-scenery in the California Coast Range. Two pictures of Cypress trees at Monterey are especially good; one of them showing the habit and expression of the individual tree with its bare roots hooked about the rocks on the coast, and the other giving glimpses of the mystery and delicate beauty of an opening in the Cypress woods. The illustrations of the Fog among the Redwoods, the Scrub Oak and Chapparal are successful in

catching the spirit of the scenery with much of its indefinable charm.

The committee appointed by the American Association of Nurserymen for the purpose of obtaining lower rates on express lines, have been successful in securing a new classification, under which a reduction of twenty to twenty-five per cent. will be saved on all express charges, on shipments of trees and shrubs, boxed or baled. Such packages are now classed with produce. This is good news to fruit growers, nurserymen and many others. Mr. S. M. Emery and his associates on the committee are to be congratulated upon their success. These organized efforts of the nurserymen have now brought about reduced freight, reduced postage and reduced express charges on nursery stock.

The *Gardeners' Chronicle*, after speaking of the fine display of color made at this season by *Crocodylus aurea*, adds that the variety Imperialis, introduced by Mr. Max Leichtlin, is much finer than the type. The stems are three feet or more high, and the flowers are fully three inches across, with broad segments, and a deep orange, almost scarlet color. Some of the plants of this variety show a slight tendency to the spotting which is so conspicuous in that recently described by Mr. Baker as Maculata. The flowers are large, and the three inner segments of the corolla have each a broad band of purple a little distance from the base. These plants, with the Montbretias and the numerous progeny of the two so-called genera, are certain to be almost as popular as Daffodils when they become better known.

The *Country Gentleman* says that the meagre show of grapes at the New York State Fair brought into prominence an exhibit of the new white grape, Diamond, an entire two-year-old grafted vine with twenty clusters being shown. The grape originated with Jacob Moore, of Rochester, in 1880, from a cross of Iona on Concord. It ripens the last of August or first of September, before the Delaware or Niagara; is of medium size in bunch and berry; pulp tender to the centre and of pure vinous, with a trace of the Iona, flavor; seeds, small. The foliage is said to be strong and healthy; certainly the specimen vine, taken up August 21st, showed well-ripened wood. The name of Mr. Moore, the originator of the Brighton, is a guarantee of a good grape, and from what we have seen of it, the Diamond is the most promising white grape in the market. It is said to keep well and to make a good raisin, characteristics not unusual in choice early grapes, like the Eumelan for instance.

An interesting account of the manufacture of "Buhach," the trade name of a well-known insect-powder produced from the flowers of *Pyrethrum cinerariaefolium* is printed in a recent issue of the *Pacific Rural Press*. This plant, a native of Dalmatia, is the source of the Dalmatian insect-powder, a well-known article of commerce for the past thirty years. Trieste, from which it is shipped all over the world, is the principal market for this product, but California is likely to become a serious rival for the trade. The plant was first introduced into California twelve years ago by Mr. G. N. Milco, a native of Dalmatia. From a small beginning the business of growing the Pyrethrum has been gradually extended. About 300 acres near Atwater, in Merced County, are now devoted to its cultivation, the product being sold all over the United States as "Buhach." The successful cultivation of the plant requires care and constant supervision. The fields are irrigated, and three years from the sowing of the seed are necessary before a paying crop of flowers is produced. The plants continue to produce crops of flowers during several years, although they are most productive at the age of four or five years. "It grows to a height of about thirty inches, and is planted in rows four feet apart and from fifteen to twenty-four inches apart in the row. The flowers are generally harvested in the latter part of May. The stalks are cut at the roots of the plant, and then by the hand the flowers are broken off by passing the stems through a sort of comb, which detaches the flowers, and they fall into a box and are then carried to the drying-ground, where they are spread upon sheets and exposed to the rays of the sun. During the day they are often turned, and at night they are covered to prevent them from absorbing any moisture. The perfect drying of the flowers is a most important operation, as, in order to retain the volatile oil which gives to the powder its insect-destroying properties, it is very necessary that the flowers should be dried quickly and thoroughly, and be protected during the process from all moisture. A light dew falling upon the flowers during the drying process will color them and reduce their value as an insecticide. In this respect the California-grown flowers are better cured and consequently more valuable than those grown in Dalmatia."

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Spare the Wild Flowers.

LADY, some time ago, wrote to an English paper complaining that an estate which she had permitted the public to use was being rapidly denuded of its luxuriant growth of ferns by "pirates," who stole them, roots and all, for sale. *Osmunda regalis* was the favorite with the thieves, and great hampers filled with it were seized at the railway station, addressed to a London florist. The *Athenæum*, in commenting upon this letter, states that thefts of a similar kind are frequent in various parts of England, and that many unenclosed districts have been entirely stripped of ferns and flowers, through greed of gain or mere wantonness.

There is so large an amount of uncultivated and unprotected land even in the most populous parts of this country that this pilfering from private homesteads is probably nowhere common. But it is quite time that earnest words should be spoken in defense of the wild flowers which grow in our woods and meadows. In another column of this issue Professor Beal speaks of the disappearance of two interesting plants from a region where they once abounded. Not long before his death Professor Reichenbach wrote to the editor of this journal deploring the wholesale way in which our native Orchids and other delicate herbaceous plants were exported to Europe, and expressing the apprehension that some of the most characteristic plants of the American flora might be entirely eradicated. In the Orchid Notes of this number some facts are given which show that choice and rare plants are in danger of extermination even when they grow in remote and almost inaccessible parts of the earth. Government protection has been given in some instances, and perhaps it will be needed in many others; one of our states, at least, has passed laws to protect certain rare Ferns. At all events it is time that public sentiment in our own country should be awakened to the real danger that some of our native plants may become extinct through greed or carelessness.

The wholesale way in which our flowers, and especially those of early spring, are gathered is a constant source of distress to those who really love them. One who now finds

a flower not actually common, scrupulously hides its birth-place. But rare plants are not the only sufferers. Even so prolific a plant as the Mayflower is now no longer found in places where it once was common. The rage of the average flower-gatherer for quantities as large as he can carry, and his carelessness in gathering, have brought this about. And now that the practice of selling wild flowers in the streets is becoming general, we may look for a still more rapid rate and wider extent of destruction.

Too often it is just those persons who have some knowledge of plants and think they love them especially well who do the most damage in the woods. If a man does not know that the flower he sees is rare, he may leave it where it grows. But if he recognizes its rarity he is sure to pick it. If picking were all, however, the damage would not be very great. But picking often means tearing up plant by the roots; and too often, instead of merely gathering the flower, an attempt is made to transplant its roots. Nothing more exasperates the true plant-lover than this, except in those rare cases when the transplanter knows what he is about, has a suitable spot prepared for his specimen, and is certain to give it the treatment and attention it requires. Even then one may wish that he had left it in its home to propagate itself for the benefit of future plant-lovers. But how trying it is when some enthusiastic young lady or curious boy digs up the rare beauty, puts it in a garden-bed, and then wonders the next year why it does not "come up." The true lover of flowers loves them best when they are appropriately placed and surrounded; and in the case of wild flowers this must usually mean when they are in their own wild home. The desire to own the specimen is more often a proof of mere covetousness than of admiration.

To all who go into the woods and meadows after flowers and foliage this advice may be given: Gather only as many flowers as you really need to embellish your homes, or as you will give away, before they fade, to the poor or sick, which means, probably, not nearly as many as you have been in the habit of gathering. If you want large masses for any special purpose, as for the decoration of a church, take only those which grow in great abundance, like the Golden-rod in autumn, or the White Weed in spring. If an effective mass is your aim, a thousand Daisies will serve as well as would a thousand white Cypripediums, if you could find them! Whatever you take, take it gently and discreetly. Do not cut off the branch of a tree when a twig would do, nor wrench a branch in getting off a twig. Use scissors or a strong knife; not your hands. If you must cut a branch, cut it close to the trunk, that decay may not fasten upon the wound, and take the one which is the least essential to the beauty of the tree. If you want a spray of a young Pine tree, for its feathery green, or a bit of spring-time Red Maple, for its ruddy little leaves, or a branch of Liquidambar for its brilliant autumn coloring, do not pick off the leading shoot—a lateral one will be less missed. When you pick from a small plant use scissors, instead of starting its roots by a vigorous pull. If it is a shrub, do not take all its blossoms, but be content with a few, and complete your bunch from another individual. If it is an herbaceous plant leave some flowers for seed, and if it is a bulbous one, spare leaves enough to insure the bulb's ripening for another year. Never dig a root unless you are entirely certain you know how to make good use of it at home. And, unless the flowers are as common as Daisies or Golden-rod, do not pick them at all if you mean to throw them away the next minute. Gather flowers to bring beauty into your homes, but do not gather them for the mere sake of gathering, for that is lawlessness and waste.

Our freedom in this country hitherto from some of the difficulties which vex the nations of the Old World has resulted largely from our comparative sparseness of population and our great area of unappropriated land. As our population becomes dense we shall have problems of our

own. Under the conditions of our modern life some opportunity for summer rest, recreation and change of place is of great importance to our people. For the inhabitants of the interior of the country, a few weeks by the sea has a greater vitalizing and restorative effect than any other accessible experience. But the time is not far before us when no one who does not own land along the shore will have any right to camp near the ocean, or even to walk over the ground, on any part of the coast that is fit for comfortable occupancy. Parks and pic-nic-grounds along the shore will be fenced in and rented to those who are able to pay for them, and a fee will be charged for admission to places where the view of the sea is good, as people formerly had to pay for every glimpse of the Falls of Niagara. The best places will be taken first, then those not so good, until only the swamps and marshy shores will be left for outsiders, for the people who cannot become proprietors along the coast.

Men who are not yet old have spent summers in delightful solitude at places on the Atlantic coast where there are now streets of costly houses. These changes are inevitable, and they will go on with increasing rapidity. Some good places along the shore ought to be kept free to all orderly visitors forever, to the end that men may walk and meditate by the waves and have their souls uplifted by musing unforbidden where

"Still shouts the inspiring sea."

Such seaside parks might be owned by the state, or by the towns in which they are situated, or by churches or incorporated societies. The method of holding them is a matter of expediency or convenience, but land for this purpose should be secured at many points within the next few years. The matter is of grave and far-reaching importance. Our children are likely to see an almost continuous town along all the healthful and accessible portions of the Atlantic coast-line, with all the land so improved and occupied as to exclude all but the owners. The people of the whole country, through all the generations of coming time, should have some right in the encompassing ocean and along its shores.

The Art of Gardening—An Historical Sketch.

XI.—Rome.

"THE trees," says Pliny the elder, "formed the first temples" of the gods of the Romans. Useful gardens seem from the first to have been more beloved in Rome than in Greece. The kings, according to Pliny, cultivated them with their own hands; and early attempts at horticulture are implied in the familiar anecdote which represents Tarquinius Superbus symbolically decapitating the Poppies of his garden. Pliny mentions window-gardens as of comparatively early origin, although it is impossible to determine the exact period to which he refers. "In former times," he says, "the inhabitants of Rome, with their mimic gardens in their windows, day after day presented the reflex of the country to the eye, when as yet the multitude of atrocious burglaries, almost innumerable, had not compelled us to shut out all such sights with bars from the passers-by."

But it was only when intercourse with Greece, and through her with the customs of Persian luxury, became close and constant, that pleasure-gardening was pursued on any extensive scale. The first great Roman gardens of which we know were formed during the last century of the Republic, but even then many conscientious citizens thought pleasure-gardening a reprehensible form of luxury. Cato would have allowed only gardens of utility, and the rich Pomponius Atticus publicly protested that he had no more than "a little pleasure-wood" near his dwelling. It was during the first three centuries of the Christian era that Rome itself developed into a veritable city of gardens, and that its wealthier citizens luxuriated in vast country homes amid a wealth of architectural and natural or semi-natural beauty which the modern imagination can hardly picture.

In these sumptuous days important city homes had, of course, their court-yards decorated with trees and flowers, while the crowded state of the city brought roof-gardens (*solaria*) into general use. The roof was carefully prepared with successive layers of Larch-wood, Beech-boards, broken

stones and mortar, and potsherds, and then finished with a pavement of stone, brick or even mosaic.* The plants were cultivated in large square boxes and in vases of stone or lead, or even set out in beds as though upon the solid earth.† Large trees were grown on these roofs, and a constant feature was the Vine-arbor or *pergola*, which is still familiar to the eyes of all travelers in Italy. Seneca makes bitter complaint of the extravagance shown in these *silve in tectis*.

The design of several small suburban gardens is preserved at Pompeii, and, although it was a Grecian city, similar arrangements prevailed in those of Roman origin. They were formal little spots, with walls and colonnades, altars and small temples, basins and sculptured figures. In one can be traced twelve large beds, evidently for the cultivation of flowers; but the inhospitable lava-soil usually prescribed the use of great boxes or long stone troughs. Climbing plants covered the walls, or else these were painted with garden scenes, fictitiously extending the narrow area. In the larger provincial towns an outer garden was often connected with the inner one, sometimes forming a vineyard or orchard, but sometimes a little wood or a diversified bit of natural-looking landscape, with grottoes and rills and multitudes of ornamental birds.‡

It is almost impossible, within brief limits, to give even a faint idea of the condition of Rome itself when its urban and suburban gardens were in their prime. Towards the end of the third century after Christ, says Lanciani,§ "there were in ancient Rome eight *campi*, or commons, green spaces set apart mostly for foot-races and gymnastic exercises, . . . and about thirty parks or gardens which, first laid out by wealthy citizens, . . . had been absorbed into the public domain by right of purchase, by bequest or by confiscation." To this list of open planted spaces, free to the people at all hours of the day or night, must be added the cemeteries, "those marble cities of the dead, shadowed by stately Cypress and Weeping Willows; || the sacred enclosures of temples, with their colonnades and fountains, . . . and lastly the great *thermae*," which, nominally baths, were really "gigantic clubs," furnished with every convenience for the enjoyment of in-door and out-door pleasures.

The largest of the "commons" was the Campus Martius, a vast level space—filled with buildings and play-grounds and water-works, and surrounded literally by miles of sumptuous colonnaded porticoes enclosing beautiful gardens—which lay beside the Tiber and extended from the foot of the Pincian Hill as far as the present Vatican Bridge in one direction, and to the Arch of Titus in another.¶ The parks and gardens proper were simply omnipresent. "The city," writes Lanciani, "was not only surrounded and enclosed by them but intersected in every direction. . . . Rome occupies the *thalweg* of the Tiber, a plain less than a mile wide and about three miles long, flanked east and west by parallel ranges of hills. . . . Both ranges were covered with gardens. Let us begin with the east range overlooking the Campus Martius. The Pincian Hill, the promenade of modern Rome, was occupied by the magnificent gardens of Acilius Glabrio. . . . Where the Villa Medici . . . now stands were the gardens of the Anician family. . . . The southwest slope of the same Pincian Hill . . . was occupied by the gardens of Lucullus. . . . The valley between the Pincian and the Quirinal, . . . a charming and undulating district with glens and overhanging rocks, rivulets of pure water and other natural attractions, was the seat of the gardens of Sallust, the finest and most celebrated of ancient Rome." Farther south lay a long line of private and imperial gardens, larger and smaller, "all forming one stretch of verdure more than two miles long and over half a mile broad." In earlier times these hillside districts had been covered with burial-grounds; but, as Professor Lanciani has recently discovered by excavation, these were gradually but systematically buried beneath enormous masses of pure earth, and turned from "pestilential dens into smiling gardens." Mæcenæ began the work on the Esquiline Hill, prompted by a desire not more for the æsthetic than for the sanitary benefit that would result.*

* Jaeger, *Gartenkunst und Gaerten Sonst und Jetzt*.

† Becker, *Gallus*.

‡ Martial calls these suburban gardens *rus in urbe*, now a familiar phrase.

§ "Ancient Rome in the Light of Modern Discoveries."

¶ The Weeping Willow was first introduced into modern Europe from the Levant about the year 1720. It would be interesting to know whether our learned author has documentary evidence for the statement that it was a familiar tree in ancient Rome. The Chinese have known it, however, for many centuries, and that there was a certain amount of commerce between China and Imperial Rome is proved by the fact that in the great collections of objects of art and curiosity displayed beneath some of the public porticoes, Professor Lanciani cites some of Chinese origin.

¶ Jaeger.

* See Horace, *Sat.* i., 8, 14.

"The hills on the west side of the valley were also occupied by an uninterrupted chain of gardens" from Monte Mario to the southern ridge of the Janiculum. "The banks of the river also had been transformed into a garden by Augustus, Pompey the Great, Domitian, Nero, Caligula and others." And in and around the palace of the Cæsars on the Palatine Hill were gardens more sumptuous and varied than all others. Within the precincts of the Golden House of Nero were comprised "waterfalls supplied by an aqueduct fifty miles long; lakes and rivers shaded by dense masses of foliage, with harbors and docks for the imperial galleys; . . . porticoes three thousand feet long; farms and vineyards, pasture-grounds and woods teeming with the rarest and costliest kinds of game; zoölogical and botanical gardens," and an incredible wealth of works of architectural, plastic and pictorial art, among them banqueting-halls with ivory ceilings, "from which flowers and precious perfumes could fall gently on the reclining guests." After the murder of Nero, Vespasian and Titus gave back to the people the greater portion of the ground which he had usurped for his private satisfaction, and the Colosseum was built on the site of his enormous lake. In short, wherever one looked in imperial Rome "in every direction the architectural masses were broken and enframed in the green of gardens and parks,"* while water was used in canals, fountains, basins and cascades to an extent unknown before or since.

The design of the Roman pleasure-ground was, in general, strictly formal, and trees and shrubs were frequently cut into the most artificial shapes. But there were exceptions. The poets constantly protested against the reigning fashions, and perhaps it was owing to their words at this time (as it certainly was in the eighteenth century in northern Europe) that a partial reaction in favor of more natural kinds of beauty came about. Many portions of the great garden of Nero were naturally disposed, and more than one ancient writer comments upon his love for rural, picturesque landscape effects. In the gardens of Lucullus the designs of Oriental pleasure-grounds were imitated.

New York.

M. G. Van Rensselaer.

The Woods of Mount Desert Island.

MOUNT Desert Island has an area of about one hundred square miles, washed by the ocean on the south, by broad bays on the east and west, and almost joining the mainland in the extreme north. Its outline is very irregular, like that of the Maine coast in general, with harbors and indentations everywhere. By the largest of these, Somes Sound, a long, deep fiord of the sea, running far into the land between mountainous shores, the island is nearly bisected. There are thirteen or more mountains, mostly bare, rocky summits, varying in height from a few hundred to fifteen hundred feet, lying across the centre of the island, from east to west, like a great belt, with deep, blue lakes nestled between them. To the north, the north-west and south-west the surface is more flat, with lower, more undulating hills. On the south-east and east the mountains approach the shore very closely in a coast of precipitous cliffs and bold, rocky headlands that has made the island famous. Nowhere on the Atlantic coast of this country is there such a wonderful combination of natural scenery; nowhere a spot where mountain and shore are so blended. For years it has been renowned as the crowning glory of the beautiful, countless-harbored coast of Maine.

The destruction of the forests of the island has already done much to mar the beauty of this unique resort, and, certainly, the importance of preserving the woods which still remain, should be admitted by every lover of Nature. The character of the soil, the ruggedness of the surface, the stunting influence of the cold sea winds upon its southern shore, all make the question of economic forestry one of secondary importance. That trees must be spared not for the lumber they yield, but for the beauty they may add to the landscape, should be the argument to the mind of the land-owners of Mount Desert. Wild beauty means summer visitors as long as the island endures, and such summer residents have, within the last twenty years, made its fame and fortune.

Mount Desert is in no sense an agricultural region. The soil is thin, very little of the surface is level, and the lowlands are so wet that the cost of draining would be beyond the means of the owners. A few favored spots in the northern part of the island, where the climate is more genial, can be profitably devoted to the plow, but the inhabitants of the island could not live by farming alone, and have no excuse for regarding the woods as their natural enemy.

The forests of Mount Desert were once full of wealth, and would still be a source of wealth if the lumberman and the forest-fire had not done their work so well. The first permanent settlement on the island was founded on the lumber business, which drags out a slow existence there to-day. While at its best, the business was profitable; saw-mills sprang up over the island—even between 1865 and 1870 there were at least eight saw and shingle-mills in the three towns of Mount Desert, Eden and Tremont—the brooks ran full and turned the wheels, vessels were built, and the lumber found a ready market. High up on the mountains, through the mountain gorges, along the ponds, everywhere, the great trees growing on the thin but rich wood-soil were taken out, not one by one, but all together, and the forest-fire followed. One of these conflagrations, fed by the dried refuse left by the lumbermen, laid waste much of the central part of the island. To-day nearly every saw-mill is in ruins; the mountains are bare; acres upon acres are overgrown only with a poor wood-growth that years will bring to little or nothing; the soil has been burned off or washed away; the streams preserve no even flow. There is no longer much to fear from lumbering, but two saw-mills at Somesville are still doing infinite harm to the beautiful Great Pond Woods, and should be stopped without delay. If the town of Mount Desert values its attractions as a summer resort, it could well afford to purchase and destroy both these mills, and even support the owners at the public expense if they were unable to earn a living in any other manner.

This great reason for jealously preserving the remaining woods of Mount Desert Island is their infinite value as a part of the wild scenery of the place, and their wonderful attraction to the city-wearied man or woman in search of a summer home and resting-place. With the destruction of the the forest-beauty and the impairment of the scenery will come depreciation in land values and diminished attentions as a summer resort.

First of all it must be understood that here, as on the Maine coast generally, the soil is exceedingly thin along the shores and upon the rocky hills and mountains. If deprived of the protection of the woods this soil is soon washed into the ravines and valleys; if exposed to fire it is burned like fuel. The peaks of Mount Desert were not always barren and desolate, nor were the rocky islets all along the coast bare as they now are, with hardly a bush to cover them. Some of the mountain summits may have been always bare, but it is plain that, as a whole, the mountain masses were well wooded and protected. To-day the steep side of Beech Mountain still shows some of the oldest, most beautiful woods on the island, while upon the sides, almost upon the summits of other greater mountains, we find evidence of great trees gone to destruction years and years ago. What the island was in those early days of its full beauty must be far beyond the conjecture of the tourist of the present time. Some idea of these mountain woods may still be gained by visiting the western peak of Western Mountain, the most beautiful mountain of the island. On the other hand, the eastern peak of the same mountain shows, in vivid contrast, the desolation wrought by fire—a mere mound of white rocks, with here and there skeleton trees, a scene only softened by the covering of green that Nature kindly gives the wounds inflicted on her earth.

In a few localities organizations have been formed to protect the forests from fires, but these should be extended and made efficient, not only to check wood-fires, even the most insignificant, and at the very outset, but to prosecute to the full extent of the law all offenders, whether inhabitants or summer visitors, although, with two or three exceptions, nearly all the wood-fires on Mount Desert have been caused, not by the visitors, but by the gross carelessness of the inhabitants themselves.

The system of wood-chopping is most wasteful. Whoever wants fire-wood for home use at once goes into his wood lot, hacks right and left, leaving behind him a desolate tract covered with debris to dry beneath the hot sun until it is tinder, waiting for a spark to begin still greater destruction. If he owns land in some convenient spot by the roadside, so much the better for him, so much the worse for the scenery! The result, of course, is ruin to the very beauty he should do his best to guard. This is especially to be lamented because such destruction is entirely unnecessary. The forest could be made to supply the needed fuel without destroying its wildwood beauty, which must be spared if the island is to retain its charm. Vigorous public sentiment, and town interference where it is possible, should at once put a stop to such wanton destruction as that on Western Mountain, on the Bubbles, and on the south-western slopes of Sargent's Mountain.

* Friedländer: "Darstellungen aus der Sittengeschichte Roms."

Not very many years ago there was no more beautiful spot on the island than Hunter's Brook Valley. Great woods sheltering the rare, shy wood-plants, and giving deep seclusion, filled the valley and extended up the mountain sides. To the south, the woods became less worthy of the name, but were still woods until the explorer suddenly emerged on the stony beach where the brook emptied into a cove between two mighty headlands, and the ocean lay before him. Northward the brook flowed down amid the wildness of the deep forest from the ravines of the Triad, Pemetic and Green Mountains, and the watershed of Bubble Pond. The spot was one of the gems of the island to every lover of nature. Its beauty, however, did not save it, but proved its ruin. A "practical" man saw dollars in the timber of the wild valley, hired a gang of French Canadian wood-choppers, built a road of a mile or two in length towards the headwaters of the brook, and established a logging camp. Utter ruin followed, the wild woodland became a desolation, and this priceless beauty was lost forever.

In some parts of the island there is a partial realization of at least the practical value of beauty. At North-east Harbor, especially, is there evidence of this. And yet, it will not answer to leave merely a narrow strip of woods along the roads, while the work of destruction is carried on behind them, to repel the very people who bring prosperity to the island.

The method of road-making, now practised, is most destructive of natural beauty and attractions. It is of great importance to the inhabitants to prevent this in every possible way. Many visitors to the island are unfortunate enough to see little further into it than along its roadsides, and these are too often masses of stones, and piles of withered brush. If these waysides cannot be adorned, their natural beauty might be spared. Shrubbery and trees could be left generally, and where cutting is needful, the brush could be removed instead of being left to shut off access to the woods, and to dry into tinder to catch the first stray spark and become a forest-fire. That such devastation is allowed to go without reproof, and that telegraph companies, when erecting poles and stretching wires, are permitted to mutilate trees as they choose, is proof that the authorities do not realize that the beauty of the island is its real value. Some resolute policy must be adopted for protecting the forest-scenery of Mount Desert, or it will be robbed of its peculiar charm and be converted into an inhospitable waste.

Boston.

E. L. Rand.

Notes Upon Some North American Trees.—XIII:

290. *CASTANEA VULGARIS*, var. *AMERICANA*, A. DC.—There is a much older name for the Old World Chestnut than that of Lamark (1783) taken up by Alphonse DeCandolle, namely *C. sativa* of Miller (Gardeners' Dictionary, 8 ed., 1768), already adopted by Nyman and by K. Koch, so that our American Chestnut, considered only a variety of the Old World tree, must become *Castanea sativa* var. *Americana*.

292. *OSTRYA VIRGINICA*, Willd.—The oldest name for our Hop Hornbeam is that of Miller (Gardeners' Dictionary 8 ed., 1768), *Carpinus Virginiana* so that it may be more properly written *Ostrya Virginiana*, Koch, than *Ostrya Virginica*, Willd.

294. *BETULA ALBA*, var. *POPULIFOLIA*, Spach.—It seems desirable to consider our Gray Birch as distinct from its Old-World congener, and to restore to it Marshall's name, *Betula populifolia*. The two plants are distinct in geographical distribution; in the shape of the leaves; in bark, size, and habit. The bracts of the fruiting catkins of the American tree are nearly triangular and covered on both surfaces with pubescence; those of the European plant are contracted into a long, narrow base and are quite glabrous. There are differences, too, in the size of the fruit and in the size and shape of its wings, which will aid in distinguishing the two species.

302. *ALNUS RHOMBIFOLIA*, Nutt.—Dr. C. C. Parry (*Bull. Cal. Acad. Sci.*, ii., 7, 351), shows that this common Alder of California extends through Arizona and New Mexico to northern Mexico, and that *Alnus oblongifolia* of Torrey, (No. 303 Census Cat.) is the same plant, which he distinguishes by the number of stamens which instead of four in each flower are only two, sometimes increased to three or more rarely reduced to one. A specimen collected by Greene at Silver City, New Mexico, shows that this character in the number of the stamens holds good in the

eastern plant. Dr. Parry points out, too, in this paper that *Alnus rhombifolia* may be distinguished always from the northern *A. rubra*, Bong., by its early flowers which begin to appear in California in January, before the leaves of the previous season have all fallen, fertilization being completed by the 1st of February, "at least as far north as the lower Sacramento Valley, the smaller winter streams over which they lean, as well as the adjoining banks, being copiously strewn with the effete male tassels resembling torpid caterpillars."

304. *ALNUS SERRULATA*, Aiton.—This, the common Alder of the southern States, is rather a shrub than a tree, although I have seen it sometimes growing to the height of twenty feet, but always with a number of stems from a common root. It may well be dropped from the *Silva* of North America.

305. *ALNUS INCANA*, Willd.—The common northern brook-side Alder, although it grows sometimes quite tall, is a shrub and not a tree, and it should be dropped from the *Silva*.

306. *SALIX NIGRA*, Marsh.—Under this species should be added var. *longipes*, Andersson in *Ofr. af. Vet. Akad. Forh.* (1858) 22—a rather common Florida tree (St. Mark's, Rugel; Jacksonville, A. H. Curtiss; Duval County, J. D. Smith; Miami River, Sargent), with paler leaves, shorter aments, and longer pedicelled capsules than are found on the ordinary northern form. It is the *Salix Humboldtiana* of Wright's *Plantæ Cubenses*, No. 2132.

315. *SALIX CORDATA*, var. *VESTITA*, Andersson.—The so-called Diamond Willow of Nebraska and Dakota, may be dropped from the *Silva*. It is not probable that any form of *Salix cordata* ever becomes a tree; and the large specimens on the banks of the Missouri River in Dakota, with the peculiar diamond markings, if they exist at all, belong probably to *S. amygdaloides*.

329. *CHAMÆCYPARIS SPHEROIDEA*, Spach.—The first name for this tree is *Cupressus thyoides*, L.; and this specific name should be retained, the name of the White Cedar becoming *Chamæcyparis thyoides*.

330. *CHAMÆCYPARIS NUTKAENSIS*, Spach.—The orthography of the specific name as written by Lambert (*Gen. Pinus*, ii., 18), with whom it originated, is *Nootkatensis*.

JUNIPERUS FLACCIDA, Schl.—Dr. Havard has discovered this north-Mexican Juniper on the Chisos Mountains in western Texas (*Proc. U. S. Nat. Mus.*, viii., 504), and it must be included therefore in the North American *Silva*. It is a shrub or small tree, with shreddy bark, spreading, slender branches, acute and somewhat spreading denticulate leaves, and large globose or tubercled fruit. This is a widely-distributed tree apparently, although nowhere very common. It should follow *Juniperus pachyphlæa* in the catalogue. C. S. Sargent.

New or Little Known Plants.

Dendrochilum filiforme.

THE remarkably well-grown specimen of this lovely Orchid, illustrated on page 485, received the first prize as the best single Orchid at an exhibition of the Massachusetts Horticultural Society in June last. It came from the fine collection of Mr. John L. Gardner, of Brookline, Massachusetts, where it was grown under the care of Mr. C. M. Atkinson, the able head-gardener of the estate. The plant had altogether forty-eight flower spikes, most of them being over a foot long.

A specimen of this size is rarely met with and presents a spectacle not soon forgotten. The individual flowers are small and of a rich yellow color, but they are so abundant and so closely set that they fully justify the name of "The Golden Chain," which has been given to the plant.

Dendrochilum filiforme was introduced from the Philippine Islands as far back as 1836, but it grows also in quantities on Mount Mulu, in Borneo, where I found it a few years

ago growing on trees together with *Calogyne Sanderiana*, at an altitude of 500 feet above the sea. It flowers in its native home in July and August, and enjoys a moist and warm atmosphere, and, therefore, the temperature of a Phalaenopsis house will suit it best; but it can also be successfully grown in the warmer part of the Cattleya house if a more moderate supply of water is given. As the plant flowers on its young growths it should be grown on after flowering, until the young bulbs are fully formed, and then less water and lower temperature may be given to it.

It appears that the plant gets a short rest in its native home, as it begins to grow and flower there again as soon

varieties. Then, of course, a Dahlia centenary would not be complete without its conference and "papers," so we had a history of the flower since its advent on English soil up to the present from Shirley Hibbard, who must have taken a deal of pains to hunt up old references in order to compile the instructive chronicle. He related the early history of the plant from 1615, the date of its introduction to England by the then Marchioness of Bute, then through all its interesting phases of development in the hands of early florists, where and when it first produced double flowers, and how the various sections originated, such as the "Show," "Fancy," "Pompon" and "Cactus," and with all this historical detail were interwoven pleasant anecdotes and incidents. Besides this literary disquisition we had papers on the practical part of the question, such as the cultivation of Show Dahlias by Turner, of



Fig. 133.—A well-grown specimen of *Dendrochilum filiforme*.—See page 484.

as the dry season of three or four weeks duration is over. *Dendrochilum filiforme* is difficult to import, owing to its thin and fleshy bulbs which easily dry or rot off, and this is undoubtedly the reason why it is to-day still comparatively scarce.

Newtown, L. I.

I. Forstermann.

Foreign Correspondence.

London Letter.

THE National Dahlia Society always holds a representative exhibition of its chosen flower at Sydenham, but this year every member seemed to exert himself to make the show out-strip in size and interest all its predecessors, and the result was a really grand exposition of the Dahlia in all its sections and

Slough, and of other sections by Cheal, both qualified lecturers.

But though we enjoyed a grand exhibition of the Dahlia, with a creditable literary accompaniment, little good will be derived from this centennial event. Nothing new was brought out in the essays, and no new varieties of the flower were shown. The exhibition, however, showed the rapid advances made of late years in the Cactus, decorative and single forms of the flower, and it plainly showed how rapidly florists are able to create a supply to meet the public demand for any particular class of plants. It seems but a short time ago when there were no single Dahlias except the old *D. coccinea* and its forms rarely seen outside of a botanic garden. Then appeared the beautiful, though tall and coarse growing, Paragon, which seemed to whet the appetite of flower lovers for more. Single varieties at once came in multitudes, until the same

public grew tired of new ones, so that to-day they are not so popular as five years ago. The Cactus Dahlias have almost a parallel history. The original *D. Juarezii* was and is still very beautiful, but, not content with this, the florists took advantage of the demand for the genuine flower to foist upon the public so-called white, yellow and pink Cactus Dahlias, which no more resemble the Juarez Dahlia in form than did the early double Dahlias resemble the exquisitely moulded varieties, the so-called Show and Fancy classes we now have, and which, by the way, seem to be more appreciated than they were a few years ago. What, to me, seems the greatest improvement in the Dahlia is the dwarf race that have appeared lately, and which, for ordinary decorative gardening, will be an immense gain. These plants are not only dwarf, but extremely floriferous, and, for massing on lawns, are invaluable. I saw, a few days ago, a mass of the Glare of the Garden, broadly margined with the pure white Pearl, which only rises eighteen inches high, and I have seldom seen a more effective touch of color on a lawn. A still later improvement is a dwarf strain of single Dahlias, which has just been brought into notice by Mr. Girdlestone, the Secretary of the Dahlia Society, who exhibited them at the centennial. Some of these, which are collectively known as *Dahlia pumila*, are under eighteen inches in height and are most floriferous, so that they are likely to prove good bedding plants. If we can fix a dwarf strain of single varieties it will do away with one of the chief objections to the older and taller sorts, which require a deal of staking and tying. Beyond these there was, among all the novelties submitted to the judges at this great show, no absolute departure in form or color. Among the Cactus section were the following certificated sorts: Mrs. Douglas, salmon-pink; Marchioness of Bute, pale yellow, suffused with mauve; and Centenary Year, scarlet. The tendency of the new single kinds is towards two or more colors in the flowers, the florets being sometimes tipped with a color different from the ground tint, and sometimes collected in concentric zones around the centre.

Though the Dahlia monopolizes the florist's attention for the moment, it will, on the first appearance of frost, give way to the Chrysanthemum, whose society has already begun its active work for another season, and at its first exhibition this week there was a fine display of early-flowering sorts, which, however, are few in number, though one grower managed to get together over forty distinct sorts in bloom. The leading varieties shown are, doubtless, all well known to American florists. They included Madame Desgranges, the white and golden forms; G. Wernig; Mrs. Burrell (last year's novelty), primrose-yellow; Sam Henshaw; Holy Innocents; Pynaert Van Geert; Précocité; Mrs. Cullingford and Mademoiselle Lassali, white. Among the certificated novelties was one under the name of Comtesse F. de Cariat, described as a semi-incurved Japanese sort, of a buff-yellow color. The other certificated sort was Sam Henshaw, also a Japanese variety, with white flowers, and a genuine acquisition to the early-flowering race.

This week the periodical visit of the floral committee to the trial grounds in the Royal Horticultural Society's garden at Chiswick took place, when the merits of various classes of plants were discussed and adjudged. The subjects were Asters, Dahlias, African Marigolds, French Marigolds, Heliotropes, Scabious and Zonal Pelargoniums. Of these there are representative collections of sorts cultivated, including novelties sent by the leading seed-houses on the continent and at home. The Asters make the most brilliant display, and the season seems to have suited them well. After inspecting all the sections, the committee certificated the strains known as the Imbricated Pompon, Dwarf Pyramidal, Hedgehog, Victoria, Cocardeau or Crown, and the new Liliput, a strain of miniature Asters a few inches high, extremely floriferous, and of varied and bright colors. Among the strains to which awards of merit only were given, and which, therefore, were not so commendable as those certificated, were the Dwarf Chrysanthemum, Dwarf Victoria, Dwarf Bouquet and New Victoria.

The Heliotropes considered worthy of certificates were all raised by Lemoine, and were named Fleur d'Ete, with a very large truss of pale purple and of compact growth; Capus, large truss of very deep purple; Victor Durny, a tall and strong variety, with pale purple flowers in very large clusters. New certificated Pelargoniums, also, were mostly all from Lemoine, their names being Charbon, double orange-scarlet; Souvenir de Mirande, single flowers with white centres and cherry-colored edges, and two unnamed seedlings, different in color from older sorts. The dwarf strain of *Scabiosa atropurpurea* is now becoming very popular, especially for market, and Vilmorins strain, named Half-dwarf Blood Red, is one of the best I have seen, and was worthily certificated. Of the French Marigolds,

the new sorts named Electric Light and Dobbies Selected were the best, and among the African Marigolds, certificates were voted to those named Lemon Queen, Prince of Orange and Dwarf Orange (which, by the way, is not very dwarf), and Dwarf Golden, very compact and pretty. Among the Dahlias approved were Professor Baldwin, a brilliant scarlet Cactus variety; Empress of India, the finest deep crimson Cactus sort, and North Light, a scarlet Pompon. Altogether, there is a most valuable series of trials being carried on at Chiswick this year, the importance of which is recognized by all who wish to make selections from classes of plants abounding in varieties. Being grown under precisely the same conditions, the relative merits of every sort may be seen at a glance. The full reports of the committee's observations are published in the Society's journal, issued periodically, so that the fellows of the Society derive the benefit of independent opinion of novelties.

London.

W. Goldring.

Cultural Department.

September Notes on Interesting Shrubs.

THE custom of spending the months of July and August at the seaside, now so common among people both from the country and city, naturally involves the loss of appreciation and value for many garden plants which are most attractive at that time. To those living in the country, or who have a rural place in which to spend a month or two in the spring or autumn, it is of importance to have such hardy ornamental plants as are most effective or interesting at these periods. There is naturally no lack of interesting or beautiful flowering plants in May or June, but, when the summer is over, the brilliant colors of autumn foliage and fruit, the Sunflowers and native Asters and Golden-rods have largely to be depended upon to make up for the loss of the greater variety found earlier in the season. But brilliantly-colored foliage in September is dependent, very much, on various meteorological conditions, as the present wet season in eastern Massachusetts has shown in the continued greenness of the leaves of nearly all trees and shrubs. And much of the beauty of some Golden-rods and Asters is destroyed by long-continued rains.

Native woody plants in full flower at this season are rare, but a few have showy fruits, and some foreign species are notable for both flowers and fruit. The showy *Clematis Jackmani* and other kindred varieties are becoming well and widely known. The period of most profuse flowering is earlier in the season, but sometimes a good number of blossoms continue to appear during the early autumn. These flowers are extravagantly admired and praised by most people, but there are a few other, though less striking, species which are equally desirable. The fragrant *Clematis crispa*, with recurved light purple sepals, and *C. Pitcheri*, with its dark, dull purplish flowers, continue to bloom in the early part of the month and the latter species even until hard frost. The Virgins Bower (*C. Virginiana*) is often past its best flowering condition by the first of September, but the flowers are followed by the conspicuous feather-tailed fruit. This species bears staminate, pistillate or perfect flowers on the same or different plants, so that where the ornamental fruit is desired, as well as the flowers, care should be taken to select or propagate (by cuttings or layers) from fruit-bearing plants. *Clematis paniculata*, a closely-related Japanese species, and the Traveller's Joy (*C. vitalba*) of Europe, both flower at about the same time as the last and cannot be called September bloomers. One of the best species is *Clematis orientalis* (*C. graveolens* is a synonym often used) which bears its yellow flowers most abundantly during September, and which becomes covered with the beautiful silvery-white, long-tailed fruit while still in bloom.

Among all the introduced climbing flowering-shrubs few have proved more satisfactory than *Lonicera Japonica*, var. *Hallii*. It differs from the typical *L. Japonica* chiefly in being practically ever-blooming, and from June until after severe autumn frosts its fragrant white and yellow flowers are continuously produced. It is becoming well-known and commonly planted. The well-known and very fragrant Dutch Monthly Honeysuckle (*Lonicera Periclymenum*) also has a few flowers at this season, but they are very apt to be unpleasantly infested by Aphides. *Lonicera Sullivanii*, which has been generally grown as *L. flava*, is frequently met with in old gardens. When trained upon some support or trellis, and well-grown, it is very handsome in September with large clusters, from two to four inches long, of large, shining, bright red berries. *L. hirsuta* and the true *L. flava*, which is very rare, also bear an abundance of fruit, but on account of having a slight bloom it appears less brilliant in color.

Lycium Chinense, which is very closely related to the common Matrimony Vine, is a trailing shrub which if trained to some strong support will grow fifteen feet or more in height. The very long slender branches hang down laden with ovate or oblong, shining, scarlet fruit, which is from half an inch to an inch in length, and with green fruit and flowers in all stages of development.

Perhaps the most remarkably distinct and showy shrub at this season is *Symplocos paniculatus*, a native of Japan. The

on account of its clean foliage as well as the graceful flowers and almost unique fruitage.

One does not naturally associate the autumn with the flowering catkins of Willows and Alders, but late August and September is the season in which the native Sea-side Alder (*Alnus maritima*) blossoms. The male catkins are very large, and the round, cone-like fruit matures in the autumn of the following year. The plant is usually shrubby, but in favorable situations it becomes a small tree twenty feet in height.



Fig. 134.—*Prunus pendula*.—See page 490.

branches of last year's growth are covered with racemes of fruit of the brightest ultramarine blue color and the size of small peas. The leaves are dark green, thick and rough, and not liable to attack by insects. The numerous small, pure white flowers appear in the latter part of May and in early June. This shrub, which appears to be one of the very hardiest, is wide-spreading, and ordinarily grows to a height of six or seven feet at the Arboretum, although it may attain much larger proportions. It is as yet very rare in cultivation, but it deserves, and is likely to have, a place in all collections

The common Spindle-tree (*Euonymus Europæus*) presents considerable variation in foliage and fruit, and there are numerous named forms and varieties to be found in nurseries. Throughout September the pods are conspicuous by their red color, which varies in intensity on different plants. A Japanese variety, known as *E. Europæus*, var. *Hamiltonianus*, has a much more robust habit of growth than the European type, and the pods, which are of a beautiful pink color, also open earlier, in the latter part of the month, and disclose the seeds in the scarlet-colored arils. The well-known climbing

Bitter-sweet (*Celastrus scandens*) does not usually open its showy orange-colored pods and disclose the scarlet covering of the seeds until October. As in the case of *Clematis Virginiana*, where fruit is desired, care should be taken to select cuttings from good fruiting plants. On many of the plants all the flowers are sterile, and consequently produce no fruit.

The native Black Alder or Winterberry (*Ilex verticillata*) is a much-neglected shrub, in spite of its neat, compact habit of growth in cultivation, its delicate early summer flowers, and the abundant rich red fruit of September, which remains until winter, if not eaten by birds. A clear, light yellow-fruited variety is growing at the Arboretum. The less common *Ilex laevigata* ripens its fruit a little earlier in the month than the last species, and, although rather larger, it is similar in other respects, and is equally ornamental.

To the white and blue fruited species of Dogwood, which ripen in August, the present month adds the Flowering Dogwood (*Cornus florida*), with clusters of large, oval, bright red fruit, which make the plant almost as showy as when in flower. Unfortunately, birds, especially robins, are very fond of this fruit, and, in this region, it rarely remains long on the tree after it is ripe. It is one of the very few large shrubs or small trees which show red foliage so early in the season.

Of several species of Hawthorns which ripen fruit during the month there is none so handsome and conspicuous as *Crataegus pyracantha*, a native of south-eastern Europe, where it is evergreen. It is not very hardy here, and is usually much injured in winter, but in sheltered situations it becomes a dense, spreading shrub, which retains its leaves and fruit through the winter. The fruit, which is bright red, is as large as good-sized peas, and thickly set in small corymbs along the branches.

The crimson cone-like fruit of the Magnolias always attracts attention at this season, and, in this vicinity, grafted plants of *Magnolia glauca* showed the scarlet seeds early in the month, much earlier than any other species or than the same species when grown on its own roots.

Arnold Arboretum.

J. G. Jack.

Observations on the Grape Crop.

IN former years the birds have stripped the vines of Early Dawn and some other varieties early in the season, while the Clinton has fallen a prey to them later; but this season they seemed to prefer the Clinton first of all, and long before it fairly began to ripen. From six Clinton vines which were loaded with fruit, every berry was taken two weeks ago. The same is true of Cornucopia, Early Dawn and several others with berries of that size which seems to be preferred. After these, the birds paid attention to Ives, Wilder, Worden, and large grapes of this class. Many of the grapes were only stabbed and left for the bees and wasps to finish. The whole berry was carried off in some cases; but this was not usual as it was with the smaller kinds. Preference was also manifested for the black grapes; the red ones were taken to a limited extent, but so far as I have seen not a white one was molested. Color seems to have been the first attraction, size next, while flavor was a matter of minor consideration. If not, why should sour, unripe Clintons be preferred to sweet Wordens and Wilders?

Many would be ready at once to charge the English sparrows with this destruction, but I have not seen one in my vineyard this season, and I conclude they are not indictable for this offence. The guilty ones are robins, thrushes, catbirds and "chippies." It has been remarked that robins are unusually numerous this season. They picked my black caps early in the season, and made clean work of it, and they did not refuse a meal of strawberries occasionally, and now it is the grapes. Can it be a scarcity of their usual autumn food, or does the increase in numbers account for their increased destructiveness? I have learned one lesson, at all events, which, is that safety in the future can only be insured by bagging every grape.

Bagging grapes has not afforded protection in other regards this year as it has formerly. While some clusters show the dried, mummified carcasses of berries destroyed by Black Rot, many more are of full size, the white ones hard as bullets, of a yellow, golden or leaden hue, with threads of fungus visible through the skin. The peduncle of such berries is invariably black and dead, and has a feeble hold on the berries. How does the fungus get to the clusters? First, it is possible that the spores may have been lurking on the young cluster when bagged; but the chances of this were much reduced in the case of clusters bagged before they bloomed, and these seem about as badly affected as any. My next theory is that the rains, which have been heavy, frequent and almost constant, have

pounded holes through the bags, and through these holes have probably carried the spores which lodged in the cluster, and, under favorable conditions, germinated and grew. In many cases where the young clusters touched the side of the bags exposed to the rain, the bags were beaten so hard against them that grapes not larger than a half-grown pea were forced through and grew to maturity. In some instances these outside berries were the only diseased ones on the cluster, which speaks well for bag-protection. I regret very much that I had not tried a few of the water-proof bags to see if they would have afforded any better protection.

There are also some problems regarding the fructification of the blossoms not easily solved. We would naturally expect the strongest and most vigorous vines to set and mature a large crop, and yet the weakest and feeblest vines are frequently found to have not only the largest crop, but the largest and best developed clusters. Scores of what I consider my best vines have, this season, made a sorry show of ragged imperfect clusters, a result which I have never before seen. There is a cause for this freak, no doubt, but I have yet failed to discover it. Another peculiarity is the unevenness with which the grapes grow and ripen. While the larger portion of the cluster will be fully ripe, the remainder will be green or partly colored. By the time these late berries get ripe, if they ripen at all, the rest of the cluster will be rotten. This feature of uneven ripening was prevalent last season, but far more so this season. The few days' difference in the blooms of the cluster seem hardly sufficient to account for this phenomenon, and I have never heard any attempt to account for it otherwise.

The last and most serious calamity with which our grapes have had to contend has proved the most fatal one. To have them escape mildew, rot, anthracnose, and the whole tribe of insect enemies, and then burst open just as they are at the threshold of maturity is disappointing, to say the least. But nine consecutive rainy days were too much for many kinds, and the way they split was a sorrow to behold. I had a quantity of fine Wilders, which lacked but a few days of ripeness, but the great majority of them cracked and became food for the bees. Cottage, Worden, and many others, fell a prey to the same cause; while Jefferson and Salem are a total loss. Remarkable as the season has been, my Salems were larger and finer than I ever grew, but they have all decayed.

It has often been said that the great diminution of the grape crop throughout the country would enhance prices, so that a partial crop would net as much money, but the present tone of the market does not justify that prediction. Retail prices seem to rule about as usual. I hear of many vineyards being uprooted because the prospect for grape-growers is so gloomy.

In my case, copper sulphate has not given immunity from mildew. This fungus is abundant, although the foliage of my Vines generally is, I think, quite as perfect as usual at this season of the year. Some varieties, of course, are entirely denuded, showing them to be less susceptible to the influence of the sulphate than others, if the retention of the foliage is to be credited to its presence. Perhaps I made too few applications, or more probably the rains washed the sulphate from the Vines as soon as applied. Forty-one rainy days in three months and a half, with much dull and foggy weather between the showers, exactly suited the habits of the fungus and protected it from our remedies. In a season of less moisture, and earlier and more persistent applications, I doubt not the results would be more satisfactory.

The most perfect foliage in my vineyard is on a few Vines of *Vitis rupestris*. They are as fresh and bright as in mid-summer, and I am inclined to think that Professor Munson, of Texas, is on the right track in attempting to evolve from this species and *V. aestivalis* a new race of grapes with iron-clad foliage. My Vines of Woodruff Red, whose foliage appears as wild as the wildest of our *Labrusca* varieties, present the opposite side of the picture, showing that appearances are often deceptive, and that only by actual trial and experience can we determine the endurance of a Vine's foliage. Next to hardiness of wood, this hardiness of leaf is the most valuable quality in a Vine.

Montclair, N. J.

E. Williams.

Stove Plants in Flower at Kew.

Solandra grandiflora.—The Solandras and Daturas are closely related to each other; they are also remarkable as being the largest flowered of the plants included in the order Solanaceæ. There is, however, a disparity between the two genera of some horticultural importance, namely, the shy flowering nature of the Solandra as compared with the Datura. But it seems not impossible that, by proper treatment,

the *Solandra* may be made to bloom every year, and when it does its beauty is of a high order, the flowers being large, trumpet-shaped, not unlike those of *Brugmansia suaveolens*, their color being pale creamy-yellow. There is a fine example of this species now in flower in the succulent house at Kew, and no doubt the dry atmosphere and bright sunshine all summer has had a great deal to do with the free production of the flowers. In moist stoves, although the plant grows very luxuriantly, it cannot be induced to flower. Planted in a bed of poor, sandy soil and trained along the roof-glass, the example in the succulent house makes good growth annually, and this is the third successive year of its flowering there. In winter it gets no water. It is a native of Jamaica, and has been in cultivation since 1781.

Allamanda violacea.—Yellow is the characteristic color of the flowers of all *Allamandas* except this, in which they are purplish-rose, or what is known amongst milliners as crushed strawberry color. Although an unknown plant in English horticulture now, yet it was in cultivation in England in 1861, when it was flowered and described. It is now in flower at Kew. As an instance of the manner in which plants are distributed and afterwards preserved in some out-of-the-way garden, we may mention the fact that the only garden where, on inquiry, this species was in cultivation was the Botanic Garden of Natal, from whence the Kew plants were obtained. Of course it and all other *Allamandas* are natives of Brazil. *A. violacea* has the habit and general appearance of *A. cathartica*, but the leaves are covered with scabrous hairs and they are arranged in whorls of four. The flowers are in terminal clusters, and each one is shaped like the flowers of *A. cathartica*, except that the divisions of the calyx are larger.

Aristolochia ridicula.—Amongst a large number of cultivated species of *Aristolochia*, which are remarkable for the fantastic shapes of their flowers, this is certainly one of the most singular. Mr. N. E. Brown, who is responsible for the specific name, described the flowers as "positively droll, the two lobes on the sides of the mouth of the flower forcibly reminding one of donkey's ears." The comparison is very unfavorable to the plant, for the flowers are certainly beautiful as well as interesting in form and color; they are about four inches long, curved as in the common Dutchman's pipe (*A. Sipho*), inflated at the base, compressed in the middle, then widening again so as to form a broad, curved neck. The outline of the limb or spreading top is that of a Commodore's hat, the mouth of the tube being ellipsoid and filled with white, converging hairs, the two elongated lobes or ears spread in opposite directions, each being one and a half inches long. There are a few club-shaped hairs near the end of each lobe. The color of the tube is greenish-white with purple veins, that of the limb brown with purple markings. The leaves are kidney-shaped, six inches across, and the stem is thin and quick-growing. The whole plant is pale green and covered with long, somewhat stiff hairs. It grows freely in a stove and produces its flowers from the leaf-axils. It is in flower at Kew. Each flower lasts two days. Other *Aristolochias* now flowering here are *A. Brasiliensis*, a grand plant for covering large pillars or trellises in stoves; *A. elegans*, one of the very best of stove climbers, as it grows freely and flowers abundantly, whilst the flowers are large, handsome in form and attractive in color; *A. tricaudata*, with dark, shining purple flowers, which are remarkable for their three long, drooping tails, and a form quite as striking as that of the Chimæroid *Masdevallias*; *A. trilobata*, with elegant, jug-shaped flowers, not unlike the pitchers of a *Nepenthes*. There are, altogether, a considerable number of *Aristolochias* with large, ornamental flowers, but they have one unfortunate drawback, namely, that of a disagreeable odor. In this respect *A. Brasiliensis* is probably the worst, whilst *A. elegans* is the least offensive.

Kew.

W. Watson.

Orchid Notes.

NEARLY half a century ago Mr. James Bateman, in the introduction to his famous work, "The Orchidaceæ of Mexico and Guatemala," wrote: "It is, indeed, probable that Orchidaceous culture will always continue in a comparatively few hands, and it will, therefore, be pursued with the same ardor in the upper walks of life that already, in a humbler sphere, attend the cultivation of the beautiful varieties of the Tulip, Auricula and Carnation." Shortly afterward a writer in the *Gardeners' Chronicle*, in reply thereto, remarked: "I suspect that the time is not far distant when we shall have many of the more-easily cultivated Orchids—*Dendrobium nobile*, for instance, the *Cypripediums*, etc., etc.—going about in the baskets of the itinerant flower-sellers in London, and as easily

grown as *Cactus speciosissimus*." Perhaps the truth lies about midway between these two opinions. We do not remember to have met with any of the numerous vendors of flowers "all a-growin' and a-blowin'" who have included Orchids among their stock in trade, though the last-named writer was, unquestionably, near the truth when he added, "But we must have them for the million."

Orchids for the million we certainly have at the present time, and still their cultivation seems to be extending over a wider field. Most people who have a glass-house of any kind include a few Orchids among their treasures, and, in many cases, with the happiest results. *Cypripedium insigne* is a kind which luxuriates in the temperature of an ordinary greenhouse, and there are many others whose successful cultivation presents no greater difficulties than does a *Cineraria* or Chinese *Primula*.

A mania, it is sometimes called by those who profess their inability to understand it and who prophesy its speedy collapse, like the Tulip-mania of a by-gone day. Twenty-five years the late Professor Richenbach gives it, when he orders that his Herbarium shall be sealed up for that period, "in order that the inevitable destruction of the costly collection, resulting from the present craze for Orchids, may be avoided." Let us hope that it is sealed up—beetle-proof, as well as proof against the ravages of bipeds of Orchidomaniacal tendencies—or we fear that its value will be sadly diminished in a quarter of a century.

But it seems highly probable that the present love of Orchids is based on a broader footing than mere vagary of fashion. Perhaps there is no other class of plants which yields a greater return for the trouble expended. The great beauty of their flowers, their grotesque shapes, their wonderful variety and the long period during which many of them remain in perfection are, perhaps, unequalled in any other group; their small size enables a large number to be cultivated in a comparatively limited space; and, so diverse are their periods of flowering, that throughout the entire year some object of attraction is to be found in the Orchid-house. Plants with so many good points are not likely soon to go out of fashion.

The amount of capital now occupied in the importation and cultivation of Orchids is enormous, and when one remembers the vast quantities of certain kinds which are annually torn from their homes and brought over for the decoration of our gardens the question arises, how long will the supply hold out? Certainly, some species seem to be in imminent danger of becoming as extinct as the Dodo. Some time ago we came across the remark of one collector of a certain species that he believed he had secured the last plant. The Messrs. Veitch remark that the old autumn-flowering *Cattleya labiata* is believed to have been exterminated many years ago, no plants having been imported for upwards of forty years, although it has been diligently sought for by English and other horticultural firms. Can nothing be done to prevent such wholesale destruction?

The beautiful *Disa grandiflora*, the "Pride of Table Mountain," as it has been termed, is no longer in such imminent danger of extermination as was the case a few years ago. Large quantities of the tubers were annually exported to Europe, but the summit of the mountain being crown-land the government has seen fit to intervene, and has restricted the removal of tubers within reasonable limits. Perhaps the principle may yet have to be applied elsewhere.

London.

Calypto.

Odontoglossum Hunnewellianum.—This is a new and handsome species dedicated to H. H. Hunnewell, Esq., of Wellesley, Massachusetts. It was imported in 1888 from near Bogota, Colombia, by Messrs. F. Sander & Co., St. Albans, England, through Mr. Oscar Bobisch. The plants have not yet recovered from the effects of the voyage, and, consequently, only a few flowers have been produced. These are two inches across, but are somewhat larger in the wild specimens seen. The sepals and petals are ovate-oblong, acute, the former being slightly wavy, bright yellow, with a few very large dark brown blotches; the latter are much more wavy on the margins, also bright yellow, and covered with numerous blotches of dark brown. The lip, which reminds one of *O. luteo-purpureum*, is broadly obovate when spread out. It is creamy-white, with crisped denticulate margins, reflexed at the tip and incurved on each side. The surface is covered with brownish blotches, which take the form of small spots at the margins and give the lip a pretty appearance. The crest consists of diverging-toothed keels, with a smaller one between them, while the white truncate limbs of the column are spotted with brown near the slightly crenulate margin. The pseudo-bulbs of this species are two to three inches long,

about one and a half broad, ovoid-compressed, with two edges, and bearing at the summit two narrowly oblong-acute leaves from six to nine inches long. Such is the description of this species as it appears at present, but it remains to be seen what results cultivation will produce.

Odontoglossum Wendlandianum.—This is also a new *Odontoglossum*, introduced to cultivation for the first time, by the same firm, this year from the mountain ranges of Colombia. It has pyriform compressed pseudo-bulbs two to three inches long, and narrowly oblong-acute deep green leaves about a foot long. As yet only few flowers have been produced, but it is probable that next year the true habit of the plant will be seen to much greater advantage. The individual flowers seen were from two and a half to three inches across, with lanceolate-acute sepals and petals, the former being reflexed at the sides, and the latter very wavy on the margins. The ground color of both sepals and petals is creamy-white, thickly covered with brown and crimson spots and blotches, which give the segments a very handsome appearance. The more or less oblong acuminate lip is somewhat like that of *O. crispum*, but is much more wavy at the sides. It is pure white, with several rich brown blotches below the crest, which consists of two long, elevated and deeply-toothed keels in the centre, with shorter diverging ones on each side. The column is whitish, spotted with purple at the side, and furnished with small incised wings.

St. Albans, England.

John Weathers.

Seasonable Work in the Flower-Garden.—Little experience is needed to teach that many of the so-called hardy plants are tender enough in some sections to need protection in the border or to justify the care of lifting and placing them in a frame or some other structure, where frost may be partly excluded. Any plants that remain green above ground through the winter, such as the *Kniphofias* (*Tritomas*), may be lifted, and the tops cut off to within nine inches of the ground, and heeled-in in a cool cellar. It will be found that *Eulalia Japonica*, and its varieties, are not always hardy, and they may be treated in the same way with perfect success. When the plants are lifted annually, and put out in spring as soon as the soil is warm enough, they make better growth, for the reason, perhaps, that it is possible to thoroughly enrich the soil at planting-time. *Montbretias*, *Crocus* *Gladioli* and *Tigridias* may now be lifted and the tops cut, not pulled, off, and stored away in dry soil, where frost cannot reach them. We used to lift *Hyacinthus candicans*, but find that, if planted where there is no danger of water accumulating, it is much best to let it winter out.

If it is desired to increase the stock of any of the tall *Phloxes*, these should be lifted, potted and placed in a cool house, and cuttings made of the young shoots as soon as they are long enough. Young plants are usually far more vigorous than the old ones, as these are liable to become impoverished, and are better replaced by strong young stock. The *Salvias* that are accredited with being hardy are *S. Greggii*, *S. Pitcheri* and *S. farinacea*. All three are too good to risk out-of-doors, and part of them should, at least, be taken in. We have found them stand well enough during some winters, while in others they die. The same may be said of *Anemone Japonica* and its varieties. These should all be lifted, the tops cut off and the roots laid in, in a cool place, the cooler the better, so long as the frost does not get to them. As these *Anemones* have a great tendency to start into growth during winter, if it is desired to propagate them, the tendency may be taken advantage of by cutting all the smaller roots into pieces four inches long and laying them in sand in the propagating-bench. These will start at once, and may be potted, and all will make flowering-plants the next season. We have some 200 plants, all beautifully in bloom, from small roots treated in this way last fall. Any bulbs, such as *Narcissus*, that are yet to be planted, should be got in the ground at once to enable them to get well established before frost, which, fortunately, has been in no hurry to appear this year.

Passaic, N.J.

O.

Prunus pendula.

OUR illustration upon page 487 represents an old and very large specimen of this tree which has already been described in this journal (vol. 1, p. 196), growing in the garden of Dainichido, a temple garden on the road from Nikko to Chiuzenji, and shows the habit which this interesting tree assumes when it is full grown.

The illustration is from a photograph made by Mr. James M. Codman during his visit to Japan in the summer of last year.

The Forest.

The Forest Pavilion at the Paris Exposition.

LAST week we gave part of a letter originally published in *L'Indépendance Belge*, describing the beautiful forest pavilion on the Trocadero, which the French Forest Department had erected, and giving an account of some of the forest-material which has been arranged with exquisite art. The department desired, however, to explain to visitors its method of work, and the result of this work, beyond the mere keeping up of the state forests, building roads through them to facilitate excursions and hunting, and making preparations to cut and re-plant for coming generations. The duty of the foresters does not cease here, and millions are annually expended to repair the accumulated ruin caused by deforestation of the hills and mountains by former generations. Forests are re-planted to resist the force of floods and preserve the mountains from being scoured by torrents and swept down upon the plains. The writer adds :

Numerous are the victories already won. Vast tracts of desert have been re-covered with vegetation; villages are springing up again where whole populations had fled before the invading waters and the danger of landslides; mountains and hills once denuded are now covered with verdure; cultivated fields and orchards have replaced the arid and desert plains.

The Administration of Forests, proud of these results, exhibits them in the form of models in relief, maps and pictures. It has gathered a great mass of documents in two halls, comfortably arranged, where easy-chairs invite the visitor to seat himself in front of wide tables strewn with photographs, albums and numerous publications. Here are views of the torrents of Arbonne, and of Secheron, in Savoy; here are photographs of the basin of the torrent of Vaudaine and of the torrent of Riouchanal, with sections of work already completed there. There are curious models in relief of other torrents, besides dioramas, which give faithful and striking representations of some of the magnificent works in progress. At the end of the forest pavilion are three dioramic views, in an excellent light, with well-studied perspective. Near each one is suspended a placard containing, in large letters, the printed explanation of the enterprise, the means employed and the results obtained. The first is a view of the Valley of Péguerre, near Cauterets. There the object was to keep in place a mountain which threatened to crumble and destroy a pretty town. The soil was loosened by the melting snows, and immense blocks, bowling down the rocky slopes, cannonaded the settlement at Ralliére or that at Manhourat. To rescue the valley, the rocky sands were sown and planted. Walls of stone, without mortar, were placed at all points where there was no chance of grass growing. The work was begun in 1885, and to-day the problem is solved. In the diorama the workmen are seen clinging to the side of the mountain, digging out the rock, blasting, constructing walls and terraces, sowing and planting on dizzy ledges, to which both men and material are hoisted by ropes and windlasses.

Next comes the picture of the torrent of Bourget, in the Department of the Basses Alpes, which had devastated the valley of the Ubaye for years, but is now under control. A series of weirs has been constructed which have raised the bed of the torrent and checked the undermining of the mountain; the violence of the rise of the waters is weakened by diminishing the incline and by successive falls, and the sliding down of the banks has ceased. The diorama shows us these weirs, and the barrier of living basket-work; the forestal guards are there, strengthening the stone work and busy in planting trees to bind the sod. The subjection of the torrent is complete; it is now a gentle mountain stream, bordered by a thousand acres of forest in thriving condition. This work occupied nearly eighteen years.

The third diorama shows the torrent of Riou-Bourdoux, also in the Basses Alpes, noted for its ravages and the most terrible of all the torrents of the French Alps. It destroyed everything in its sudden overflows. Forests, houses, flocks, all had disappeared, swept away by its floods or swallowed up in its deposits of mud, sand and rocks. Not a tree, not a blade of grass, not a living being remained. Barcelonnette, near which it debouches, was endangered. In 1875 the struggle with the torrent began, and now it is vanquished. Here the barrier against floods is a colossal wall of masonry, with hydraulic

mortar buttresses and openings for discharging the water, twenty-eight feet high and 275 feet long; its purpose is to keep back all the solid materials which the torrent carries down and to allow only clear water to pass through. And what a different picture does this region now present! A young forest which has been planted covers the scarred surface with its protecting growth; the soil on the steep slopes is now mantled with grass growing thick and fine; in the valley, once so dangerous, villagers cultivate their lands and Barcelonnette is saved.

This is what is accomplished by restoring the forest and planting trees on a few hundred acres. How many inundations might be prevented, how many annually-recurring disasters averted, if the money and the skill were ready to prosecute more of these effective works.

Near these dioramas are dark chambers, in which the happy idea of picturesque illusions has been carried out. Here is the cabin which serves as a shelter for a gang of twelve workmen; two camp-beds, made of planks covered with straw, blankets and changes of clothing, then tools, shovels, pick-axes, ropes, cans and all the provisions. Here is the interior of a hut for a forestal agent out on a high mountain: An iron bedstead, pine furniture, two chairs, a table and a chest, some shelves on which are placed books, instruments and cooking utensils. Elsewhere we see the forge, set up in a shed made of boughs and ferns, with anvils, bellows, tongs and hammers. All this proves most entertaining to the visitors, and it is instructive as well.

One can imagine that the gigantic trunks from America and Australia consider our modest trees as poor, degenerate species. Beside the Eucalyptus from Victoria and New Zealand, the Mahoganys from Mexico, the Cedars from the Argentine Republic, the big trees of the United States, the Pines from Brazil, the Perobas from the Amazon, and other prodiges from the New World, our Poplars, our Elms, our largest and tallest Pines look like a child's playthings. But our trees, nurtured with so much care and cost, might well retort: "You will not always be giants if those who exhibit you do not heed the lessons taught by the dioramas of Riou-Bourdoux, of Bourget, and of the valley of Péguerre. Let them see what it costs to strip the trees from the mountains without moderation or method; let them ask our foresters what pains and money it costs to repair the recklessness of former generations. The axe and fire and browsing flocks will too soon make your forests as thin and small, and your torrents as destructive as ours."

No doubt our trees are right, and the commissioners from Australia and America would do well to take advantage of their stay on our continent to study the art of cultivating forests and of systematic felling.

Correspondence.

Some Native Vines.

To the Editor of GARDEN AND FOREST:

Sir.—Your admirable articles on Masking House Foundations seem to have had in view suburban houses mainly; but the lack of vines about our country homes is noteworthy. One may ride miles without seeing a well-chosen and carefully-trained vine near a farm-house. There are not infrequently piazzas standing bare in the sunshine, which might be made beautiful as well as comfortable places for the household if shaded and fringed by some festooning climbers. This neglect is less excusable since we have so many desirable native vines that can be had for the digging. Perhaps the Virginia Creeper, always thrifty, and with the crowning excellence of rich autumn color, deserves the precedence; but there are many others worthy of kind treatment. The Ground-nut (*Apios tuberosa*), which I lately saw in bloom, is certainly one of these. It is a twining perennial, with light green foliage, which is ornamental throughout the season, though its chief interest lies in the peculiar color of the flowers and their appearance after most of our familiar native climbers are in fruit. The racemes of chocolate-colored blossoms, paler-hued outside, contrast finely with the green leaves, while the inside has a rich velvety appearance and a pleasant odor of Violets. The specimen which I observed had climbed sixteen feet among the branches of a Larch-tree, bearing clusters of bloom at the axil of each leaf for a good part of the distance. The Moonseed is also easily cultivated, and its twining stems and abundant foliage make a most desirable Vine. Even more abundant is the foliage of the unarmed Smilax, which is also ornamented with umbels of black fruit. And why is not the common Virgin's-bower (*Clematis Virginiana*) planted wherever any planting is done? It is the most beautiful of the

northern Clematises, and can be found in any wooded region. It is never more beautiful than it is along a country road-side but it thrives under cultivation, and makes a wonderful growth in deep rich soil.

Klinger Lake, Mich.

Dorcas E. Collins.

Rosa setigera and Ipomœa pandurata in Southern Michigan.

To the Editor of GARDEN AND FOREST:

Sir.—Mr. B. W. Steere, an intelligent nurseryman, living near Adrian, Lenawee County, in southern Michigan, gives me the following in reference to the Prairie Rose:

"About 1846-47, Barber Perkins made considerable money by shipping the Roses east, where extravagant prices were paid for them. As the excitement ran high, men and boys scoured the woods in all directions from Adrian. They were also found in Monroe County, in the south-eastern part of the state. They were sold as the 'Michigan Rose,' 'Michigan Climbing Rose,' 'Prairie Rose,' and 'Eglantine Rose.'"

"They grew mostly on the rich borders of swamps. In going from Adrian by way of Blissfield to Maumee City in a carriage, years ago, in July, I saw them in full bloom, covering small trees to a height of ten to fifteen feet; and their great clusters of flowers were so abundant and beautiful that the sight of them well repaid one for many miles of travel. The last one that I was sure of here, grew on our place near the river Raisin, but was taken up or destroyed seven or eight years ago. The name 'Prairie Rose,' doubtless came from our habit of calling our swamp meadows, 'prairies.'"

There is one vine which I think must be about extinct here in the wild state, Man of the Earth, *Ipomœa pandurata*. The only one I know of runs over a large quince bush, planted forty or forty-five years ago. It still shows its large flowers in July and August, white, with purple throat. It can look at the sun without blinking.

Agricultural College, Mich.

W. J. Beal.

The St. John's-worts.

To the Editor of GARDEN AND FOREST:

Sir.—I was much interested in Mr. Jack's article on "Hypericums," and I wish to endorse his statement that *H. calycinum* is "decidedly the most interesting and satisfactory." In this conclusion every one must concur who is familiar with the beauty of foliage and flower of this species, to say nothing of the immense value of the plant from its hardness and adaptability for undergrowth and in shaded locations. There are so few really desirable shrubs which succeed under trees and in shady situations, that it is surprising that this fine variety is so little grown or known.

In a trip through England and on the Continent during the past summer, one of the most pleasing and effective things in hardy trees and plants I saw was a solid border of *Hypericum calycinum*, planted on both sides of a walk directly under some double rows of shade. The foliage above was quite thick. Few, if any, sunrays fell directly on the plants at any time during the day. The soil was an ordinary loam, not specially prepared nor over rich. The shade was sufficiently dense to preclude the growth of any shrub or plant not congenial to such conditions, yet the border on both sides, and for the entire length, was a solid mass, about a foot in height, of the most beautiful green, and covered with large, showy, golden-yellow flowers.

Nearly all the Hypericums are largely used for ornamental planting in Europe, but *H. calycinum* is generally considered there—as it will be here in time—not only the most valuable of the species, but for massing in shady situations as almost without a rival or equal in all the long list of dwarf-growing hardy shrubs.

New York.

Fred. W. Kelsey.

A Pleasing Combination.

To the Editor of GARDEN AND FOREST:

Sir.—A lady, and gardening enthusiast, mentioned to me, the other day, a combination which she had used with pleasing effect on her grounds at Wyncote, Pennsylvania—the Trumpet-creeper and Wistaria placed together to help one another rise in life, and drape a gnarled old Cedar-tree.

Possessed of so fine a sense of the beautiful as to have planted the large Dogwood by the hundred upon an extensive lawn as clumps, sections in boundary planting, and notably as a hedge-backing against a row of stately Red Cedars, that forms a protection to one side of her hardy flower-garden, the combination which she emphasizes must, in the very nature of things be a happy one.

Rochester, N. Y.

G. H. E.

Notes.

The *Engineering and Mining Journal*, in advocating some action by government to protect the forests against fires, asserts that these fires have this year destroyed more than the value of all the timber planted, the timber stolen and the timber legitimately cut between the Missouri and the Coast Range.

The Dwarf Gray Willow (*Salix tristis*) should make an excellent plant for the slopes of embankments and excavations along railroads, where it will flourish. It rarely exceeds two feet in height, and has slender stems not more than half an inch in diameter. The roots, however, are often as thick as a man's wrist, so that it is a hard plant to dislodge, and it would render good service in holding a bank firm.

The forest-trees in the vicinity of New York are late this year in putting on their autumn colors. Even the Maples are still green, but the Liquidambars are singularly brilliant in chocolate, bronze, maroon and glowing crimson. The Pepperidge, too, is brilliant in cases where the leaves have remained on the trees, but in many instances the leaves of this tree, and of many others, have fallen prematurely, leaving the branches as bare as they are in winter.

In his interesting article in this issue, Mr. Jack states that *Clematis paniculata* can hardly be called a September-blooming plant in Boston. In the vicinity of New York, however, this admirable species was in full bloom from the 1st until the 20th of September. It may be added that *C. crispa* is still showing flowers, even after quite sharp frosts, and the same is true of *C. coccinea*, whose light coral-colored flowers are yet seen in considerable numbers.

We have received from Mr. S. C. Moon, of Morrisville, Pennsylvania, some very large and beautiful chestnuts from a tree said to be a seedling of the European Chestnut. The variety has been named Numbo, by Mr. Moon, on whose farm it originated more than thirty years ago. When boiled, these chestnuts are of good flavor, but the quality of the meat in its natural state is inferior to that of our smaller nuts. The tree is said to be very hardy, symmetrical in outline, and unusually productive.

Worden's Seckel is a new pear which has been in bearing four years. It is a seedling of the Seckel, but is a more vigorous tree and produces its fruit in clusters. The *Country Gentleman* describes the fruit as above medium size, pyriform, smooth, with clear yellow skin and a broad, rich-red cheek. The flesh is white, fine-grained and melting and of a mild and sweet, pleasant flavor. Altogether, it is one of the most beautiful of Pears, and its quality would be rated "very good." It was raised by Mr. S. Worden, of Oswego County, New York, the originator of the excellent Worden Grape.

Syringa oblata in this vicinity has this year sustained its reputation for freedom from mildew. A small plant observed on Saturday last had foliage as fresh and green as in early spring. About Boston, however, many large plants are slightly but distinctly mildewed, and a young plant in the Arnold Arboretum is mildewed as badly as many of the common Lilacs. *S. japonica* shows no trace of mildew, nor do *S. pubescens* or *S. villosa*. The Chinese and Persian Lilacs are as liable to the fungus as are the varieties of *S. vulgaris*, and, by the way, different varieties standing side by side are very unequally affected.

Agricultural Science for September contains a study of the contents of seed packages obtained from American seedsmen and from Vilmorin-Andrieux et Cie, of Paris. Very little weed-seed was found, and not enough foreign material or imperfect seed to justify the establishment of seed-control stations. The most harmful adulteration of seeds is that of mixing varieties, or of substituting inferior strains or varieties for good ones. But this adulteration cannot be detected by an examination of seeds, and is, therefore, difficult to control. The redress in this case must be demanded of the seedsman by the grower himself after the crop is grown. It is doubtful if the self-asserted irresponsibility of the seedsman, printed upon all seed packets, constitutes any legal immunity from damage in the case of harmful substitutions; at least an English court has decided that such statement does not relieve the dealer. The fact that such instances so rarely come to our courts is proof that adulterations of this character are rare in this country.

The people of the British Islands, as well as the continent of Europe were surprised by a sudden taste of winter on the 16th and 17th of September. Much damage was done to

tender vegetation, especially in Belgium, where there are so many large establishments devoted to commercial horticulture. A correspondent of the *Gardeners' Chronicle*, writing from Ghent, says: "About 2 A.M. on Monday, the 16th, frost came on so suddenly and was so severe that every one was taken unawares, and by daylight it was apparent that a serious disaster had befallen the Indian Azaleas, the plants in most places presenting the appearance of having been singed, and for some miles around Ghent the plants have, with scarcely an exception, suffered alike. The disappointment to buyers will be great, and the loss to the growers will prove to be one of the most serious misfortunes which has occurred within the recollection of the oldest horticulturist in Ghent. Packing operations for export were to commence on the very day of the disaster."

The manufacture of shingles in Oregon and Washington from Red Cedar (*Thuja gigantea*) is a rapidly growing business. Formerly these shingles were sold in Colorado and Utah only. Several of the largest manufacturers last year united to form the North Pacific Consolidated Shingle Company, which now sells 20,000,000 shingles a month, finding markets in Missouri, Iowa, Illinois, Indiana, Ohio and New York. These Puget Sound and Columbia River shingles are absolutely free from knots, and they neither curl, warp nor split, and dampness has little perceptible effect on them. Fort Nesqually, built by the Hudson Bay Company in 1841, was covered with split cedar shingles, which are still sound. Roofs laid thirty years ago, and for years covered with moss, have never leaked and appear little the worse for wear. This Cedar is a great favorite with the Indians who hollow their canoes out of the wood because it is so light, splits so true and works so easily. For the same reasons most of the sash and doors in Washington and Oregon are made of this wood. The tree grows to a diameter of twelve to thirteen feet very often, and in a late number of the *Northwestern Lumberman* is an illustration of a tree which is eighteen feet in diameter.

A botanical garden has been established in the Alps of Valais at an elevation of more than 5,600 feet above the level of the sea. It is situated on a cone-shaped knoll, which is about 200 feet high, and composed of a number of natural terraces, planted with *Pinus Cembra* and Larch, and faces north, east and west. On the summit is a plateau facing the south, on which will be a little chalet, containing the library and herbarium of the garden. The Association for the Protection of Plants has bought the land, and converted it into an alpine garden, for plants from all the alpine regions of the globe. Representatives of the floras of the Himalayas, of the American mountains, of New Zealand, of the Antarctic regions, of the Caucasus, of Siberia, of the Pyrenees, the Alps, the Carpathians, and the Ural, will be separated, and each cultivated in a special division. Naturally, M. H. Correvon was named Director of this new trial-garden, in which he had already planted several thousand mountain plants. This garden is at so high an elevation that interesting observations can be made concerning the floras of all the alpine regions of the globe, on the relations of plants with insects, their acclimatization, variability, etc. Already consignments of plants have been sent to M. Correvon, and a German botanist who is traveling in the East, and is continuing the work of Boissier—M. Bornmüller—has promised some interesting specimens. Other parcels are expected from Canada, Greenland and New Zealand. The *Gardeners' Chronicle*, from which we take these facts, invites all who are in suitable latitudes to send to M. Correvon seeds or bulbs from the northern regions in which they are traveling, for the garden of Bourg St. Pierre, which will necessarily serve later on for the temporary reception of plants from high altitudes which cannot be acclimatized directly with us, but require to be subjected to an intermediate temperature first. In this way, M. Correvon is going to try to acclimatize the celebrated but fragile *Calypso borealis*, which he hopes to introduce into cultivation by accustoming it to this intermediate position.

Catalogues Received:

A. M. C. JONGKINDT CONINCK, Dedemsvaart, near Zwolle, Netherlands; Coniferae, Rhododendrons, etc.—DAMMANN & Co., San Giovanni a Teduccio, Naples, Italy; Seeds, etc.—R. DOUGLAS & SONS, Waukegan, Ill.; Forest and Ornamental Trees.—ELLWANGER & BARRY, Mount Hope Nurseries, Rochester, N. Y.; Fruits, Ornamental Trees, Shrubs, Strawberries, Select Roses, etc.—JOHN GARDINER & Co., 21 N. Thirteenth St., Philadelphia, Pa.; Mushrooms, Spring Bulbs, etc.—HERBERT A. JONES, Himrods, N. Y.; Fruit and Ornamental Trees, Plants, Shrubbery, etc.—JACOB W. MANNING, Reading, Mass.; Choice Hardy Perennials.—SAMUEL WILSON, Mechanicsville, Pa.; Seed Wheat, Strawberry Plants, Fruit Trees, Small Fruits, Grape-vines, etc.

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The Forestry Meeting at Philadelphia.

ON another page of this issue will be found a vivid picture of the desolating progress of fire through some of the most magnificent timber now standing on this continent. League after league of Pine and Redwood on the flanks of the Coast Range and the Sierra, the growth of centuries, is turned to cinder in a night, and the only record of the loss is a paragraph in some local paper. In spite of the immense value of this timber, and of the incalculable importance of these mountain forests as conservative and vitalizing forces in the economy of nature, the man who flings a blazing torch among them is not counted a criminal, and no one interests himself to check the sweep of the flames. This is what is happening in one state now. All summer long conflagrations, tenfold more destructive, have been raging through the vast stretches of timber in the North-west. Every year, in every state, the flames devour the woods wherever any woods remain. It would hardly be an exaggeration to say that the forest fires kindled by the earliest white settlers who landed on this continent have never gone out from that day to this. And fire is but a single agent of devastation. From the turpentine orchards of the South to the logging camps of the North, and even in the wood-lots of the farmer, nothing but waste and improvidence is expected wherever an American carries his axe. The pitiful story of a priceless forest inheritance recklessly squandered, has been told so often that one is almost ashamed to repeat it.

And yet, if an association like the American Forestry Congress is to do any effective work, it must be in the face of just such discouraging facts as these. In spite of all the convincing statistics and arguments so often urged to demonstrate that the nation's welfare, and we could almost say the nation's life, depend upon the preservation of forests, utter apathy prevails where we should reasonably hope for intelligent interest. Only in rare cases has the popular demand been strong enough to compel action by legislatures, state or national, and when laws for the protection of forests have been enacted, public sentiment has been too lifeless to enforce them. The time for missionary work will not be over so long as a thousand square miles

of timber are consumed in a single year in a state like Pennsylvania. The day will come in this country for the refinements of forest practice, when a congress of skilled foresters will be comparing the results of experiments in natural reforestation and artificial planting, and discussing abstruse problems in mathematics and forest biology. But there is no occasion now for close calculations, so long as the people show by their practice that they do not consider the woods of any value whatever.

The diffusion of knowledge and the propagation of ideas regarding the necessity of economic forestry are best carried on by voluntary organizations, like the Pennsylvania Forestry Association; and the joint meeting of this body with the American Forestry Congress this week should be useful in promoting clearness of thought and increasing practical co-operation and efficiency among all public spirited people. The papers and discussions at such meetings are important means of arousing and directing popular thought. Unless based on a general and intelligent appreciation of the value of our forests, laws will avail nothing. Scientific forestry will find no field of usefulness until the people are educated to feel the need of it. The preparatory work accomplished by these agencies is, therefore, of prime importance, and the men and women who are unselfishly devoting themselves to this cause will be gratefully remembered hereafter as pioneers in one of the most beneficent movements of modern times.

A series of letters from the Adirondacks, which lately appeared in the *New York Times*, presents a most discouraging picture of the reservation. The writer has not been able to discover in any part of the wilderness south of Mount Marcy that the state forests have the slightest protection against the timber-thief or the bark-stripper. The forest laws are neither obeyed nor respected, and the state officers not only fail to enforce the statutes, but even help others to violate them. The fact that the commonwealth owns a tract seems to invite trespass, because such trespass is difficult to prove, and even when a logger is detected in the very act of taking timber from the state lands, his friends, the town and county officials, make a compromise which is satisfactory to the offender. The game laws, too, are violated in the same free-and-easy fashion, and no one feels any restraint about catching fish or killing deer at any season or in such a manner as may suit his pleasure. Unless this lawless slaughter is checked, the deer will soon be as scarce in the Adirondacks as the moose is in Maine. Altogether the prospect is most gloomy, and without decisive action by the state and the strong assistance of public sentiment, the beautiful scenery and abundant game of the North Woods will be little more than a memory ten years hence.

The writer does not deal in generalities, however, but cites instance after instance to show how half-grown deer are murdered, how the lakes are fringed with death by rising water backed up by illegally-constructed dams, how timber from government land is openly bought and sold, and how the constituted guardians of the place are helping to desolate it. It is to be hoped that there is a brighter side to this picture. Our own correspondent reported that depredations on state timber-lands were growing less numerous and that there was a gathering sentiment among the inhabitants of the region against further desolation by the axe and by fire. Nevertheless, his conclusions, that from three-fourths to four-fifths of the original forest has already been cut off and that hundreds of thousands of acres have been utterly stripped and ruined by the burning and washing away of the soil, are sufficiently depressing.

What we want are the facts of the case, and it is to be hoped that other papers will follow the example of the *Times*, and make an honest effort to place before the people the true condition of the North Woods. There ought to be enough public virtue left in the state to make it possible to rescue, for posterity, some remnants of this once priceless possession.

AT a meeting of the committee appointed to select a site for the Exposition to be held in this city, it was voted to take possession of as much of Central Park above Ninety-third street as might be found necessary. Who is to decide how much it will be necessary to confiscate, the committee did not divulge; but inasmuch as no considerable amount of land has been secured elsewhere, the action is a threat to vest some unknown body with full power to destroy the best half of the park, at least. It would be unjust to characterize this proposed defiance of law and violation of pledges as audacious or impudent, as some indignant critics have already done. It is simply the outcome of ignorance. The majority of these worthy gentlemen have not even an elementary knowledge of what Central Park is, or what function it fulfills in the life of the city. They offer to "improve" the park, as if an appointment upon some committee by a mayor was all the preparation needed for a work which demands as much taste and skill as do the design and construction of a cathedral, and they propose to obliterate the park, as a park, for several years certainly, and perhaps forever, without the glimmer of a suspicion that they are robbing the people of rights which are plainly guaranteed to them and their children. It remains to be seen whether the city possesses enough intelligence, firmness and civic virtue to resist this dangerous attack upon its grandest public work. We believe the scheme will be defeated.

Color in Flowers.

MR. G. H. ENGLEHEART, writing in *The Garden*, speaks with excellent taste regarding the colors produced in florists' flowers. "Could we appeal," he says, "to a competent florist who was also as refined and sensitive a colorist as, say, Mr. Ruskin or Mr. Albert Moore, I have little doubt but what he would maintain the principle that each flower or race of flowers has its own legitimate and illegitimate, or vicious, ranges of coloring, the former of which should be encouraged to extend and unfold to the utmost, while the latter should be absolutely suppressed. The florist's art may induce false and bad colors in flowers, just as the chemist's art has discovered and brought into ruinous use the horrible aniline dyes. It is no excuse to urge that all colors which appear in flowers are natural and may be retained. Nature (an ambiguous term this) must often be led or restrained, rather than followed, and there is often an 'Old Adam' which must be cast out of flower-kind as sternly as out of mankind. Thus in Primroses the so-called blues, the purples, magentas and all slaty tones are natural, but evil tendencies, and ought not to be tolerated. What should be encouraged, delighted in, heightened to vividness, or subdued to faint, soft tints, and in every way elaborated in this lovely flower, is the whole gamut of true crimson, ruby, maroon, pink, orange and yellow. Sometimes a flower appears which heralds the possibility of a true vermilion Primrose, and there is a cinnamon-brown and a cinnamon-chamois (to coin a word) which might in skillful hands lead to a new and lovely set of colors."

The many tints of white are, of course, also approved and "a Primrose of a Nemophila blue might be an acquisition (though, for my part, I do not feel certain that it would not be astonishing rather than charming), but the links of leaden and livid hues by which it is being reached after are ugly means, to be used and destroyed—not beautiful ends to be exhibited. Let me instance the herbaceous Phlox as a parallel. Here the legitimate and admirable range of coloring is that of pinks, roses, true lakes and crimsons, and especially certain glorious salmon-reds containing possibilities of scarlet and orange, besides the whites. No faintest suggestion of magenta should be tolerated in the Phlox. But when I turn to the florists' catalogues I observe that it is their endeavor and their pride to torture this fine plant, or rather to help it to debase itself, into sullen and impure purples—purple is a word grievously abused by our florists—and that their joy culminates in the production of a magenta with slate stripes. . . . But there may be found, very near to the Primroses, a rightful province for these colors. Turn to the Auriculas, and the true eye will see that purples, plum colors, sapphires, amethysts, lavenders and grays are not only permissible, but delightful and altogether desirable there. This is no mere open question of taste, but a matter of right and wrong, with, no doubt, demonstrable scientific reasons behind it, concerned perhaps with the greater

refraction or absorption of light in Primroses and Auriculas respectively. Some law might probably be established to the effect that blue, and all colors into which blue largely enters, can be pure and lovely only in such flowers as in texture or in tubular construction possess a certain luminous quality or transparency. The Gentian is the typically beautiful blue flower, and the Auricula has accomplished in its blossoms the seemingly impossible combination of velvet and crystal, and so fitted them for the reception of the bluest of rich purple coloring. But Primroses do not possess this crystalline texture or transparency to nearly so great an extent. An entire book might be written upon color in flowers, and many interesting laws traced, from a different standpoint to that from which the subject has already been considered by some men of science."

The writer might have instanced hardy Rhododendrons and green-house Azaleas as classes of plants where vicious colors, especially impure purples and glaring magentas, are far too commonly esteemed. If our readers will study their collections of these plants when in bloom, with the same regard to color that they would bestow in criticising a picture or choosing a ribbon, they will find many which, in Matthew Arnold's phrase, aptly quoted by Mr. Engleheart, should rouse "a sense of lamentation, mourning and woe."

Holiday Notes in Southern France and Northern Italy.

IN this and the following papers I shall endeavor to present some of the more interesting notes taken on a September holiday-trip. Practically the holiday commenced at Aix-les-Bains, for but few disconnected notes were taken by myself or my companion before Aix was reached. Both of us gardeners, looking upon matters horticultural and arboricultural as of the first importance to us, nearly the whole of the time at our disposal was spent in the open air as we journeyed from Aix-les-Bains to Turin, thence to Venice, back to Milan, and thence to the north Italian lakes. After seeing these we made for Genoa and skirted the Mediterranean as far as Marseilles, where the notes will close.

Aix-les-Bains presented comparatively little of interest from a gardening standpoint. The gardens of the Casino and of the Villa des Fleurs—an establishment of a similar character—were gay with gaudy beds, carpet and otherwise, and displayed the same taste, or lack of taste, which characterizes the devotees of the bedding system everywhere. No remarkable trees were noticed, except a fine *Magnolia grandiflora* and a good *Sequoia gigantea*, close to one of the few relics of the Roman period, the Arch of Campanus, a tomb of the third or fourth century, built in the form of a triumphal arch. In the little market place, what struck us most were the large quantities of flowers of the beautiful, fragrant *Cyclamen Europæum*, offered for sale by the peasant women; the flowers were done up in bunches of about a hundred and surrounded by a few of their own leaves. Were only flowers offered for sale no great harm would be done, but if roots are dug up, and destroyed at the rate observed by us, much longer, this charming plant will soon become as much a thing of the past in the neighborhood of Aix-les-Bains as is the Primrose—thanks to the Primrose League—within considerable distances of London. Some dealers had card-board boxes and address labels all ready, so as to leave no excuse for weak-minded plant-lovers not to buy their wares. According to advertisements and placards in the shop windows, etc., the deliciously scented flowers of the Cyclamen are used to perfume almost every conceivable toilet requisite; this, however—knowing something of what perfumery manufacturers are capable—we take leave to doubt.

The finest avenue tree here, and, indeed, in the whole of the region through which we traveled, is the so-called London Plane (*Platanus acerifolia*), misnamed in nearly every nursery and botanic garden of Europe *P. occidentalis*; from the American tree, however, *P. acerifolia* may be distinguished at the first glance by its having numerous buttons in a string. From Aix to the Lac du Bourget grateful shade is afforded by a fine Plane avenue of considerable length. The lake is picturesque and beautiful enough, and is largely visited by those who repair to Aix. The season was too advanced for most wild plants, the most noteworthy ones we collected in flower being *Campanula persicifolia*, the Nettle-leaved Campanula, *C. Trachelium* and *Lonicera Caprifolium*. A tall, perennial, yellow-flowered Salvia (*S. glutinosa*), well worthy of a place in the herbaceous border, was abundant in places along the margins of the woods. Box (*Buxus sempervirens*) grew as underwood on the steep, chalky slopes, and in the clearings Buckwheat was one of the principal crops.

About Chambéry the Walnut is largely cultivated, and gives

a character of its own to the country-side as seen from the windows of the railway-carriage. Beautifully-wooded slopes, ruined castles on commanding spots and smiling valleys combine to render the district between the last-mentioned city and the Mont Cenis tunnel singularly picturesque and beautiful. On the gravelly, stony banks of the rivers Isère and Arc—the train crosses the latter many times—welcome bits of bright color were afforded by bushes, heavily laden with fruit, of the Dog Rose (*Rosa canina*), Barberry, and the Sea Buckthorn, with its long, narrow, gray leaves and innumerable orange-red fruits. After passing through the Mont Cenis tunnel we pass the now deserted Mont Cenis road (constructed under Napoleon I. in the years 1802–5), which continues to ascend the Arc Valley. Here the latter narrows into a wild, picturesque gorge, and the train passes through numerous tunnels, between which we catch glimpses of frontier fortresses, aqueducts, waterfalls, bare, grassless hill-sides, bleak, desolate-looking mountains, on the highest of which snow-fields of considerable size glistened in the fierce sunlight. Then the valley expands, and Susa, with the Arch of Augustus, comes into sight. On the dry, hot banks above the river, a Globe-Thistle (*Echinops*), with its spherical heads of bright blue, was very attractive, and in the small meadows the pale purple flowers of the Meadow Saffron (*Colchicum autumnale*) were everywhere conspicuous. From this point the railway descends rapidly, passes through beautiful Chestnut-woods, and crosses the Dora, whose waters flow into the Po below Turin.

George Nicholson.

Kew.

Small Burial Grounds.

THROUGHOUT the country many public and private institutions can be found, such as hospitals, asylums, almshouses and the like, which are compelled to provide burial grounds of their own. As a rule, these are located upon the most folorn spot which the institutions can command. They are constructed without regard to appearance, and little care is taken of them. The contrast between these ill-kept grounds and a properly maintained cemetery is so great, that one is disposed to consider the treatment of the dead in some of them as almost barbarous. It must be remembered, however, that these institutions often care for the living without charge, and they are inclined to consider their obligations to the dead discharged when a free burial is furnished; and it is little wonder, therefore, that these grounds at last become a neglected Potter's-field. There are no monuments here, no headstones, no shrubbery, no planting of any kind, and the little mound which marks the place of burial will soon settle down in the tangle of briars and weeds, and leave no sign.

Now, plainly, something can be done to render these burial places less offensive. The problem is how to prepare them with little expense and in such a way that little labor will be required to maintain them. If the ground can be selected at a distance of half a mile or a mile from the institution, so much the better. A fair slope or easy undulation is preferable to level ground, and as no expensive treatment is allowed, the dignity which such a place should command must be secured by its general arrangement and by the simple disposition of trees and shrubs. It is desirable to conceal to some extent the actual burial ground from the entrance gate, and to devote a space for an appropriate planting in which the expression of repose and solitude should prevail. Gate piers, built of rubble stones and covered with ivy, would add to the proper character and effectiveness of the entrance. Through this gateway the approach should connect with a circuit road, which may either enclose the grounds where interments are to be made, or give direct access to them. The road or pathway, of some twelve or fifteen feet in width, may consist of a mere excavation of the top soil to the depth of twelve or eighteen inches, its grade being uniform with that of the surface of the ground. It should be seeded with lawn grass, with the edges sodded. The border of ten feet wide on either side of the circuit road, should be planted with evergreen trees, twenty-five feet apart, and a burial plot surrounded in this way is divided into tiers for occupation. These tiers follow the grading of the pathway in

line until the innermost one leaves a space in the center of the plot of from fifty to a hundred feet wide, and this space is reserved for the grouping of trees and shrubs in such a way as to create a picturesque background from any point on the circuit paths. There will be little need of any wheeling over such grounds, and the reason for lowering the pathway is

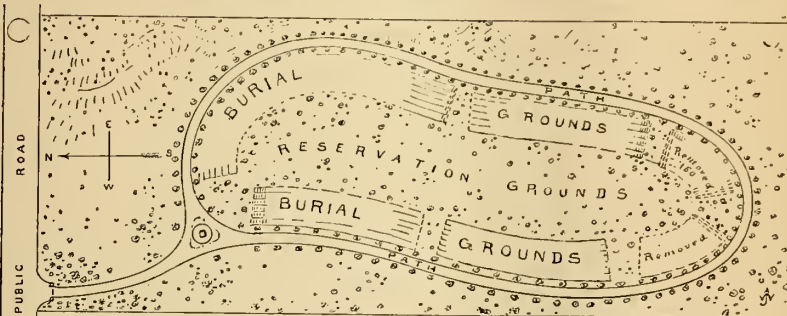
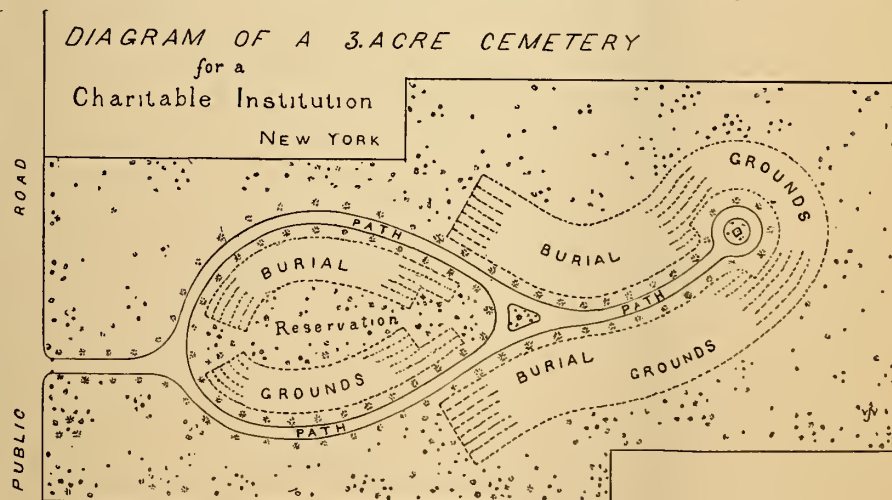


DIAGRAM OF THE CEMETERY FOR THE IOWA HOSPITAL FOR THE INSANE.
AT INDEPENDENCE, IOWA.

simply to establish a permanent mark for the proper line while the ornamental belt of evergreen trees on both sides of the path will mark the border when deep snow covers the ground. An occasional day's work given to cutting grass in the path and on the border is all that will be required to keep such grounds in order. However, if it is possible, a little labor in the care of the burial space and of the trees will add much to the attractiveness of the grounds, or if a little expense can be afforded for some general monument or memorial at some prominent point near the entrance, the aspect of the cemetery would be greatly improved.

To illustrate these principles the above diagram of the cemetery of the Iowa Hospital for the Insane, at Independence, is given to explain the simple arrangement necessary for improving such grounds at the smallest possible cost. The old burial-grounds of this large institution were considered too close to the main building, and a removal was made to this new cemetery, which is a mile and a half from the hospital. The plot is somewhat undulating, the highest point being near the eastern boundary line, with a slope to the west of about four feet in one hundred. The circuit drive was laid out over the most eligible part of the ground, beginning at about fifty feet from the entrance gate, and it follows in its course the natural contour of the land, enclosing an area of some thirty acres. As is customary in such institutions, the sexes are separated, and between the two tiers the so-called permanent reservation ground is now used as an irregularly planted nursery for forest and ornamental trees. Upon a triangular plot at the beginning of the circuit path and in sight of the entrance a plain general monument will be erected. Deciduous and evergreen trees are planted in groups covering



a space between the path and enclosure line, so as to seclude the place more completely from its surroundings.

Many institutions, however, are not able to devote so large an area for cemetery purposes; their grounds are contracted, and therefore an additional diagram is given to illustrate the application of these same principles to a comparatively small tract. The plan given is for an enclosure of only three acres.

New York,

J. Weidenman.

Notes Upon Some North American Trees.—XIV.

352. *PINUS REFLEXA*, Engelm.—Mr. Pringle 'rediscovered' two years ago Engelmann's *Pinus strobiformis* on the mountains of Chihuahua, in the very region where Wislizenus first found it, and his specimens show that *Pinus reflexa* cannot be separated from the Mexican tree, which was known previously from a single cone only. It will be found perhaps that *Pinus strobiformis* is merely a northern form with short leaves, and small cones, of the widely distributed *Pinus Ayacuhuite*, Erh. The two are certainly very closely related and not readily separated.

359. *PINUS TORREYANA*, Parry.—Mr. Brandegee's discovery last year of this Pine on Santa Rosa Island is interesting. It was up to that time, so far as was known, the most local and the most poorly represented in living individuals of all American trees. About one hundred specimens were found growing on the bluffs of the eastern shore (Brandegee in *Proc. Cal. Acad.*, i., 2, 217); and this new and remote station may reasonably be expected to prolong the existence of the species.

373. *PINUS INOPS*, Ait.—This name, published in 1789, must give way to Miller's *Pinus Virginiana* (*Gardeners' Dictionary*, 8th ed.), published in 1768.

377. *PINUS MITIS*, Michx.—This species has sometimes been referred to the *Pinus echinata* of Miller, but Miller's description leaves some doubt as to species he intended to describe, so that it appears advisable to retain Michaux's name, *P. mitis*.

PINUS LATIFOLIA.—Dr. Henry Mayr, the Professor of Sylviculture in the University of Japan, detected in the autumn of 1887 on the southern slopes of the Santa Rita Mountains, in southern Arizona, a part of the range which had not been explored before botanically, the remarkable new species of Pine,* figured upon page 498 of this issue. Its very long leaves, in threes, with persistent sheaths, and with the strengthening cells under the epidermis, and surrounding the ducts, bring it into Engelmann's second section, of *Ponderosæ*, with *P. macrophylla*, *P. ponderosa* and *P. Canariensis*. It is described by Dr. Mayr as a medium-sized tree, about sixty feet high, with thick and deeply-furrowed dark brown bark and stout tortuous branches. The leaf-bracts, reflexed in the bud, are three-quarters of an inch long, acuminate, with scarious, lacinated margins, and contracted into a long, subulate point; leaves serrate, fourteen to fifteen inches long, one-sixteenth of an inch wide, with a prominent rib; sheath persistent, dark chestnut-brown, with a conspicuously-fringed margin; cones sub-terminal, clustered, oblique from the greater development of the outer side, sessile, three to five inches long; the scales, with recurved apophyses, and stout, projecting, mammillary umbos and slender terminal prickles. The seed (imperfect and probably not fully grown) is only one-eighth of an inch long, oval, prominently ridged and light brown; the wing three-fourths of an inch long, widest nearest the base. The cones, which appear to be light brown, leave, in falling, the peduncle, with a few of the lower scales attached, on the branches, resembling in this the cones of *P. ponderosa*. The flowers have not been seen.

This species differs from *P. ponderosa* in its longer and broader leaves, and by the long, round umbo of the cone-scales not unlike that of *P. Coulteri*, although much smaller; it differs from *P. macrophylla*, to which it appears closely related, by the somewhat shorter and broader leaves, always in threes, by the much smaller cones, and by the absence of the stout, broad, much recurved, persistent points of the umbo.

Dr. Mayr's notes give no information of the exact elevation at which this tree was found, but it must have been

considerable, as he found it associated with *Quercus hypoleuca*, and growing just below *Pinus Arizonica* and *P. Chihuahuana*.

382. *PICEA NIGRA*, Link.—Miller's description of this tree (*Gardeners' Dictionary*, 8th ed.) is the first published after the adoption of the binomial nomenclature of Linnæus, and his specific name being adopted the Black Spruce becomes *Picea Mariana*.

383. *PICEA ALBA*, Link.—The White Spruce was described by Miller (*l. c.*) as *Pinus Canadensis*; but that name having been applied by Linnæus to the Hemlock as *Pinus Canadensis*, the next name to be taken up is the *Pinus laxa* of Ehrhart (Beitr., iii., 24), which antedates, by one year, the *Pinus alba* of Aiton, so that the White Spruce should be called *Picea laxa*. Koch (*Dendrologie*, ii., 2, 243) adopts Ehrhart's specific name, while considering *Abies* the correct generic name for the Spruces.

PICEA BREWERIANA.—This distinct Spruce-tree was discovered by Mr. Thomas Howell in June, 1884, on the alpine slopes of the Siskiyou Mountains of northern California. It may be distinguished from all North American Spruces by the long, pendulous branches, flat or slightly rounded leaves and long cones, with thin, spreading, entire scales.*

391. *PSEUDOTSUGA DOUGLASII*, Carr.—Lambert, who first described the tree now very generally known as the Douglas Spruce, named it *Pinus taxifolia* (*Genus Pinus*, i., 51, t. 33); and his specific name must be taken up as it has been already by Dr. Britton (*Trans. N. Y. Acad. Sci.*, viii., 74), who becomes the author of *Pseudotsuga taxifolia*. This change is particularly to be regretted, as it completely disassociates the name of David Douglas from this tree, the most important, perhaps, of his many North American discoveries. Happily, however, the name "Douglas Spruce" is beginning to find a place in the language of the people living in some parts of the country where it abounds, and in British Columbia it is rarely called by any other name; the name of Douglas, therefore, will not soon be forgotten in the land which was the scene of his sufferings and achievements, and which, more than most men in his day, he made known to the world.

394. *ABIES SUBALPINA*, Engelm.—Dr. M. T. Masters would seem to have established the fact (*Gardeners' Chronicle*, 3 ser., v., 172;—*Journal of Botany*, May, 1889) that the *Pinus lasiocarpa* of Hooker (*Flor. Bot. Am.*, ii., 163), based upon a specimen brought by Douglas from our interior northwest region, is what has been called more recently *Abies subalpina*, which would then become *Abies lasiocarpa*, Nutt.; which, however, must not be confounded with the *Abies* (or *Picea*) *lasiocarpa* of gardens, which is the Sierra Nevada form of *Abies concolor*.

397. *ABIES BRACTEATA*, Nutt.—David Douglas, who discovered this species, first described it, calling it *Pinus venusta*. His name was published in 1836 in the "Companion to the Botanical Magazine" (ii., 152), a year earlier than Don's *Pinus bracteata* (*Trans. Linn. Soc.*, xvii., 443), so that the name should now become *Abies venusta*.

401. *LARIX AMERICANA*, Michx.—The oldest name for the eastern Larch is that of Du Roi (*Obs. Bot.*, 49), published in 1771—*Pinus larcina*, so that *Larix larcina*, Koch, "*Dendrologie*," ii., 2, 263, should be adopted.

SABAL species.—The large arborescent Palm of the lower Rio Grande Valley and the east coast of Mexico is a *Sabal* not yet determined, and probably an undescribed species.

PSEUDOPHENIX SARGENTII, Wend.—A small arborescent Palm found on Elliott's Key, Florida, and described in *GARDEN AND FOREST*, vol. i., f. 55, 56. I have received another Florida Palm from the Messrs. Reasoner, of Manatee, who discovered it last year growing in shallow water in the Everglades. The leaves are pinnate, and it is said to grow to a height of forty feet, with slender, often prostrate stems.

**Picea Breweriana*, Watson in *Proc. Am. Acad.*, new ser., xii., 378.—Sargent in *Gardeners' Chronicle*, new ser., xxv., 498, f. 93.

**PINUS LATIFOLIA*, nov. spec.: arbor mediocris, ramulis tortuosis; squamis longe acuminatis, fimbriato-laceris, squarrosis, persistentibus; vaginis elongatis laciniatis, persistentibus; foliis ad apicem ramulorum congestis, ternis, latis, margine serrulatis; strobilibus sub-terminalibus, ovatis, obliquis, 3-5 poll-longis; squamis apophysii ancipiti, umbonem conico uncinatum; seminibus parvis, late alatis.

CONCLUSION.

Thirteen species which appeared in the Census Catalogue as trees are now dropped entirely, later investigation showing that they are shrubs and not trees. These are *Clusia flava*, *Byrsonima lucida*, *Porlira angustifolia*, *Ximenia Americana*, *Pistacia Mexicana*, *Acacia Berlandieri*, *Eugenia longipes*, *Genipa clusiefolia*, *Myrsine Rapanea*, *Forestiera acuminata*, *Alnus serrulata*, *Alnus incana*, *Salix cordata*. Six trees formerly considered species are now reduced to varieties. These are *Magnolia acuminata*, var. *cordata*, *Negundo aceroides*, var. *Californicum*, *Cratægus Douglasii*, var. *rivularis*, *Cratægus Crus-galli*, var. *berberifolia*, *Cratægus coccinea*, var. *mollis*, *Bumelia lanuginosa*, var. *rigida*. Two species, *Ficus brevifolia* and *Alnus oblongifolia*, are reduced to synonyms; making a reduction in all of twenty-one.

Three species, *Tilia pubescens*, *Cratægus punctata*, and *Drypetes glauca*, formerly considered varieties of other species, are now raised to specific rank. Three species, *Eugenia Garberi*, *Quercus Morehus* and *Quercus Engelmanni*, confounded with other species, are now (the last two provisionally) considered species; and twenty-four species are now first added to the list. These are *Xanthoxylum emarginatum*, *Heliella parviflora*, *Kœberlinia spinosa*, *Ilex monticola*, *Rhamnus crocea*, var. *Ceanothus velutinus*, var. *Rhus integrifolia*, *Cercidium floridum*, *Acacia Farnesiana*, *Acacia flexicaulis*, *Pithecolobium brevifolium*, *Lyonothamnus asplenifolius*, *Terminalia Buceas*, *Aralia spinosa*, *Fraxinus cuspidata*, *Quercus Macdonaldii*, *Quercus tomentella*, *Quercus Leana*, *Juniperus flaccida*, *Picea Breweriana*, *Pinus latifolia*, *Sabal* species; *Pseudophoenix Sargentii*, *Palma* species; or, in all, thirty additions to the catalogue, which is thus increased by seven, making the total number of North American trees (exclusive of Mexico), 419, as I now understand them. C. S. Sargent.

The Bur Oak.

THE Bur Oak (*Quercus macrocarpa*) is one of the most widely distributed and valuable Oaks of North America. It may be readily distinguished always by the broad, corky wings found on the young branches, by the large, oblong, lyrate-pinnatifid or deeply sinuated-lobed leaves, twelve to fifteen inches long, with lobes often extending nearly to the mid-rib, and by the large fruit, with a deep, thick cup with pointed scales, those at the top awned and forming a heavy pale fringe, which has given to this tree one of its popular names—the Mossy-cup Oak. The broad ovoid acorn is immersed for half its length or often entirely enclosed in the cup, a character which has given to this tree another popular name—the Over-cup Oak. This Oak, although so generally distributed, is less common on the Atlantic sea-board than it is west of the Alleghanies, and so it escaped the attention of the early botanists and botanical collectors in this country, and was first discovered as late as 1794 by the elder Michaux near the present city of Nashville, almost at the southern limit of its distribution east of the Mississippi River, during his hazardous and memorable journey to the Illinois country. The Bur Oak is now known to extend from Nova Scotia down the coast of Maine as far as the Penobscot, to occur in western New England, in western New York and in Pennsylvania, and then to stretch far to the north-west and to the south-west, and to represent the flora of the eastern part of the continent on the foot-hills of the Rocky Mountains of Montana and in the dry valleys of western Texas. It is the prevailing Oak in the "Oak Opening" of the north-west, and the only Oak that can support the dry climate, and maintain its existence in Manitoba, Dakota and western Nebraska. The most interesting thing about this tree, perhaps, is this power, quite unknown in the other American White Oaks, of adapting itself to very different climatic conditions, which enables it to live in the humid climate of Maine and northern Vermont, to flourish in the somewhat drier climate of the Mississippi Valley, and to exist in the driest and most exposed region inhabited by any of the east American Oaks.

The Bur Oak grows under favorable conditions to a large size. Specimens may still be found in the rich alluvial soils of the lower Ohio Valley 150 to 170 feet high, with straight trunks, six or seven feet in diameter, rising for seventy or eighty feet to the first branches, and covered with thick, deeply furrowed, dark-brown bark. Such a tree is represented in our illustration upon page 500, made from one of Mr. Robert Ridgway's photographs of forest-trees. It grew in southern Indiana, where the Bur Oak attains its largest size and greatest value, and where it is the largest, although not quite the tallest of the Oaks which abound in that part of the country.

The wood of this tree, when it grows under favorable conditions, that is, in deep, rather moist soil, is the most valuable produced by the American Oaks. It is light or dark, rich brown, handsomely marked with the broad medullary rays, heavy, very strong and tough, close-grained, and not liable to warp or open in seasoning. It is classed as white oak commonly, and is not distinguished from the wood of *Quercus alba*.

Quercus macrocarpa is one of the most ornamental and desirable of the American Oaks in cultivation. It is easily raised, and grows rapidly in good soil.

Like all the White Oaks, it is not, when once fairly established, easy to transplant successfully, and it is better, therefore, to set the plants very young where they are to remain, rather than to attempt to move larger specimens. The vigorous constitution of this tree, shown by its power of adapting itself to varied climatic conditions, and the great value of the timber which it produces, indicate that it may prove one of the best Oaks for forest-planting within the area of the region which it inhabits. C. S. S.

Foreign Correspondence.

London Letter.

OUR flowers are gradually disappearing from the open-air gardens, and attention is now mainly directed to the garden under glass. An eight-degree frost has already scorched every plant in exposed gardens of such tender constitution as the Dahlia and Tropæolum. The leading Dahlia-growers had planned a great gathering for the last meeting of the Royal Horticultural Society, but only those whose gardens were sufficiently sheltered to escape the frost could exhibit. There was a brilliant show, notwithstanding, and not a few novelties were submitted. The absence of Orchids in numbers is still conspicuous, though their flower season has commenced; but we had a first-rate novelty in a new hybrid from Messrs. Veitch, named Cattleya Miss Harris. It is the result of a cross between *C. Schilleriana* (which, according to the views of some authorities, is either a natural hybrid or a variety of *C. Aclandiae*) and the well known *C. Mossiae*. Comparing this hybrid with *C. Schilleriana*, which parent it most resembles, the flowers are larger, the sepals broader, and the lip larger and of different shape. The sepals are of a rich deep mauve color, and the labellum is crimson-lake, pencilled and netted with deep crimson, which pales to almost white on the throat. It is, therefore, a very showy Orchid, and the fact that the plant exhibited bore four flowers on a spike indicates that it possesses the vigorous constitution and free-flowering tendency of most all Orchid hybrids. It was voted a first-class certificate. The other Orchid, which won a first-class certificate, came from Baron Schrœder's collection, and was quite as remarkable as the Cattleya. It was a variety of *Odontoglossum vexillarium* (now called *Miltonia vexillaria*) named Leopoldi. It is so much like the variety Superba, which created a sensation a few years ago, that at first sight it appeared to be the same, but in Leopoldi the heavy crimson blotch which adorns the labellum is not rayed as is the Superba variety. The body color of the flower is a deep rose-pink, and the flower is altogether smaller than the summer-flowering form of *M. vexillaria*. Both these Superba and Leopoldi varieties appear to be forms of *M. vexillaria rubella*, the name given by Mr. Bull for the autumn-flowering variety, which is always distinguished by the smaller flowers and darker color. I remember seeing the Superba variety sold at Stevens' auction-rooms some years ago, and as nothing before had appeared at all like it, the competition in the bidding was keen. Sir Trevor Lawrence secured it for \$400.

It is still exceedingly rare, though every form that appears so very near it as *Leopoldi* is must lessen its value. The rare little *Masdevallia vespertilio*, which belongs to the *Chimara* section, was shown in flower. Though not a showy Orchid, it is very pretty and interesting, and it was appropriately decorated with a botanical certificate.

A new pure white-flowered *Watsonia* was greatly admired, and won a unanimous vote of the Committee. It is named *W. iridifolia O'Brieni*, having been recently introduced from South Africa by Mr. James O'Brien. In habit of growth and of flower it is a good deal like *W. rosea*, but the snow-white flowers mark it as distinct from any other in the genus. It grows about two feet high, and the flower-stems carry as many as a dozen fragrant blossoms, which open in succession, and therefore will be valuable for cutting, and if it can be induced to flower in winter its value will be enhanced. It is reported to be the only pure white Iridaceous plant in cultivation, but those who make this claim forget the pure white *Freesia*, the white *Crocuses*, *Irises* and others.

The awards of merit were voted to several new Dahlias, the most remarkable of which were the following sorts: Centenary, a genuine Cactus variety, resembling the original *D. Juarezi* in form and size, but of a different, and, if possible, a more brilliant tone of color. It is one of the best of this year's new Dahlias. Guelma is a remarkable single variety, the broad, flat florets being white, edged with cinnamon-red, a strange mixture, and different from any other. Marazion, bronze-yellow, and Conquest, rose magenta, are two good show varieties, while Hester Dorothy is the first of the new Pumila or dwarf strain shown here, and to which I alluded last week. The flowers are large, of fine form and a red-scarlet, and the plant does not exceed thirty inches in height, which is a decided advantage in bedding out or massing. A selection from among the best sorts of Cactus Dahlias shown would include Honoria, yellow; Zulu, black; Miss

Jekyll, orange-red; Annie Harvey, crimson; Sidney Hollings, bright and rich maroon (very fine); Germania Nova, lilac; W. Rayner, red; E. Constance, white, and Henry Cannell, scarlet, the last named being shown by Mr. Cannell, of Swanley, who believes he has in it a good variety. There was nothing remarkable about the other selections, and the majority of the flowers had evidently felt the effects of frost.

Chrysanthemums of the early or September-flowering sorts were strongly represented, but with their out-of-season look, and the absence of bright color in them, beyond yellow, they made a poor display, and though there is much stir made about every new addition to the race, the early *Chrysanthemum* cannot be called a popular flower. One new sort was certificated. It is called Annie Stevens, and is a Japanese variety with long, narrow florets of creamy-white. The fact is we do not want *Chrysanthemums* before November, and then we must have them or have no flowers in our green-houses. Till then we have plenty of brightness in other flowers.

Among the most noteworthy of other exhibits the finest, perhaps, was the new Pitcher plant, *Nepenthes Burkei*, from the introducers, Messrs. Veitch. It is a distinct and extremely handsome species, with pitchers of elegant form, having a broad and peculiarly shaped rim of deep crimson, the rest of the pitcher being pale green, blotched with crimson. It should have been certificated. Scarcely less remarkable was the grand group of the Java *Rhododendrons* which Messrs. Veitch are now putting prominently before the public, and rarely have they put into commerce such valuable garden plants as their new hybrids of this race of *Rhododendrons*. They have now colors among them from the purest whites to delicate

pinks and glowing crimsons, besides every shade of yellow. They are most satisfactory plants to grow, as they flower almost throughout the year.

A splendid show of autumn Roses was made by Messrs. W.

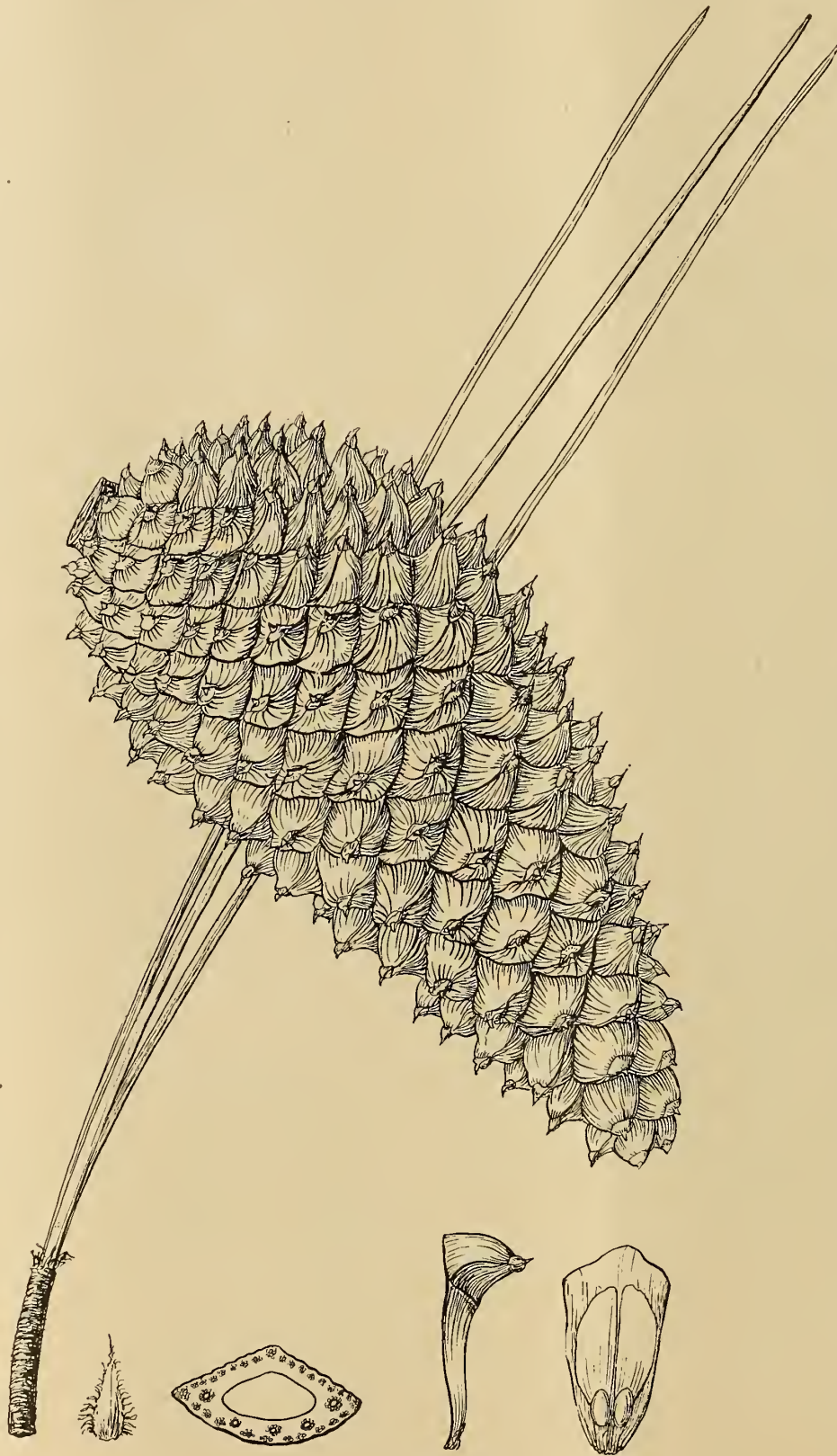


Fig. 135.—*Pinus latifolia*.—See page 496.

Paul & Son, the sorts consisting chiefly of Tea varieties, among them being the new Sappho, the Bride and Corinna, all first-rate for summer and autumn bloom. Among the best of the perpetuals were Mrs. John Laing, Marchioness of Lorne, Pride of Waltham, Ella Gordon and Ulrich Brunner.

The National Chrysanthemum Society last week held a meeting and conference, but the early Chrysanthemums were outnumbered by the Dahlias, which really gave the color to the otherwise dull show. The papers read were mostly of a practical nature, and difficult to epitomize. They contained nothing new.

London.

W. Goldring.

Cultural Department.

Rose Notes.

THE summer of 1889 will be long remembered among the Rose-growers of the Atlantic States for its excessive rainfall and the unusual prevalence of dull weather. Naturally the greatest injury has been inflicted upon out-door Roses and especially upon Hybrid Perpetuals that were in preparation for winter forcing. These varieties suffered severely in some localities from the heavy rains, it having been almost impossible to get them dry enough to ripen the wood. This is, of course, a great drawback to the successful forcing of Roses of this class, for, unless the growth is well ripened, failure is almost certain if an early crop is attempted, and, for that matter, matured wood is necessary for the production of a good crop at any time.

In regard to the ripening of Hybrids, an old but good practice is to lay the pots containing the Roses on their sides on the ground, and then to place sashes over them, merely raising them enough at one end to throw off the rain, so that the Roses are kept dry until the wood is sufficiently hardened. A convenient method of growing Hybrids has been adopted by some commercial growers, who plant them out in boxes, about three feet in length by eighteen inches in width, and only four inches deep, and containing about a dozen plants. Boxes of this size are easy to handle and economical in regard to space occupied, and they may be conveniently brought into heat from time to time, so as to secure a succession of bloom. These boxes cost but little to manufacture and can be put together by any man capable of using a hatchet and saw, and, if whitewashed inside and out, or given a good painting with crude petroleum, will last for several seasons. The crude oil is an excellent preservative for wood-work, though the objection has been made to it that the nails draw out of the wood when it has been penetrated by the oil.

This method of growing Roses in boxes may be used not only for Hybrid Perpetuals, but also for other classes, and will be found very convenient where the space can only be occupied by Roses for a portion of the season, as the boxes are readily removed from one house to another. La France Roses can be grown to advantage in this manner, and after a crop of flowers has been cut (say in December), the boxes can be placed in a cold frame and kept rather dry for a time, until the plants are in a good condition to be brought into heat and started afresh for a spring crop. Meanwhile the room inside can be utilized for the growth of other plants, so that green-house space can be kept constantly occupied.

The earliest Hybrids are already in growth, and some of them as early as the last week of September had shoots from one to two inches in length, the most forward sorts being Anna Alexieff and Magna Charta. But such early forcing as this requires much care in regard to temperature, for when kept too warm the growth soon weakens and frequently fails to produce any bloom worth mentioning, and, even under the most favorable circumstances, the quantity of flowers produced will not bear comparison with that of later crops.

Which is the favorite Rose? continues to be a hard question to decide, and can perhaps be best answered by individual growers, each for his own locality. There is considerable diversity in popular favor, though the liking for large Roses seems to be quite general, and therefore American Beauty will undoubtedly receive its full share of attention during the coming winter. And yet, in some of the largest flower-markets, as, for instance, in New York and Philadelphia, Madame Cusin and Madame de Watteville, both pretty, though neither notably large or of specially fine form, are extremely popular and consequently in large demand.

A passing glance at a number of commercial places and also some private establishments shows that Tea Roses in general have not suffered greatly from the dull, damp weather, and the prospect, for the first crop of flowers at least, is a promis-

ing one. Wootton has been planted largely and will undoubtedly be thoroughly tested this season. I lately saw a bench, about two hundred feet in length, filled with this variety, and it presented a fine appearance, though many of the plants showed "black spot" on the foliage, but since there was in the same house a large bench of American Beauty suffering from a bad attack of the "spot," the condition of the Woottons could be easily accounted for.

Holmesburg, Pa.

W. H. Tuftin.

Richardias.

THE Richardias are a group of five species forming a genus of the great family of *Aroideæ*. They are all natives of the southern half of Africa, and have a thick, lumpy root, and more or less elongated arrow-shaped leaves. The best of them, by far, for garden purposes, is the *R. Ethiopica*, so well known and widely cultivated under the name of "Calla Lily" or "Arum Lily." In a wild state this plant grows frequently in such numbers as to almost exclude all other vegetation from the ground it occupies; a correspondent of the *Gardeners' Chronicle* mentions seeing an island of about twenty acres in Saldanha Bay completely covered with it, and all the plants in bloom.

It is best treated as an evergreen plant, turning the pot containing it on its side in a shady place during the summer, and furnishing water again in the fall. It will retain its leaves during this period of rest, and will grow and blossom with renewed vigor when again watered. It may be treated as a deciduous plant, the root being kept perfectly dry during the winter, like Gladioli, etc., but it suffers much from such usage, and, besides, most persons desire to have it blossom in the winter. If the flower-stalk be carefully cut away, after the spathe has withered, another flower-bud will usually be found at its base, which, with proper treatment, will grow up and blossom. Through ignorance of this fact the whole stalk is generally cut off, young bud and all. There is a variety of this species whose leaves are splashed and mottled with white, but it is a very poor thing, growing very feebly and never flowering. Very vigorous plants sometimes have two spathes, one on each side of the spadix, but such developments detract very much from the stately simplicity of the normal form. *R. Ethiopica* very rarely yields seed.

R. albo-maculata, *R. hastata* and *R. melanoleuca* differ much in nature from the foregoing, for they are all best treated as summer-blooming plants, though the first named will grow very well in pots in the winter. The tubers of these three kinds may be lifted in October, and kept perfectly dry in the winter, and again planted out at the beginning of May. A long row, or a large bed, of strong plants of *R. albo-maculata* is a very beautiful sight, with its profusion of dark green, white-spotted leaves, and its abundance of white spathes, each with a purple spot at its base. Every flower-spathe, after a week or two of beauty, turns greenish, bows its head and bends over toward the earth, and by the middle of September will have ripened a large number of seeds, whitish, round, and as large as small peas. If these be planted in January (under glass, of course), they will show above ground in two weeks, and will make tubers as large as a filbert the first year, and the second year will bloom. Propagation may also be effected by cutting the old tubers in as many pieces as it has buds.

R. hastata and *R. melanoleuca* are less vigorous, and not infrequently rot when planted. I have no doubt that they need more heat than *R. albo-maculata*. Their flowers are yellow, with dark spots at the base; those of *R. hastata* being of a deeper shade than those of *R. melanoleuca*. The leaves of both are faintly spotted with gray.

Canton, Mass.

W. E. Endicott.

Orchid Notes.

Vanda Kimballiana.—The Orchid-growing world is indebted to the enterprise of Messrs. Low & Co., of Clapton, for the introduction of this remarkable species to cultivation at the beginning of the present year. It has been dedicated to Mr. W. S. Kimball, of Rochester, New York, by the late Professor Reichenbach, but no information respecting its native country has yet been divulged by its importers.

Plants of this species have lately flowered in various collections in England, and from one which flowered here in the nursery I have been enabled to make the following description: The stem is terete, about as thick as an ordinary lead-pencil, dull green, with numerous dark purplish spots. It is furnished with over a dozen sub-distichous, dull green, more or less drooping leaves, which are from six to twelve inches long, gradually tapering to a subulate point, and deeply

channeled on the upper side, especially towards the sheathing base. About midway on the stem, the erect dull purple peduncle springs from the axil of a leaf; it is about a foot long, the upper portion being flexuose, and bearing eight flowers, which present a very charming appearance. They vary from one and a half to over two inches across, the lower ones being somewhat larger than those above them. The individual flowers are borne on pinkish-white pedicels, about two and a half inches long including the ovary, and have sepals and petals of a delicate white color, faintly suffused with rose in the centre. They are all suddenly twisted at the base—a characteristic of several species of *Vanda*. The oblong-elliptic subacute upper sepals and petals are nearly similar, while the two lower oblong-falcate sepals are much larger. The deep crimson-purple lip presents a very striking contrast to the color of the sepals and petals; it is more or less suborbicular and emarginate, with undulate denticulate edges, while on each side of the opening into the slightly bent, tapering, pinky spur, is an obovate, bluntly-hooked auricle, dull orange outside, and thickly spotted with purple inside.

Although *Vanda Kimballiana* cannot be said to present a robust appearance, owing to its slender cylindrical stems and leaves, nevertheless there is at present every reason to believe that it will be much more easily grown and produce its flowers in greater abundance than some of the species which belong to the same section. Unfortunate as it is for cultural purposes not to know the native country of this species, it may be assumed that its home is somewhere in the eastern tropics, whence come the remainder of its congeners, and that it must, therefore, be grown in a warm, moist atmosphere, in such a position as to obtain as much sunlight as possible. The plants may be grown in clean crocks and charcoal, which should have a layer of fresh sphagnum moss on top, and in spring and summer they may be syringed a couple of times a day, to keep them moist, but not too wet.

Oncidium splendidum.—The earliest knowledge we have of this fine *Oncidium* is from Richards' herbarium, where there is a dried specimen, collected in Guatemala in 1852, presumably by M. Herment. It was not, however, until some ten years later that this collector, who was then living at

Caen, France, succeeded in getting a few plants alive to Europe, and these passed from his possession into that of MM. Thibaut and Keteleer, nurserymen, of Paris, in whose establishment a plant flowered for the first time in January, 1862. All the plants in cultivation at that time were distributed among continental collections, each plant realizing a very high price, and it was nearly eight or nine years after its actual introduction before *Oncidium splendidum* made its appearance in England. Until within the last few years it remained

very scarce, but now that large importations, chiefly from Guatemala, have been received, its price has been considerably reduced, and specimens of it are consequently much more frequently met with than they formerly were.

The chief characteristics of this species are its ovoid compressed pseudo-bulbs, each of which bears a single, very fleshy, dull green leaf at the summit, while a branched scape, from two to four and a half feet long, springs from the base, generally bearing from fifteen to twenty large, handsome flowers, the oblong, recurved sepals and petals of which are more or less of a yellowish-green, transversely barred with large, rich brown blotches, while the broad, flattish lip, often quite two inches across, is of a bright yellow, with one or two reddish-brown blotches at the base, on each side of the three-keeled disc.

As a rule, *Oncidium splendidum* produces its flowers at a season of the year when they are most acceptable, namely, during the gloomy months of December, January and February. I might, however, mention that an imported piece here began to bloom at the beginning of August, and has now been in flower nearly six weeks, and, even while I write, is still

in good condition. Its strong, glaucous green scape is slightly over four and a half feet long, and bears forty-four flowers, the largest and richest-colored I have yet seen.

This species requires to be grown in a warm atmosphere, and should be suspended in baskets from the glass, so as to enable the plants to enjoy as much light as possible. Great attention must be paid to watering, for if too much be given during the growing season, the bulbs are apt to become rotten when their growth is about half finished. As soon as the plants have done growing, the temperature of a cooler house



Fig. 136.—The Bur Oak (*Quercus macrocarpa*).—See page 497.

will help to mature the pseudo-bulbs, which, if well-developed, should produce a good crop of flowers. *John Weathers.*

St. Albans, Eng., September 18, 1889.

Phalenopsis rosea.—A great many plants of this pretty Orchid are now in bloom with us. It grows very freely, producing leathery lanceolate leaves, eight inches to one foot long, dark green in color. The racemes are branching, and bear about thirty flowers, but will continue to grow and flower from the apex for many months. The flowers are about an inch across, with lanceolate sepals and petals, white, tinged with rose. The ovate-acuminate lip is of a beautiful violet-purple, with an orange disc. We find the warmest part of the house suits this Orchid best, and it can scarcely have too much water. Small, shallow baskets should be used, though we have about a dozen doing well on some horizontal rafts of wood, but these require a good deal more water, and, consequently, more care than those in baskets of living moss. *P. rosea*, *P. Lowii* and *P. Esmeralda* are the three species that are in flower in quantity at this season, and will keep the *Phalenopsis* house gay until the standard kinds are in bloom.

Phalenopsis violacea is a showy plant, with round, leathery, deep green leaves. The spike is very short, producing one or two flowers at a time. These are about two inches across, white, deeply suffused with deep violet on the basal half of the segments. The lip is of a rich violet-crimson, with a golden-yellow callus. This Orchid was introduced in 1861. Since then three good varieties have been discovered—*Schröderi*, with flowers of uniform violet-rose; *Murtoniana* and *Bouringiana* both have yellow flowers, but vary in the markings and intensity of color. *F. Goldring.*

Kenwood, N. Y.

Catasetum Bungerothii.—Too much cannot be said in praise of this lovely Orchid, a plant that everybody should grow, and, from all appearances, one that everybody can grow. A basket seems to be the best receptacle for it, and very little potting material should be used, as the roots dislike being buried. Give it the warmest corner and abundance of water, and it will soon give a good account of itself. After growth is matured it should be put in a cooler house and water gradually withheld, but the bulbs must not be shriveled. The large, showy, pure white flowers last quite a long time in perfection in a cool, dry house. Since the introduction of this plant, two years ago, from South America, two excellent varieties have cropped up, the first appropriately named *Aureum*; the other, called *Pottianum*, has the flowers prettily marked with purple, the lip also spotted with same color.

Notes on Hardy Plants.—The present season has been noticeable for the abundance of moisture and the total immunity, thus far, from frost, conditions, taken on the whole, very favorable for the strong growth and flowering of hardy plants. *Anemone Japonica* and its varieties have never made so fine a display as that of the past weeks, the pure white form, *Honorine Joubert*, being most beautiful in its snowy-white petals and conspicuous yellow anthers. The pink form, known as *Hybrida*, is of a lovely shade of bright pink, a most suitable companion plant to the white one. It appears that the proper name of this hybrid *Anemone* is *Elegans*, but in the trade lists this name is very seldom used. We are also growing what is known as the type *A. Japonica*, and, if this is correctly named, it is singular how much more robust and beautiful the varieties are than the parent plant. The flowers of the latter are semi-double and of a dark rosy-carmine, a pretty color enough, but the plant sadly lacks the constitutional vigor so characteristic of the other two varieties. Of *Kniphofias* (since the generic name, *Tritoma*, is doomed to slow death), *K. grandis* has proved itself worthy of the name by its majestic autumnal beauty. These plants have shown to better advantage this year than ever before. *K. grandis* is now bearing numerous grand flower-spikes five feet high; and its bright red and yellow flowers make it the most showy plant in the garden. It is the best of the tall-growing kinds, and is the more valuable on account of its late-flowering habit. This plant has always been known as *Tritoma grandis*, but it appears that we must hereafter call it *Kniphofia aloides maxima*. *K. carnea* is a pretty, remarkable and distinct species; pretty, in that its flower-spikes do not exceed eighteen inches and are most useful for cutting purposes; remarkable in its flowers, which, unlike all other species that have come under our notice, commence to open at the apex of the spike and continue to flower downward; and lastly, distinct in being a native of Abyssinia, while most of this genus hail from South Africa, and also in being strictly

deciduous, the foliage dying down in the fall to a thick, fleshy rootstock, which should then be lifted and potted, and given plenty of heat in spring to induce it to start early. When nicely started it should be planted out in a warm position in good rich soil. Treated in this manner, its liability to be damaged by early frosts is considerably lessened. It is singular that, with all our care and solicitude, we have never been able to obtain a single seed of this plant. All other kinds seed freely with us, and prove only too susceptible to hybridization. We are hoping for good results from the use of pollen of *K. carnea* on species of the evergreen section.

Passaic, N. J.

E. O. Orpet.

Eichornia crassipes.—This fine aquatic has been in bloom in the open air, in several of the basins and lakes of the public squares and parks of New York, the past season, and has made the handsomest display, next to the Water Lilies, of any plant in the collections. It comes from South America, and is a floating plant that sails about the surface of the water as the wind drives it. In general appearance of foliage it is much like the *Calla Lily*, and forms broad, dense masses of stems and leaves, in one basin, covering a space six by eight feet. The base of the leaf-stems is inflated with air, like small bladders, while the white roots hang down in the water. The flowers are in spikes of five or six, as large as a half-dollar, of a purplish-blue, borne twelve to eighteen inches above the water on stout stems, the whole expression of the inflorescence suggesting a spike of huge Hyacinth blossoms. It is very easily grown. All that is needed is to anchor a clump in the water with a stone, or allow it to drift about as the winds will, and the plant will take care of itself. It has bloomed very freely this year, and remains open at night also. A good mass of this plant, covered with its spikes of showy blossoms, is something easily had, and sure to be much enjoyed through July and August. *F. L. Temple.*

Cambridge, Mass.

Two Good Perennials.—Among hardy, herbaceous plants introduced in recent years, *Platycodon Mariesii* and *Polygonum spharostachyum* hold a prominent rank. Both are beautiful, floriferous and very hardy, qualities which make them desirable for our flower-gardens as standard plants. *Platycodon Mariesii* was sent to Europe, from Japan, by Mr. Maries, then in the employ of Messrs. James Veitch & Sons, about eight years ago. It is a dwarfed form of *Platycodon grandiflorum*, small plants only a few months old, and scarcely two inches high, producing one or two large, starry, flat, cup-shaped flowers of a bright blue color. Some botanists merge *Platycodon* into *Wahlenbergia*, others into *Campanula*. *Polygonum spharostachyum* is also a small plant only about a foot in height; it flowers during May and June very profusely, and the rosy-crimson spikelets are very showy among the bright green, graceful foliage. After two months of rest they come forward again and bloom as abundantly as before until the frost in November kills them. The plant is a native of the Himalayas and makes a sort of tuber. It is very hardy.

Baden Baden.

Max Leichtlin.

Resetting in Peach Orchards.—It is a practice of doubtful expediency to set new Peach-trees after an orchard has been planted three years. Peach-trees are short-lived, and an orchard cannot be kept full of trees with profit, unless the trees are all nearly of the same age. If new trees are constantly set in, when the body of the orchard becomes unprofitable, there are still a few straggling and younger trees which the owner dislikes to sacrifice, and which are yet practically of almost no value. Land can be put to better use than to be tilled for the purpose of supporting a few scattering and indifferent trees. But even the more immediate value of trees which are filled in is trifling and seldom worth the trouble they give. They are checked by their well-established neighbors, and yield little. I have had experience for many years in this direction, and have yet to see such an experiment in the Peach-orchard which paid. In Apple-orchards it is frequently profitable, but Apple-trees are set further apart, and the trees are sufficiently long-lived to allow all the trees to even up. I am confident that most growers allow their Peach-orchards to get too old. There should be no sentiment in a matter-of-fact operation like the growing of peaches, and when the trees cease to be profitable on account of age, they should be uprooted. I have seldom known Peach-orchards to be profitable after they were twelve years planted, particularly when they have had good culture and have borne heavily. It is sometimes true that they cease to be profitable at an earlier age. But whenever the time comes, cut them down, root them out, and plant anew, with the same thought for profit that leads you to cut

your Corn or plow under your Strawberries. At any rate, do not be deluded with the notion that continually filling in an orchard is profitable.
L. H. Bailey.
Cornell University.

The Forest.

Recent California Forest-Fires.

FOR nearly six months I have read almost daily accounts of forest-fires in this state. Since the quail-hunters began to shoot over the dry grass and leaves on the hill-sides, the number and extent of these fires has greatly increased. All the great valleys are clouded with smoke, and the fires will probably continue until the rains begin, and that may not be until November.

To illustrate the extent of these fires I will quote the papers for only three successive days, September 16th, 17th and 18th. Forest-fires were reported on the 16th as in the San Mateo woods, only twenty miles from San Francisco, where a strip of heavy Pine and Redwood timber, fifteen miles long and three miles wide, was devastated before the fire was controlled. In this county at this time there were eight or ten smaller fires in the hills, all doing more or less damage. The same day large forest-fires were reported from the Pineries of San Bernardino. In the beautiful Redwoods of northern Sonoma, two fires destroyed 500 acres of Oak and Redwood. A portion of the Madroña and Maple woods, described by me in a recent article in the GARDEN AND FOREST, was burned over, and the famous Guerneville forests narrowly escaped. The same day, in southern Sonoma, 1,000 acres of second-growth timber were destroyed. The woodlands on the hills west of Gilroy were burned over, perhaps 2,000 acres in all. Fires were reported in the Ventura forests, where they had raged for a week. The heavy Oak timber near Oakdale was badly damaged. Fires were east, north and west of Shasta and Redding. There were forest-fires in Alameda, Santa Clara, Humboldt and Fresno. Quail-shooting begins in most of the counties September 15th, so it is fair to suppose that many of these outbreaks of the 16th were due to the quail-hunters.

The next day, the 17th, in addition to the fires already noted, extensive conflagrations were reported from Sierra and Nevada Counties, in the Pine-belt. All the middle foot-hill country was said to be "so full of smoke that one could not see over half a mile in any direction." Large fires were raging in Clarke County, Washington, and along the Columbia at Yaquina City.

On September 18th large fires were reported in southern Oregon, in the Siskiyou region, and in the Pineries of Tehama County and on the borders of Lassen. Almost every day since, items of fires in standing timber have appeared in the local newspapers. Generally the fires start on Government lands and spread to the forests under private ownership. During the present season nearly the whole area of mountain forests of the state has been threatened, and every few miles fires have actually occurred. Some were accidental, some were kindled purposely, some were the results of criminal carelessness. Hardly three arrests have been made in the whole state.

A dispatch from Sonoma County attributes the large fires there to the sheep and cattle men, who annually set fire to the woods and sweep away hundreds of acres of young forest, simply for the sake of a scanty growth of grass that follows for a few years on the surface of the "burn." There is a law against it; but there are so many ways of starting fires without detection, that it would take a large patrol system to protect the Government lands. The quail-hunters cause most of the fires, but if the game laws of the state forbade shooting any game in the forests of California until after the first rains they could do no harm. We have always a month or so of warm, clear weather after the first days of rain—a perfect Indian summer period. This should be the quail-hunter's opportunity, but it is shooting at the earlier season that ruins our forests.

The quantity of game that can be grown in the forests here is remarkable. I am inclined to think that the food-value of the steep hill-sides, cañons and wilder mountains, left in forests, protected against fires, sheep and cattle, and allowed to shelter quail, grouse, pheasants, rabbits, hares, deer, bear and other game of all descriptions, has never been estimated at a sufficiently high figure. Quail at present bring from twenty-five to seventy-five cents a dozen in San Francisco. Put them in refrigerator-cars, and they might be delivered all over the United States. I have no doubt but that the forests are worth more for quail than for sheep.

There is now talk of a law giving the Supervisors of every county, funds to patrol the forests and arrest careless hunters,

campers, sheep-herders and others who set fires. But the average county Supervisor is a slow and inefficient person. If all the forest lands left are withdrawn from sale, and protected by a permanent board of trained foresters, and if the hunting season is changed, the chief danger will come from private tracts. The owners of these tracts must be educated to a knowledge of this subject. Many of the mill-owners of the Pacific Coast are men of intelligence and energy who are well aware of the importance of protecting the forests. But all this work takes time, and many of us fear that the regular autumnal fires will entirely destroy the forests of California long before the public conscience can be aroused.

While I am closing this letter, telegrams in the daily papers state that the mountains for twenty miles east of Santa Anna "are a seething mass of flames." Three thousand sheep have been burned, the timber and brush is swept off, and 50,000 sacks of grain in the valley near the hills will be destroyed, as the fire is descending into the lowlands at many points. Very large fires are again raging in the heavy Redwood forests of Santa Cruz and San Mateo. In some places the owners of small ranches have been forced to abandon everything and hasten to the valley. There is a large fire on Mount Hood, Sonoma County, another at Los Guilicos, a third in the Sierras near Oroville, and a fourth in Waterman cañon, San Bernardino. In this valley, Santa Clara, within twenty miles of San Francisco, the air is heavy with smoke from fires in the mountains, south, east and west. The upper Sacramento valley, for a hundred miles, is under a thick cloud, and at night the red edges of fires can be seen on the hills of both Coast Range and Sierra. When the wind blows from the right quarter the scent of burning Redwood and Pine is easily distinguished many miles away; here in Alameda County we can smell the Redwoods which the flames are destroying at San Mateo, fifteen miles distant, in an air-line, across the bay.

Niles, California.

Charles Howard Shinn.

Correspondence.

On Popular Plant Names.

To the Editor of GARDEN AND FOREST:

Sir.—Mr. Manning's letter on this subject in your number of September 14th, which has just reached me, opens a question which, though of great importance to us here in Europe, is, I think, of still greater importance in the United States, where gardening is now taking such wonderful strides, and where few, as yet, have learned to appreciate the importance of uniform and correct nomenclature. The subject has been a good deal discussed with us, and the editor of *The Garden*, who is, perhaps, the leader of the advocates for English names, has endeavored for years past in his paper to introduce and popularize English names for many plants which are more or less known to gardeners. As far as I can see, however, he is not succeeding; and I sincerely hope he will not succeed, because if he does, the confusion of names and the difficulty of knowing what plant people are talking about when they use English names, will be greater than it is now, whilst if we have to use a Latin name after the common one, which is often done in *The Garden*, we only add to the immense number which have to be remembered. Of course, I would never wish any one to give up talking of Roses, Lilies, Primroses or Violets in a general way, or to give up using any local names which are generally used and understood in local parlance. But the vagueness of local names is so great that, in nine cases out of ten, they are useless out of their locality. Perhaps, for instance, I want a particular Lily from Oregon, which I learn is called Swamp Lily in some parts of the state, and writing to a settler for it, I get, instead, a Camassia. I tell the sender that it is not the right plant, but get for an answer, that "he guesses it is what they call a Swamp Lily in his section." Another instance occurred to me last week. A well known and distinguished gardener, who should have known better, wrote and asked me for a plant of "Spatum." I had not an idea what he meant, and wrote back that I could not read the word in his letter. Then he wrote to say that he meant *Lewisia rediviva*. I should have said that if there was a plant whose scientific name was a happy one it was this. For, though it is not always possible to follow the good old rule of giving Latin names which either connect plants with some distinguished explorer, collector or scientist, or indicate some peculiarity of their structure, habit or color, yet it is much more easy to remember such names than a name like Spatum, which means absolutely nothing, and, if used anywhere, is, I suppose, an Indian name, which I never heard of in the native country of

the plant itself. A great deal is said by some of the difficulty of getting unscientific people to use scientific names, but, as the editor of GARDEN AND FOREST very truly points out, every one uses such names as *Spiræa*, *Fuchsia*, *Rhododendron*, and when they have arrived at the stage of distinguishing species, they find it just as easy, and a great deal shorter and more certain, to use the specific name also, than to do as Mr. Manning suggests and coin an English name. For many years English names were coined for new plants in the *Botanical Magazine*, and yet I never hear them used any more than I hear the fanciful English names introduced by Mr. Robinson used by common English gardeners, or ladies, who neither know nor care for the scientific name of a plant. The best name, in the end, must be the name which is most generally used and understood by the greatest number; but directly we allow new names to be coined by persons who are too careless or too ignorant to learn the correct scientific name, endless confusion must result.

With regard to varieties of garden plants which are not known in a wild state, I think that the custom of giving florists' names is perfectly right and proper, because it is highly desirable that the garden origin of such things should be shown by the name, and as the duration of a very large proportion of the varieties of florist-flowers, fruit and vegetables is very short, such long-worded names, as some of our Belgian and French friends give their Roses and Pears, are not likely to trouble us forever. I once heard a distinguished English entomologist exclaim with warmth that such a name as *Korolkowia Swertzowi* was intolerable, but would not a Russian have just as much reason to say that a genus named *Mac-lauchlanii* was unpronounceable? We must always remember that science, of which horticulture is only a branch, is international and cosmopolitan, and though uneducated people will always continue to use vernacular names for the common plants, birds or insects of their own country, yet it should be the common object of all who desire to advance science to use names which can be understood by all who are interested in the same subject. And when I know, as I do, that the editors of the *Gardeners' Chronicle* and GARDEN AND FOREST are quite of one opinion on this subject, I feel very hopeful that they will do all in their power to influence their readers for the common good of England, America and the world.

Cirencester, England.

H. J. Elwes.

The City of Oaks.

To the Editor of GARDEN AND FOREST:

Sir.—Raleigh, the beautiful capital-city of North Carolina, has well been named the "City of Oaks." All through the residence portion of the city these giant relics of the primitive forest-growth are scattered, giving the city the appearance of a great park. Here and there, in the bed of the streets, magnificent Oaks have been allowed to remain and are cherished with religious care, and all over the wide lawns are superb specimens of White, Red, Scarlet and Black Oaks. Two immense Oaks on the lawn attached to Bishop Lyman's residence are particularly noticeable. These two trees alone shade over half an acre of lawn. One gentleman has an Oak which he values so highly that he has effected an insurance of \$1,000 upon it. If it were not for the grand proportions of the Oaks the Elms of Raleigh would be almost as voiceable as those of New Haven. The old specimens of the American Elm are remarkably fine, and the small-leaved or Wahoo Elms have attained here a size which I have never noticed in this tree elsewhere. The Mimosa (*Albizia Julibrissin*) is also seen of unusual size. One on Blount street, I noticed, with a trunk fully two feet in diameter and a great spread of branches. On Hillsboro street I observed a grand specimen of *Cedrus Deodara* full of cones, but the tree is being crowded out of shape by a couple of worthless Silver Maples. Specimens of *Magnolia grandiflora* abound, but all seem rather young, and none are nearly as large as the specimens of this tree in Norfolk, where, in St. Paul's Church-yard, may be seen some of the finest in this country north of the Gulf States.

Raleigh is emphatically a city of homes. Its citizens will have elbow room, and, though only claiming about 15,000 inhabitants, it would furnish space for nearly half a million if built up in the usual manner. But when a Raleigh man builds a house, nothing short of half a block, and, in many instances, a whole block, will satisfy him. He must have a front lawn, with as big Oaks as possible, a paddock for a cow and horse, and a fruit and vegetable garden. He will endure no kitchen in his residence, and he gets rid of its heat and odors by erecting a separate building for this purpose in his back yard.

Just at this season the Tea Roses are the glory of the city. Immense bushes of every shade known in this lovely race are

covered with a wealth of bloom, and the colors have that peculiar depth and richness only found in the cool autumn weather. Marechal Niels clamber on porticoes and over division fences with a perfect abandon, and the cool nights have imparted a rosy hue to their outer petals which adds greatly to the beauty of the great buds. A little later there will be a grand display of Chrysanthemums. They are everywhere, and the myriads of buds now showing give promise of an immense bloom. The carpet-bedding mania has never taken hold here. In all my walks about the city I have seen but one clipped bed of foliage plants, and this was in the yard of a German florist, who, doubtless, would profit by the introduction of the practice, but who, as yet, has been unable to spoil the flower-gardens of Raleigh. The city has been called a slow place, and so, perhaps, it is in business enterprise, but there is a great deal of wealth here, and a cultivated taste for natural beauty which throws an indefinable charm over the whole place, and points it out as a spot where those tired of the hurly-burly can find a dignified repose.

Raleigh, N. C.

W. F. Massey.

Recent Publications.

Days Out-of-Doors, by Charles C. Abbott. New York: D. Appleton & Co.

Dr. Abbott is no mere fair-weather stroller. It is not bright sunshine and balmy air which invite him to wander over meadow and upland, by the brook-side or through the wood-path. The company he seeks does not shut itself up in nest or burrow because the skies are dark and the winds are chill, and, therefore, this calendar leads one not only through the varied seasons of the year, but through the changing phases of each season, and introduces the reader to all the flying and swimming and creeping things which a lynx-eyed naturalist can find. And Dr. Abbott knows when and where to find them, as the readers of his former books discovered long ago. The wary creatures which the unobserving stroller never encounters, all come out to meet him, or, rather, they all find him waiting for them where he knows they are sure to appear, and forthwith they begin to disclose their family secrets in the most unconstrained fashion. What these secrets are Dr. Abbott tells in such an engaging way that many a one will find himself fascinated by the description of some toad or lizard, upon which he would hardly bestow a glance or a thought if it should chance to obtrude itself in person upon his observation; and the reader who is not a student of natural history will be surprised to find how numerous are the forms of lowly animal life about him, and how much there is to interest him in their habits and history.

Dr. Abbott is not primarily a botanist, but an examination of the very complete and satisfactory table of contents at the close of this book shows hundreds of allusions to the trees and shrubs and herbaceous plants among which he held converse with his friends, the birds and beasts, the reptiles and fishes. Perhaps it is because he is less interested in the classification of the wild plants than he is in their appearance and their relation to the animal life about them, that his notes upon the vegetation in the regions where these days out-of-doors were passed have such an open-air freedom and freshness. The lowly growths which creep over the sands of the Pine Barrens, the tall weeds by the wayside, the shrub-thickets in marshy lowlands, and the forest trees everywhere, all find in him an appreciative observer, who catches the spirit of the scene, and portrays, as far as words can portray it, their delicate and elusive charm. A few interesting passages in the book, and notably one descriptive of the wild work of the great March blizzard, will be recognized by readers of GARDEN AND FOREST as having appeared in these pages while the event was still a matter of news, and the passage seems more interesting still, now that it has passed into history.

One cannot read these pages without feeling to how great a degree the pleasure of living is increased by the habit of interested and systematic observation. The man or woman who has learned to be alert for original information about natural objects will find in every brook and hedge-row and wayside, material at once for study and for recreation, and whole days to him are delightful which are dull to his neighbor who cannot distinguish one bird-song from another, nor tell the name or the characteristics of the trees or shrubs which he constantly passes by without seeing them. The influence exerted by a book like this in the one direction of encouraging the practice of taking up some branch of natural science in the natural way is altogether benignant. A man who has acquired a habit of this sort may add but little to the sum total of human knowledge by his investigations, but his life will be more full, happy and wholesome for it.

Notes.

The Agricultural Society of Hérault has opened a subscription for a monument to the late Professor Planchon, who, by his studies of the Vine, and of its greatest enemy, the Phylloxera, rendered signal and highly appreciated services to French agriculture.

A correspondent, referring to Mr. Boynton's note on *Helonias bullata*, writes that he has tried to naturalize the plant on his grounds in Ohio, but found it short-lived, the inland climate being apparently inhospitable. In the damp sand of southern New Jersey the plant seems most at home.

Professor Lintner estimates that if all the species of insects inhabiting the world were known their number would reach a million, and, descending to the consideration of individuals, he adds that he has seen at one glance, within a small extent of roadway, more snow-fleas of a single species than there are human beings on the entire surface of the globe.

The Rothschilds, according to a note in a recent issue of *L'Illustration Horticole*, have established at Jerusalem a School of Agriculture, Vine-culture and Horticulture under the direction of the former head gardener of the Maradja of Cashmere. Ten thousand plants of the Cashmere Vine have been planted, and special attention is to be given to the cultivation of Saffron and plants with sweet-scented flowers for the production of perfumes.

Some carefully conducted experiments at the Ohio Station seem to indicate that winter apples keep longer when picked early. There was practically no difference in the percentage of loss for six months from picking, but after that the apples gathered early were much more sound than the others. The greater part of the loss in weight by drying takes place in the first six months. The apples picked early lose slightly more than those picked late.

In reply to some inquiries in regard to the planting of the slopes of railroad cuts and embankments, Mr. Jackson Dawson, of the Arnold Arboretum, writes that where shrubs or small trees are collected for this purpose from neighboring woods and fields, it is advisable, as a rule, to cut them hard back and grow them for a year in well-prepared ground, before they are set in their permanent position. Mr. Dawson has had extensive experience with native shrubs, but he adds that many trials will be needed before we can know whether a selection of shrubs can be made which will flourish on slopes of clay, for example, without any surface preparation.

A flowering plant of *Vanda Kimballiana*, described in another column of this issue, was exhibited by Mr. John L. Gardner, of Brookline, before the Massachusetts Horticultural Society, on the 7th of this month, and was awarded the silver medal of the Society. It is an interesting fact, significant of the present advanced state of American horticulture, that a plant which was entirely unknown to science up to the present year, and had not flowered in Europe six weeks ago, has also flowered in at least one American collection. The fact that this particular plant commemorates in its name the zeal of an American lover of Orchids, whose collection ranks with the best in existence, is, perhaps, not less significant. A portrait of Mr. Gardner's plant is being prepared for this journal.

The Colonial Board of Viticulture in Melbourne recently proposed the establishment, at public expense, of an experimental vineyard and school of viticulture for the colony. The suggestion has now been accepted by the Minister of Lands, and a site has been selected for the purpose at Rutherglen. The area selected is 200 acres, and it will be permanently reserved for the purpose. Instruction will be imparted at the institution by capable teachers in the most improved methods of vine cultivation, and experiments will be conducted with the view of testing the value of new plants said to be suitable for growth in Victoria. Funds for conducting the school will be provided in the present year's estimates, but pending the formal vote the Minister has authorized the expenditure of a sum sufficient to at once plant twenty acres of the reserve, and so expedite the work.

Mr. George W. Archer, in an interesting paper on "A Trip to Old Baltimore and Other Points in Bush River Neck," which has since been published in the Belair (Maryland) *Ægis*, writes of "Shandy Hall," the home of some of the Hall family for five generations. It was built by Benedict Edward Hall, a stanch and prominent patriot during the Revolution. He says: "In the yard is a group of venerable Box-trees, which are said to have been planted when the older part of the house

was built, in 1701. And it may well be believed; for the group is now so large and compact that, but for the color, it might readily be mistaken at a little distance for a misplaced haystack. But this remarkable growth of Box is thrown into the shade by a White Oak nearly half a mile distant. Not that the Oak literally casts a shade quite so far as that at noon, but that I found it, by actual measurement, thirty-nine feet four inches in girth at the ground, and twenty-one feet seven inches at the smallest part of its venerable waist, where the limbs begin to swell. These limbs are as large as most full-grown oaks. The first one, where it branches off, ten feet from the ground, is exactly twelve feet four inches in girth. The extent of this patriarch, from end to end of its opposite branches, is 123 feet. It stands in an open field, solitary and alone, and I wondered that the lightning left it so long untouched. Not the least remarkable thing about it is, that from tip to root, it gives no hint whatever of decay. If it were a human being I might say it has not a gray hair in its head, nor the sign of a wrinkle on its rugged limbs. A deed of 1672 (217 years ago) designates it as a 'Spreading Oak,' marking a corner of a tract of land."

Professors L. H. Baily, E. S. Goff and W. H. Green were appointed at the last meeting of the Association of Agricultural Colleges and Experiment Stations to report on the nomenclature of kitchen-garden vegetables. In their report just issued by the Department of Agriculture, after stating that a name is bestowed upon a plant solely for the purpose of designating, and not for describing, it, the committee lay down the following rules: 1. The name of a variety should consist of a single word, or at most of two words. A phrase, descriptive or otherwise, is never allowable; as, Pride of Italy, King of Mammoth, Earliest of All. 2. The name should not be superlative or bombastic. In particular, all such epithets as New, Large, Giant, Fine, Selected, Improved and the like should be omitted. If the grower or dealer has a superior stock of a variety, the fact should be stated in the description immediately after the name, rather than as a part of the name itself; as, "Trophy, selected stock." 3. If a grower or dealer has procured a new select strain of a well known variety it shall be legitimate for him to use his own name in connection with the established name of the variety; as, Smith's Winningstadt, Jones' Cardinal. 4. When personal names are given to varieties, titles should be omitted; as, Major, General, Queen. 5. The term "hybrid" should not be used, except in those rare instances in which the variety is known to be of hybrid origin. 6. The originator has the prior right to name the variety; but the oldest name which conforms to these rules should be adopted. 7. This committee reserve the right, in their own publications, to revise objectionable names in conformity with these rules.

The following description of the manner in which floating fields and gardens are formed in China, was condensed for publication in *The Garden* from an article by Dr. Macgowan, which originally appeared in the *China Review*: "In the month of April, a bamboo raft, ten to twelve feet long and about half as broad, is prepared. The poles are lashed together with interstices of an inch between each. Over this a layer of straw an inch thick is spread, and then a coating two inches thick of adhesive mud taken from the bottom of a canal or pond, which receives the seed. The raft is moored to the bank in still water, and requires no further attention. The straw soon gives way and the soil also, the roots drawing support from the water alone. In about twenty days the raft becomes covered with the creeper (*Ipomœa reptans*), and its stems and roots are gathered for cooking. In autumn its small, white petals and yellow stamens, nestling among the round leaves, present a very pretty appearance. In some places marshy land is profitably cultivated in this manner. Besides these floating vegetable gardens there are also floating Rice fields. Upon rafts constructed as above weeds and adherent mud were placed as a flooring, and when the Rice shoots were ready for transplanting they were placed in the floating soil, which being adhesive and held in place by weed roots, the plants were maintained in position throughout the season. The Rice thus planted ripened in from sixty to seventy, in place of 100 days. The rafts are cabled to the shore, floating on lakes, pools or sluggish streams. These floating fields served to avert famines, whether by drought or flood. When other fields were submerged and their crops rotten, these floated and flourished; and when a drought prevailed they subsided with the falling water, and while the soil around was arid advanced to maturity. Agricultural treatises contain plates representing rows of extensive Rice fields moored to sturdy trees on the banks of rivers or lakes which existed formerly in the lacustrine regions of the Lower Yangtze and Yellow Rivers."

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Attacks on Civilization.

IT is a matter of importance for the American people to learn as soon as possible that under the conditions of our national life, nothing in our civilization will keep very long. It must be perpetually reproduced, must in some way always be the fresh expression of the life and thought of the time, or it will decay and vanish. Whatever may be true of other countries, with us nothing valuable is ever secure. This is not always understood or remembered, and when any good thing is gained our people are apt to think that continued interest in that particular matter is unnecessary. This baseless notion of security invites attack, and most of our battles have to be fought over again under somewhat different conditions.

It is but a few years since the land about the Falls of Niagara was withdrawn once for all and forever from the realm of money-making uses, and dedicated to entirely different objects. The people of the state, after a most deliberate and thorough discussion of the matter, decreed that here there should be an opportunity for the tranquil, undisturbed exercise and delight of the higher faculties of human nature. The establishment of the State Reservation was a distinct advance in civilization. It cost years of strenuous effort, and a large amount of money. When it was accomplished the friends of human progress rejoiced. But while the quiet festival with which this achievement was celebrated was in progress a new attack on Niagara was planned. Some men could not bear to see so much power going to waste, and they have ever since been busy with imaginative schemes for illuminating the country or propelling its machinery by utilizing the great waterfall.

Niagara is owned by the state of New York, having been solemnly set apart forever from private ownership for the express purpose of preserving its unparalleled scenery. Is it therefore secure? Not at all. An account of the movement for the redemption of Niagara, written in 1885, observes that "great wisdom and decision will always be required adequately to protect the Niagara Reservation from the encroachments of greed and vulgarity. In the nature of things it can never be safe for the

people of intelligence, good taste and public spirit, of the state of New York, or of the country at large, to withdraw all oversight and interest from the management of the Reservation and the care of the scenery about the Falls." Under existing conditions—that is, with our present degree of development—there is no possible arrangement by which Niagara can be made secure. It will be the object of perpetual attack, and will require constant effort for its defense, until the mass and average of the people of our country become sufficiently enlightened to understand the true value of the place and its scenery, and to prize it for the "vital feelings of delight" which it inspires. The men who "saved Niagara" a few years ago will not live to see that time. If the people of this state, and of the country, intend and expect to keep the State Reservation at the Falls free and unspoiled, they must be always on guard. No electric light or power plant of any kind can be established or operated at the Falls without impairing the value of the scenery, and fatally interfering with the objects for which the Reservation exists.

The account already quoted (from the *New Princeton Review*), declared that the movement to save Niagara is of peculiar interest, because it was the first effort made in this country on so large a scale to use the machinery of government for an object of this kind—that is, for a purpose belonging so entirely to the realm of elevated sentiment and noble spiritual emotion. No sordid element modified or degraded the pure ideal which the laborers in this movement set before them from the beginning. No person made any money out of it. There was no stain or shadow of jobbery from the inception to the final accomplishment of the enterprise. Here was a great natural possession of unparalleled beauty, with peculiar power to inspire wholesome and elevated emotions, to calm the fevered unrest of our crowded, hurried modern life; to delight and reinvigorate all who feel that "the world is too much with us, late and soon," and to minister to the sanity and happiness of millions of toiling men and women through all coming time. It was certain to be speedily destroyed and its priceless loveliness extinguished in cureless ruin, unless the state intervened to save it. The great state of New York has never acted more wisely, or more in accord with the highest civilization of the age, than when she devoted a million and a half from the public treasury to make the region about the Falls of Niagara free to her people and to mankind forever. Such objects will always be easier of accomplishment in America because of the precedent thus established.

The truth that the best things in our civilization are subject to constant attack appears also in the difficulty of maintaining parks and open spaces in our large cities. One of the reasons offered in favor of confiscating Central Park for the World's Fair is that a great building, or more than one, erected for the fair, may be left standing permanently, to add to the attractions of the park. To those who understand the true value and uses of a park this would be a reason on the other side. A pastoral park is not a place for buildings, and the minimum of artificial constructions should be the rule in all places of the kind. It was wrong to take a part of City Hall Park in this city for the Post Office, and it is entirely natural that the result of this uncivilized proceeding should be one of the ugliest buildings, for its size and cost, in our whole country. If we had been sufficiently developed to produce a beautiful and noble building we should never have thought of putting it in the park. It would be far better for the city if there were no buildings in this park except the old City Hall, which is the only one possessed of any architectural merit.

Perhaps the necessity of perpetual struggle to maintain what we have, is not so much to be regretted as many people think. The constant wariness and effort thus required are the condition of all farther advance. If it were possible, which it never is, or can be, to make everything safe, we should probably lie down in peace and rot. Luxury and inaction would bring on atrophy of the higher qualities of the national character, and unless they are maintained

in vigorous life, civilization itself would decay. Without these higher moral qualities a nation would not fight even for freedom, though it might try to buy it. The need of serious thought and hard work is not to be altogether regretted, or regarded as a discouraging condition; and even such a manifestation as the raid on Central Park may have its use in making this need still more apparent and urgent. The necessity of struggle is abiding, normal and stimulating.

Chatsworth.

IN the heart of the beautiful Derbyshire country lie, twelve miles from one another, two of the most famous country homes of England—Haddon Hall, one of the residences of the Duke of Rutland, and Chatsworth, the seat of the Duke of Devonshire. At Haddon Hall the house itself is the chief object of interest, being a most picturesque and beautiful structure, no part of which is of later date than the fifteenth century; the once magnificent park was plowed up for cultivation some seventy years ago, the chief residence of the duke being now Belvoir Castle. At Chatsworth, however, the grounds are even more magnificent and famous than the house. The estate is said to have been granted by William the Conqueror to his natural son, William Peveril, and is familiar to readers of Scott's "Peveril of the Peak." In the reign of Elizabeth it was bought by Sir W. Cavendish, who commenced a residence that was finished by his widow, the famous Countess of Shrewsbury. But this house was swept away in the first years of the eighteenth century to make room for an imposing structure to which wide-spreading wings were added by the sixth Duke of Devonshire, who made its grounds to rank among the wonders of the world.*

When the first of American landscape-gardeners, A. J. Downing, visited England in 1850, this duke and his head gardener, Joseph Paxton, gave him hospitable entertainment, and, from a long letter which he wrote home to the *Horticulturist*, we shall take many of the following descriptive passages:†

The house—palace would be a better word—stands in a valley, and therefore makes a less imposing effect as the visitor approaches than do some other English homes of perhaps smaller architectural pretensions. But if the site is thus disadvantageous in one way, it conduces vastly in other ways to the beauty of the domain. The surrounding hills, of picturesque outline and from 300 to 400 feet in height, form from every point of view a beautiful background and setting for the park; and, their sides being filled with prolific springs, it has been possible to utilize water in the pleasure-grounds to a far greater extent than in any other English estate.

The park measures about nine miles in circumference, and its surface is beautifully diversified with hill and dale. The visitor usually enters it by the Edensor Gate, which takes its name from a little village near by, which was wholly rebuilt by the sixth duke, and, with its thirty or forty charming cottages, is, says Downing, "precisely what everybody imagines the possibility of doing and what no one but a king or a subject with a princely fortune and a taste not always born with princes, could do." Each cottage has its garden and stands among beautiful trees, and a wide village green, a village play-ground, school, drying-ground and fountain serve the common comfort as well as delight the eye by their tasteful disposition. From the village to the house "is about two miles through a park, which is a broad valley, say a couple of miles wide by half a dozen long . . . backed by wooded hills and sylvan slopes . . . with a lovely English river, the Derwent, running like a silver cord . . . and grouped with noble drooping Limes, Oaks and Elms that are scattered over its broad surface. . . . After driving about a mile the palace bursts upon your view, the broad valley-park spread out below and before it, the richly-wooded hills rising behind it, the superb Italian gardens lying around it . . . the whole, a palace of Arcadia." The house forms a great quadrangle, in the centre of which is a magnificent fountain. The Italian gardens are a "series of broad terraces on two or three levels, which surround the palace, and which, containing half a dozen acres or more of highly-dressed garden scenery, separate the pleasure-grounds and the house from the more sylvan and rural park. . . . Of course, the Italian gardens are laid out in that symmetrical style which best accords with a grand mass of architecture,

and are decorated with fine vases, statues and fountains. . . . A surface of real dark green velvet of a dozen acres would scarcely soothe the eye more by its look of softness and smoothness than the turf in the Italian gardens at Chatsworth. . . . But the crowning glory of Chatsworth is its fountains. . . ." From the gardens, which extend along the whole house-front of 800 feet, one sees the "carpet of velvet divided by broad alleys enriched by masses of the richest flowers and enlivened by fountains of various forms." And further away is a "mirror-like lake, set in turf and overhung by a noble avenue of drooping Lime-trees, beyond which you catch a vista of the distant hills. . . . Out of this limpid sheet springs up a fountain so high that as you look upward and fairly hold your breath with astonishment, you almost expect it, with its next leap, to reach the sky; and yet, with all this vast power and volume, it is so light and airy and beautiful . . . that you will not be convinced that it is not a production of naturelike Niagara. This is the 'Emperor fountain,' the highest in the world—about the height, I should say, of Trinity Church steeple.† It is only suffered to play on calm days, as the weight of the falling water, if blown aside by a high wind, would seriously injure the pleasure-grounds. . . . As the eye turns to the left the wooded hill which forms the rich forest background to this scene seems to have run mad with cataracts." Towards the base of the hill stands a circular water temple, from which the water rushes out with tremendous force to fall at the back of the gardens down a long flight of very broad marble steps, giving the effect of a waterfall more than a hundred feet high."

Beyond the terraces and flower gardens and more formal lawns "the path becomes wild, and, after a turn, you enter upon a scene the very opposite to all that I have been describing. You take it for a rocky wilderness. The rocks are of vast size, and, indeed, of all sizes, with thickets of Rhododendrons and Azaleas growing among them, Ivy and other vines climbing over them, and foot-paths winding through them." Here, again, are many waterfalls and streams. "Nothing can well look wilder or more natural than this spot; and yet this . . . rock-garden of six acres has all been created. Every one of these rocks has been brought here—some of them from two or three miles away. It is just as wild a scene as one finds on the skirts of some wooded limestone ridge in America . . . yet all traces of art are obliterated. You wish to go onward. No, that you see is impossible; a huge rock weighing fifty or sixty tons exactly stops up the path. Your companion smiles, and with a single touch of his hand the rock turns slowly on its centre and the path is unobstructed. There is no noise and nothing visible to explain the mystery. . . . One of the greatest beauties of Chatsworth lies in the diversity of surface, which . . . offers excellent opportunities for the production of a succession of scenes now highly ornate and artistic . . . now romantic and picturesque."

Closely connected with the name and fame of Sir Joseph Paxton is the magnificent conservatory which stands at about five minutes' walk from the house in the centre of a level forest glade surrounded by fine old trees. It is 300 feet in length and 145 in width, and covers about an acre of ground; and directly through it runs the wide carriage-drive. "All the riches of the tropics," says Downing, "are grown here, planted in the soil as if in their native climate. . . . The surface is not entirely level, but there are rocky hills and steep walks winding over them; and lofty as the roof is (seventy feet), some of the Palms of South America have already nearly reached the glass." A large pond forms a feature of this conservatory, and a gallery is carried all around it, whence the best view of its tropical splendors can be obtained. One notable plant in Downing's time was an *Amherstia nobilis*, the only specimen in Europe, which had been procured in Burmah by a collector specially sent by the Duke. Paxton's success in building this conservatory, which he covered not with flat panes of glass, but according to what is called the "ridge and furrow system," induced him to send in a competitive design when the government was contemplating the erection of a great structure for the first "World's Fair" in 1851, and so great seemed the practical utility of his novel scheme that his services were chosen in preference to those of any architect. The triumph he achieved in his exhibition-building is a matter of history, and no one thought him too highly honored by that "handle to his name," which had never before been bestowed upon a man in his position. The building itself, transferred to Sydenham, is the famous "Crystal Palace" of to-day.

But in the grounds of Chatsworth, as well as in the conservatory, the sixth duke revealed his passion for horticulture and

* Mary Queen of Scots was confined for thirteen years in the old house at Chatsworth, and here the philosopher Hobbes passed many of his days.

† The *Horticulturist*, vol. v., p. 217, November, 1850. See also vol. i., p. 297, where another pen likewise describes the wonders of Chatsworth.

‡ The height of this fountain is 267 feet. The next highest in the world, at Wilhelmshöhe near Cassel, is 190 feet, while the loftiest jet at Versailles rises only to a height of ninety feet.

his willingness to spend vast sums of money in its gratification. The arboretum, as Downing saw it, was about a mile in length, and its trees—forming a complete collection of all that were hardy in that climate—were “neither set in formal lines nor grouped in a single scene, but scattered along a picturesque drive with space enough for each to develop its natural habit of growth.” Many exotic trees, shrubs and flowers, which are now more or less well known, were first introduced to cultivation at Chatsworth, and the story of its plantations would make an important chapter in the history of horticultural progress in Europe.

On the opposite side of the house from the conservatory and arboretum lie the immense kitchen and forcing gardens. Here the most famous item that Downing noted was a Peach-tree “occupying a glass-house by itself and extending over a trellis, say a hundred feet long,” which, Mr. Paxton stated, had borne in the current season 8,727 peaches, of which 926 had been allowed to come to maturity. To show that Paxton knew how to save money as well as to spend it, the duke remarked that the cost of growing his Pineapples had been reduced two-thirds since this great gardener had taken them in charge, twelve years before.

Of course, we have only hinted at a few of the many beauties and marvels of this wonderful place, but enough has been said to explain Downing's enthusiasm when he wrote that, from a tower on a hill-top a mile away from the house, one saw “such a picture of palace and pleasure-ground, park and forest scenery as can be found, perhaps, nowhere else in the circle of the planet.” It is interesting, too, to read his defense of the duke against charges of selfish extravagance. The “refined taste” shown at Chatsworth seemed largely to excuse its magnificence, while “when one sees how many persons are constantly employed in the various works of improvement—and how cheerfully the whole is thrown open to the study and enjoyment of thousands and tens of thousands annually, one cannot but concede a liberal share of admiration and thanks to a nobleman who might follow the example of many others and make his home a closed castle.* . . . One has only to visit Windsor and Buckingham Palace after Chatsworth to see the difference between a noble and pure taste and a royal want of it. The one may serve to educate and reform the world. The utmost that the other can do is to dazzle and astonish those who cannot recognize real beauty or excellence in art.”

To create and maintain a place like Chatsworth needed the conjunction of two exceptional men like the sixth Duke of Devonshire and Joseph Paxton. It was not to be expected that their successors would equal them in enthusiasm, knowledge and taste. Consequently, the Chatsworth of to-day is not quite the place that Downing saw. The great features remain, of course—a noble palace in a noble park, with gardens perhaps too artificial for the taste of the present time, but it is no longer a great centre of horticultural activity and progress.

Asters and Golden-rods.

THE earliest Aster here is *A. cordifolius*, the Heart-leaved Aster in our language. Here are great beds of its large leaves, six inches or more long, covering the ground completely, just here with very few flower-stalks.

Gather it within the dense shade of the copse or forest and compare it with some grown in the open and you may think you have two species. The first has a slender stem, as green as its leaves, and pure white rays; in the sun its stout stalk is red or purple, with a broad corymb of blue or rosy purple flowers, whose disk florets are much more highly colored also; it seems to gain its full stature only in sunny or partly sunny places. You find great masses of its flowers along every wood-side through August and September, but the beds of great leaves are often absent, the plants having only cauline leaves. It is a handsome plant when well grown, and if it has at times a weedy look, it is because it attempts to grow everywhere, whether it can or not.

Almost as early is the Spreading Aster, *A. patens*, with its large, light blue flowers, more perfect in form than the blossoms of *A. cordifolius*. It may be known by its stiff and angular branches, which spread widely, and its narrow leaves, that clasp the stem; though this last habit is not peculiar to this species. It grows beside the first named, but is less abundant, lasting well into September.

The many-flowered Aster, *A. multiflorus*, a large, stout stemmed species, with pure white rays and red or brown disks,

is found here and there, but is hardly common. Its flowers are pretty, but are much concealed by the foliage; they do not make themselves felt from such a distance as those of *A. Nova Anglia* or *A. miser* do.

A larger and more showy species blooms about the last of August, the Red-stalked Aster, *A. puniceus*. It is four feet high, with long, narrow, bright green leaves, red stems, and long and numerous rays of a rich blue or violet, and brown disk florets. It grows in swamps and beside streams. It catches the eye from afar with its strong growth and bright flowers. One may overlook the others, but this one advertises the fact that Asters are in bloom and that autumn is at hand. The first of September brings the best of all, the New England Aster, *A. Nova Anglia*. Its growth started early last spring; it has been patiently building up its strong purple stems, crowded with its neat and abundant foliage, ever since. They are now four or six feet high, as the plants come into bloom. Its almost countless flowers are an inch and a half in diameter, with rays of the richest violet and brown disks which suggest the plush of a bumblebee's jacket. They have a strong fragrance, and are the only scented Asters so far as I know. They smell just like the Witch Hazel's flowers, which you may find before the Asters are gone. Could we see the particles of odor given forth by these two widely differing plants, would they have the same form and size and color? Heat and drought cut short the bloom of the New England Aster—and perhaps that of all other Asters growing in dry soils, for cool rains and gray skies make it glow best and longest. I almost imagine its colors are brighter on hard, poor soil, an effect due, perhaps, to the background of dull brown earth and fading herbage found in such places.

The Acuminate Wood-Aster, *A. acuminatus*, is found in shady woods early in September—a noticeable plant, a foot high, with a loose panicle of large, whitish heads with a spreading cluster of leaves just below it; the lower stem is naked. Soon comes the starved Aster, *A. miser*, one of the most floriferous of plants, in spite of its name; its flowers may be small, but their multitude makes up for that. They are pink, white, purple and blue on the same plant sometimes, due, perhaps, to their varying age, like the blue and paler flowers of *A. patens*. The hard, dry road-sides owe much to the slender growing starved Aster. Frost is nothing to it; it gathers fresh glory from being positively the latest flower. You may find it bending with its weight of flowers in the midst of deep drifts of fallen leaves, while *A. cordifolius* beside it is heavy with its ripened seed. A little spray of its pink and blue flowers, as fresh and bright as though it were the first blossom of spring, is almost more to you than the great purple plumes of the New England Aster were in their time, now so long past.

The Golden-rod contemporary of *Aster cordifolius* is the smooth Golden-rod, *S. serotina*, a fine species, three feet high, with purple stems, smooth leaves, and a bright inflorescence. Tramping through pastures and woods at this time, you see Golden-rods in bloom in the distance which you imagine may belong to other species, but as you come near you see the red stem and smooth leaves of *S. serotina*. *S. altissima* and *S. Canadensis*, upon which the autumn depends for most of its golden effects in these parts, are in bud, and biding their time, which comes in mid-August. They grow a foot high here and eight feet there; erect or drooping, and their variations are endless. Their mission is to light up every field margin, lane and wood-side in the land, and for this none of their forms come amiss.

We now come to a section of the genus that the popular eye hardly holds as Golden-rods at all; no artist puts them into his picture of autumn scenery; they are small, shy, woodland species, doing little to decorate the country. *S. latifolia*, with broad leaves and a golden spike; *S. bicolor*, of slender, erect habit, the only white Solidago, and even this has yellow stamens, whence its name; and the *S. casia*, a lovely plant in woods and shades. Most Golden-rod leaves and stems are rough to the touch and somewhat coarse looking, but no smoother plant grows than the blue stemmed Golden-rod. *S. casia*, a stalk of slenderest growth, having long, narrow leaves and a bunch of flowers at the insertion of each leaf; often gracefully bending like a long, golden garland. Then there is the grass-leaved Golden-rod, *S. lanceolata*, remarkable for its flat topped inflorescence; but no one locality can boast the seventy or more species of these two genera. That purple ridge over there, where they have Huckleberries and rattlesnakes, has a different set, and though the above list contains all my own, and will doubtless hold over large areas of Beech and Maple country in western New York, it will need large revision in the region of Chestnut, Oak and Pine anywhere.

Canaseraga, N. Y.

E. S. Gilbert.

* It is recorded that as many as 80,000 persons had been permitted to inspect not only the grounds but the house also during a single year before Downing's time.

New or Little Known Plants.

Spiræa Millefolium.

THIS remarkable plant, figured on page 509, was discovered in the valley of the Bill Williams Fork of the Colorado River of the West, in the Territory of Arizona, in the autumn of 1853, by Dr. J. M. Bigelow, the naturalist of Lieutenant Whipples' explorations along the thirty-fifth parallel for a railroad to the Pacific. It is now known to occur very sparingly at high elevations from Wyoming to northern California and along some of the mountain ranges of the Great Basin, and on the eastern slopes of the Sierra Nevada to the neighborhood of Owen's Lake, in south-eastern California, as well as in northern Arizona.

*Spiræa Millefolium** is a glandular-pubescent, spreading shrub with a loose habit, growing sometimes to a height of five or six feet. It has stout branches covered with thin reddish bark, separating readily into thin deciduous scales and narrowly lanceolate leaves, which resemble those of *Chamæbatia*, fascicled or sometimes scattered near the extremities of the branches. They are pale gray-green, one to three inches long, twice pinnate, with numerous pinnæ and minute oblong-obtuse leaflets. The flowers are produced in slender terminal panicles six or eight inches long. The calyx is top-shaped, with acute erect divisions rather longer than the tubes, but shorter than the orbicular-obovate white petals, which are about an eighth of an inch long. The stamens are included. The five carpels are nearly pubescent or glabrous at maturity, and two-valved to the base, with seeds the twelfth of an inch long, somewhat attenuated at the two extremities.

I found this plant growing in considerable abundance in the autumn of 1878 on the dry and arid foot-hills of the Monitor Range, above the elevated Fish Spring Valley, south of Eureka, in central Nevada; and was fortunate in securing a quantity of the seeds, which germinated in the Arboretum, where this plant has quite unexpectedly proved entirely hardy, and has produced flowers and fruit for several years. It may now, I believe, be seen also in several European collections. The whole plant, like many others of the Great Basin and other arid western regions, is strongly impregnated with the odor of creosote. *Spiræa Millefolium* will interest probably the botanist more than it will the cultivator of purely ornamental plants, although the foliage is not without beauty.

Maximowicz proposes the genus *Chamæbatiaria*† for this plant, adopting the sectional name in *Spiræa*, first used by Professor J. C. Porter—a view which will not probably be adopted by all American botanists. C. S. S.

Plant Notes.

Vaccinium Vitis-Idæa.

AMONG the many varieties of edible berries that abound throughout Canada, none occupy a higher place in the economy of nature than the northern Cranberry, better known in the south as the Cowberry. Deemed of no value in the warmer parts of Canada, and pronounced by Gray to be "acid, and rather bitter, mealy, barely edible," it seems, when in its own home in the cold, rocky woods of the north, or along the shores of Hudson Bay and the Arctic Ocean, to derive size and flavor from the very conditions that dwarf and kill its less hardy competitors. For there it is not "acid and rather bitter," but simply acid, and far from being "mealy." It is firm and juicy, and, when cooked, is pronounced by those who eat it to be equal, if not superior, in flavor to the fruit of the true Cranberry, *Vaccinium macrocarpon*. Along the Gaspé coast and the north shore of the Gulf of St. Lawrence, the fishermen's families gather this fruit in large quantities for their own use or for sale, calling it the "Low bush Cranberry;" and, throughout the whole of northern Canada, hunters and trappers, as well as the native Indians, have frequently to depend upon it for food when game and fish are scarce.

* *SPIRÆA MILLEFOLIUM*, Torrey, *Pacific R. R. Rep.*, iv., 83, t. 5.—Brewer and Watson, *Bot. California*, i., 179.

† "Adnotationes de Spiræaceis," in *Act. Hort. Petro.*, vi., 225.

But it is not man that this useful berry is of the greatest service. It forms the most important, and, in some places, with the fruit of *Empetrum nigrum*, the sole food of the larger migratory birds, as they return from the south in early spring; and the islands in some of the large lakes of the north and in Hudson Bay are at times covered with geese of several species that have stopped to rest and feed. It is in the spring, immediately after the snow disappears, that this berry seems to be most sought after by birds and animals, partly, perhaps, because it is then soft and sweet, but principally, no doubt, on account of the scarcity of other food, although grouse, partridge and ptarmigan eat it at all seasons, even when only half ripe. In the spring, in suitable localities in the wooded country, it forms the favorite food of the black bear, and on the islands in Hudson Bay and along the Arctic coasts the polar bear spends much of his time in tearing up the low evergreen plants, in order to get at the fruit more easily; for it is on the under side, and almost touching the earth, that the berries are to be found in the greatest numbers. Immense patches of ground covered with the dead plants may often be found, telling where bruin has been at work. All summer long the last season's fruit may be found mixed with the flowers or with the green berries, and is then eaten by many birds in preference to anything else.

Ottawa.

J. M. Macoun.

Holiday Notes in Southern France and Northern Italy.—II.

MUCH of interest to the gardener is to be seen in and about Turin, the principal city of Piedmont and once capital of Italy. There are many long, broad, straight streets planted with various species of trees, several gardens and pleasant squares. The most noteworthy features observed by us I shall try to condense into the present paper; many places were, however, visited which lack of space prevents me from mentioning. One of the favorite promenades of the Turin people is the *Giardino Valentino*, on the left bank of the Po; this is easily reached by tram, and is well worth a visit. The royal chateau, "Il Valentino," a turreted building of the seventeenth century (now used as an engineering college), gives its name to the garden. The ground seems to have been well laid out, and is not broken up by paltry beds, as is so often the case in similar places. Groups of Planes, Pines, etc., and a few fine single specimens of *Arbor-vitæ*, Red Cedar, etc., stand out well on the broad stretch of grass, which, however, had a coarse and neglected look in comparison with a well kept English lawn. Rock-work, apparently constructed on false principles, bordered the steps and slopes leading from one level to another, but no plants relieved the bare, even forbidding, aspect of what surely might have been made a pleasing feature.

The Botanic Garden is, like so many continental establishments of a similar character, not open to the public, but visitors desirous of seeing it can obtain admission on application to the doorkeeper. Many very fine trees exist in the by no means extensive grounds, and, among them, the following struck us most: *Zelkova crenata* (grafted on Elm), planted quite small forty-one years ago by the present curator, and now a huge tree four feet through at the base; this is the biggest specimen I have yet seen of this interesting Caucasian tree. *Fagus ferruginea* seems to be quite at home in Turin; in Britain, as far as my experience goes, it makes hardly any headway at all, and is inferior in every respect to the European Beech. The Kentucky Coffee (*Gymnocladus dioica*) was represented by a splendid tree, laden with pods. The most remarkable of the other American trees were a White Oak (*Quercus alba*), about seventy feet high, with a trunk more than three feet through, and a Bur Oak (*Q. macrocarpa*), about the same height, with a trunk two feet in diameter; in Britain and in other countries of northern Europe none of the American White Oaks thrive; on the other hand, the Red Oak (*Q. rubra*) and the Scarlet Oak (*Q. coccinea*) make huge trees, and grow much more rapidly than our European species. A tree of the Bitter Nut (*Carya amara*), with a trunk two feet through, had attained a height of about seventy feet. The first Locust (*Robinia Pseudacacia*) introduced into Piedmont is also to be seen in the Turin Botanic Garden; it is still a fine, vigorous tree. No one familiar with the Sweet Gum of the Levant (*Liquidambar Orientalis*) in British gardens only can form any idea of the beauty of the species under conditions suitable to its development; at Turin it is a graceful tree, from forty to fifty feet high, and it flowers and ripens fruit, though not every year; in England it only makes a dense dwarf bush—specimens at Kew do not seem to have increased in size to any appreciable extent during the last fifteen years or more. *Fortunea Sinensis*, an interesting ally of the Hickories and Walnuts,

Fig. 137.—*Spiraea Millefolium*.—See page 508.

ripens seeds freely under the sunny Italian sky; the Turin plant was a fine, handsome bush some nine feet high. This, as well as the Japanese *Stachyurus præcox*, which flowers and fruits freely in company with the above-mentioned trees, only succeeds under exceptionally favorable conditions in England. Another member of the Walnut family, *Pterocarya Caucasica*, sixty feet high, with a trunk three feet in diameter, was laden

in festoons from the roof. Only a few of the handsome flowers were to be seen at the time of our visit; but when the plant is in full blossom it is, so the Curator informed us, one dazzling mass of deep red. *Tecoma jasminoides*, too, flowers equally freely and attains dimensions as large as those of the plant previously mentioned. *Dioclea glycinoides*, an Australian climber, was very showy with its long racemes of scarlet,

with its long pendulous spikes of small winged nuts. A big Maidenhair tree (*Ginkgo biloba*), seventy feet high, and an *Idesia polycarpa*, thirty feet high, were among the finest of the Japanese trees. The Himalayan Spruce (*Picea Morinda*) was represented by a small group of fine pyramidal specimens from fifty to sixty feet high. *Sterculia platanifolia*, a species which grows so rapidly and produces such a fine effect in northern France, is here a round-headed pollard, the long, thick shoots being killed back more or less every winter.

Amongst other features of special interest noted in the open air were a Jujube (*Zizyphus jujuba*), laden with fruit, and close to it a fine *Aristolochia ornithocephala*, flowering abundantly. The latter, however, will be housed before winter sets in. A nice lot of terrestrial Orchids (European species) were growing in pots, not plunged, but merely standing on gravel in partial shade. A dense covering of the commonly cultivated *Selaginella Kraussiana* made an excellent substitute for the grasses, etc., amongst which they grow in a wild state. This plan is well worthy of a trial, as very few orchid growers, professional or amateur, succeed with many of these peculiarly interesting plants, numbers of which are as beautiful in the color of their flowers as these are quaint and strange in form. In England we do not, as a rule, get sufficient sunshine for the Wild Potato-vine or Man-of-the-Earth (*Ipomœa pandurata*). In Turin, however, it was a splendid object, clothing a stump fifteen feet high, and literally covering it with large, beautiful, white, purple-throated flowers. *I. Quamoclit*, too, generally grown as a warm greenhouse plant with us, was a fine sight in the open, close to the species just named, the finely cut, slender leaves and profusion of bright scarlet flowers affording a combination as charming as it was novel to us.

As far as in-door cultivation is concerned English gardeners have not much to learn from Italian practice. The houses were heated by steam, but the plants, excepting some in a large conservatory, call for no remark. The climbers in the last-named structure were exceedingly fine, and the large, twisted stems of the Bignonias helped one to realize travelers' descriptions of the vines in a tropical forest. *Bignonia Cherere* covers a large space of back wall, and hangs

pea-shaped flowers. A large bush of *Grevillea asplenifolia* (recently figured in the *Botanical Magazine*) was here some fifteen feet high, and bore the name of *G. longifolia*. Close to this was a bush of the Japanese *Osmanthus Aquifolium*, which, on enquiring the reason for its cultivation under glass, we learned, had repeatedly failed in the open at Turin, the winters proving too much for it.

Perhaps the prettiest of the squares is the Piazza dello Statuto, with its huge allegorical monument, commemorating the completion of the Mont Cenis tunnel. As the guide-books say, "the genius of science is seen soaring above a chaotic pile of granite rocks, on which lie the stupefied and conquered giants of the mountain." The mass, at one end of a pretty fenced-in garden, is surrounded by water, bordered with a broad Ivy band, through which, here and there, emerge Yuccas. At the back are Bamboos. There is an excellent piece of turf, with groups of fine Lagerstræmias (in full flower at the time of our visit), *Hydrangea quercifolia*, Judas Tree (*Cercis Siliquastrum*), etc. A good bed of Colocasia and green and red-leaved Cannas was pleasing, and did not look at all out of place.

The Plane, the same as that mentioned in my last paper, is in Turin, undoubtedly, far and away the best street-tree. In some of the broadest streets the trunks of the trees were protected by a fenced-in border, about four or five feet wide, and a hedge of the Chinese *Spiræa Cantonensis* occupied the distances between them. In other places Forsythias were grown under similar conditions, and in others again, Noisette and China Roses. The constant waterings these shrubs require is, no doubt, of immense advantage to the Planes in that hot and thirsty soil. Oak avenues obtained in some parts of the city, and Elms elsewhere, but the oak-stems were riddled by the larvæ of the goat moth, or some equally objectionable enemy to trees, and the Elms were badly attacked by various fungi. The Plane, however, everywhere seemed clear from both fungoid and insect attacks.

The fruits of the Azarole (*Cratægus Azarolus*), about the size of a small Medlar, were offered for sale in the markets. This species is hardy enough with us, but it flowers sparingly and rarely ripens its fruit in the comparatively sunless climate of Britain.

To the south of Turin is the village of Moncalieri, picturesquely situated on a ridge of hills, the highest spot being crowned by the royal château in which Victor Emmanuel died in 1823. From this point the snowy summits of the Alps are visible on the left, and a good view of the Turin hills is obtained. Large Spruces, Junipers, Red Cedars, Weymouth and other Pines adorn the grounds of the château. The wood behind is simply Oak and other indigenous trees. A dazzling mass of blue along the top of a wall in the Via Petrarca immediately attracted our attention. It turned out to be *Ceratostigma plumbaginoides* (better known under its old, but incorrect, name of *Plumbago Larpenæ*). This handsome Chinese perennial evidently requires a sunny spot, a rather dry situation and soil—perhaps rather poor than otherwise—for its beauties to develop to their fullest extent. Along the road-sides we noticed from the train which took us back to Turin fields of Indian Corn, Millet (*Panicum miliaceum*) and *Erigeron Canadense*, a yard and a half and more in height, occurring as a weed amongst the lower-growing crops. This New World weed, now spread over the whole of Europe, was accidentally introduced into Germany, about half a century ago, in a stuffed bird.

Kew.

George Nicholson.

Cultural Department.

Notes on Begonias.

DURING the past summer, with its storms and excessive rainfall, which ruined so many ordinary bedding plants and shortened the bloom of all but the most sturdy flowers, one could not but admire the hybrid Tuberous Begonias, which reveled in the abundant moisture and from early July till now have ever shown fullness of bloom which rain-storms seemed only to improve. A wet period which ruined Geraniums and other soft plants left the Begonias in renewed vigor and full flower. The improved hybrids which we now have are the product of many species and selections from various crosses, so that it cannot be said that all seedlings and plants are equally adapted to out-door culture; but with some care one can select such as will prove capital out-door plants, which, planted in proper position, cannot fail to prove satisfactory, at least in this latitude. The proper position seems to be one which receives sunlight only a portion, say an hour or two,

of each day. The soil should be light, rich and perfectly drained. The most satisfactory kinds for such a position are the single ones, and care should be taken to select those of a sturdy and erect habit. The double varieties are of a much more slender habit, and, while not as showy in the borders, they have a grace of their own and are well adapted to out-door culture. Good drainage is of first importance, for stagnant moisture will cause a wholesale rotting of corms and loss of plants. Otherwise there seems no difficulty connected with their culture, though an occasional stem will be attacked in close weather by some parasite.

Like all free flowering, fast growing plants, these, to be well grown, require copious supplies of liquid manure. It is, perhaps, needless to say that hybrid Tuberous Begonias range in color from pure white, through most delicate pinks and salmons, to the clearest scarlets and reds of innumerable shades, and yellows from faintest primrose to clear gold, and are very free from shades of magentas and "blue-reds." In form they range from the single four-petaled flowers, which, in perfection, should make an almost perfect circle, to the fullest double. A stock is readily procured, as they grow rapidly and easily from seed; cuttings strike quickly and corms may be divided to single eyes. It is well in forming a collection to secure at least a few named kinds; a postal note to one of the leading French houses will bring a collection of good named ones (though not the very latest productions) at the cost of ordinary "rogues" or culls here. These superior kinds will furnish abundant seed for future cultivation and better than can be otherwise obtained; for, after trying seed from the most trustworthy dealers, one finds it difficult to believe that the best is sent out.

The cultivation from seed is of the simplest. Scatter it as thinly as possible over some light earth, not too moist, and cover the pan or pot with a glass; over the glass lay paper to exclude light, and keep in a moderate temperature. Do not cover the seed with earth. The pan should not be allowed to dry out, and, when necessary, it must be moistened by dipping it in water, deferring this, if possible, to nearly the time of germination, which will be in about a fortnight. Begonia seeds are so extremely small that the point of a penknife will hold several hundred. The seedlings are not at all "miffy," but are rather tedious to handle, as it is usual to pick them out while so small that they must be handled with a moistened camel's-hair brush, and a smooth ivory point as a dibber.

They bloom while small, and seed sown in January will begin to come into bloom in June, and, perhaps, even earlier. A collection of Tuberous Begonias is incomplete without some of the species, among which there is a wide diversity, both in foliage and flower. To mention only a few, *B. Martiana*, *B. racemiflora*, *B. grandiflora*, and *B. diversiflora*, old introductions, are very interesting and distinct, with lovely flowers (the last named, being a rose color and the others an opaque pink), on short axillary peduncles. *B. Natalensis* is an interesting and distinct species, with small pointed leaves of a light metallic green, red stems, and profuse, small, four-petaled flowers, of a peculiar burnt-orange shade. The habit of the plant is somewhat suggestive of *B. Weltoniensis*. *B. geranioides*, a new species, also from Natal, is interesting from the resemblance of foliage to the Geranium, but its culture has not been successful with me.

Of the later blooming Tuberous Begonias, *B. octopetala* is well known as a sturdy late flowerer, and Lemoine has crossed this with some of the more showy species in the endeavor to improve the flowers and furnish bloom after the ordinary hybrids have passed out of bloom. The new cross has foliage more pointed, but showing clearly the Octopetala parentage. The variety Anemone is but just showing color with me, while the others are but giving indications of flowering. I hope to report later as to this interesting cross.

B. Scharffiana, a new introduction from Brazil, is a fibrous rooted kind, and in a young state seems very promising. The leaves are thick, covered with hairs on both sides, deep green above and red beneath. As the flowers, which are white, are said to be of good size, it will no doubt be an addition to the flowering varieties. Plant fanciers, who are fond of collecting, will find in Begonias a wide field, as there are said to be about four hundred species, with innumerable hybrids, and from the little *B. Imperialis*, with its leaves of embossed velvet, to the giant Rubra, there is a wonderful diversity of size, form, foliage and flower.

Mr. Thorpe has lately, in GARDEN AND FOREST, given a list of some good fibrous rooted kinds, while the raisers of Rex varieties bring forward every season wonderful new varieties to please those who fancy variegated foliage. J. N. Gerard.

Elizabeth, N. J.

Pandanus.

AMONG the various members of this interesting genus are found some of the most useful foliage plants for decorative purposes in general cultivation, and for this purpose some of the species are grown by thousands annually by commercial florists. Being of easy cultivation in most instances, and especially so in the case of the two most useful sorts, *P. Veitchii* and *P. utilis* (if a few reasonable conditions are observed), they have become very well known and appreciated. Though most species of *Pandanus* are natives of the South Sea Islands, many of them may be grown in a moderate temperature, say from 55° to 60°, and, in fact, when grown at this temperature, that is, under cool treatment, the plants are found to be in much better condition to bear exposure to changes of atmosphere such as are unavoidable when they are moved about for decorating purposes.

The best known representatives of the Screw-Pines, as the

off is perhaps the most critical time for them, because if kept too damp or in too close an atmosphere many of them will rot off.

After this period the most necessary points in their cultivation are to keep them potted on, so that the lower foliage does not suffer from starving, and to place them in a light house, only slightly shaded in midsummer, giving them space enough to develop their leaves, for when crowded they quickly become weak and drawn.

Pandanus Veitchii, when well grown, is undoubtedly the finest of the genus, and can be managed in the same way as *P. utilis*, though it is possible that *P. Veitchii* will stand more abuse in regard to over-watering than *P. utilis*. Either may easily be injured in this way during the winter. *P. Veitchii* is only propagated by cuttings, which will root at almost any season if given a reasonable amount of care. They are best separated from the parent plant with a small portion of the hard wood attached, so as to form a heel for the



Chatsworth.—See page 508.

Pandanus family is frequently called, from the spiral arrangement of the leaves about the stem, are *P. utilis* and *P. Veitchii*, the first named being a native of Madagascar, and long known in cultivation, and the latter of more recent introduction, having been one of the many fine plants brought into horticultural use by the late John Gould Veitch.

As is well known, *Pandanus utilis* is readily propagated from seeds, which have become almost a staple article among the larger seedsmen of late years, and when the seeds are received in good condition they will come up in from six weeks to two months from the time of planting if strong bottom heat is given. These seeds, of a peculiar angular shape and from one to two inches in length, are compound, producing several plants from each; and there are sometimes seven or eight shoots, which may be easily separated from the seed with a sharp knife. They should be potted off in two and one-half or three-inch pots, as the size of the plants may require, after which they should be shaded for several days, until they become established. The first few weeks after the seedlings are potted

cutting. Plenty of pot room and light should be given to this plant, as, when well colored, it makes one of the most effective specimens for exhibition purposes.

P. candelabrum, perhaps better known as *P. Javanicus*, var., is another handsome variegated variety of rapid growth, but from its branching habit it makes a less shapely plant than the preceding. It is also propagated from cuttings in the same manner as *P. Veitchii*, and is of easy cultivation.

Among the species with plain green foliage, perhaps *P. reflexus* is the most notable, though rather an unpleasant plant to handle, the long, pendulous leaves being reflexed or recurved to such a degree as to almost hide the pot of a large specimen. Besides this, it is the best armed species of the genus, the spines being very numerous and strong, both on the edges of the leaves and on the under surface of the midrib.

A pretty species of dwarf habit is *P. graminifolius*, a native of Tenasserim, and having narrow, grassy leaves of dark green, edged with small, white spines. It is of branching habit of

growth, and is useful for dinner-table decoration or for small ternerics.

P. heterocarpus, or *ornatus*, is a highly ornamental species from the Philippine Islands, where it grows to a large size. It is a vigorous looking plant, with broad, shining green leaves, which attain a length of five to six feet. It makes a fine specimen where space can be spared to develop it. It will be found to do best in a stove temperature.

The soil best suited for the Pandanus is a rather light loam with a fair proportion of sand and some well rotted manure. The pots should be well drained, so that the soil shall not at any time become sodden. With ordinary care in watering during the winter, the successful cultivation of the plants is not difficult.

Holmesburg, Pa.

The Guava in Florida.

GUAVAS are seldom, if ever, seen in our northern markets in their natural state, although guava jelly is a very common northern luxury. In south Florida they are the peaches of the region, and are grown with but little cultivation. The fruits are very healthful, and when the taste for them is once acquired they are relished as much as peaches, and are prepared for the table in the form of jellies, jams, pies, and served raw with cream. Little attention has been given to the manufacture of guava jelly for market in Florida, but it is confidently believed that it could be made immensely profitable in the southern counties.

Aside from their delicious fruit, the Guava bushes are of value for their ornamental qualities, with their evergreen leaves, polished stem and pure white flowers. The plants attain the height of small trees, averaging from fifteen to twenty feet in their native country (Tropical America). They bear short-stalked, egg-shaped or oblong leaves, with strongly marked veins covered with a soft down. The flowers are borne on axillary stalks, and the fruits vary very much in size, shape and color, numerous forms and varieties being cultivated. Cattley's Guava is the best kind for south Florida, as it is more hardy than any other. The fruits are pear-shaped and of a purple or claret color, and somewhat smaller than the common guava, though more prolific. The fruits begin to ripen in June or early in July, when not disturbed by cold, and continue blooming and bearing without interruption for months.

The soil for the Guava should be moist and rich; and the plants should be copiously watered in dry weather. It is better, in Florida, to train the plants to bush form until the roots get established, which will require several years. They should be protected from occasional cold periods. If the soil is kept rich and moist there will be a crop of fruit the latter part of summer, even though the stems are nipped in the winter.

The fruit is of much too perishable a nature to allow shipment to any great distance in its natural state, and for that reason very little attention has been given to the cultivation of the plants in Florida. A great deal of the low soil in the southern counties is well adapted to the cultivation of this fruit, and at present it cannot be utilized for any other purpose. Land which can be put into first-class condition for the Guava by a little drainage may be had for a few dollars per acre. Low hummock land is especially fitted for the Guava plants. In Monroe, Manatee and De Soto Counties there are several groves of these trees, which annually produce enough fruit for the manufacture of a great quantity of jam and jelly.

The Guava takes its name from the Mexican *Guayaba*, and was probably brought to Florida either from Mexico or the West Indies. The white Guava (*Pisidium Guayaba*, var. *pyriferum*) is sometimes found here, but it is very rare. The fruits are pear-shaped, about the size of a hen's egg, covered with a thin, bright yellow or whitish skin filled with soft pulp. *P. Guayaba* is the most common species and it produces most of the Guava fruit. The trees average from fifteen to twenty feet in height, and the fruits vary very much in size.

P. Guayaba, var. *pomiferum*, is sometimes called the red Guava and produces a large globular or apple-shaped fruit. The pulp is of a dark hue and not so well flavored as the former. It is seldom eaten except when manufactured into jelly or jam.

A few plants of *Pisidium Cattleyanum* make an attractive addition to the shrubbery around the house. The flavor of the fruit is an agreeable acid-sweet, almost like that of the strawberry. The trees produce abundant fruit of a large, spherical shape, and of a fine deep claret color. The rind is pitted, and the pulp is soft and fleshy, purplish near the skin, but nearly white in the centre.

New York.

George E. Walsh.

Orchid Notes.

PREPARATION FOR WINTER.—To insure a good display of bloom from the present time until March and April next, some Orchids will need more than usual attention. During this period a number of the deciduous Dendrobiums contribute their lovely flowers. They have now completed their new growths, and should be removed to a temperature much cooler and drier, with an abundance of air to ripen and strengthen them before they commence to bloom. Avoid keeping the atmosphere moist, or new growth will again start, and this means few or no flowers. They should occupy this position until the nodes show signs of swelling, when they may be returned to their former situation until the flowers are well expanded, and these will remain several weeks in good condition if brought again into the coolest end of the house. *Dendrobium Wardianum*, *D. crassinode*, *D. Falconerii*, *D. Leecheanum*, *D. Ainsworthii* and *D. nobile* are plants which succeed under this treatment. There are also among the Cattleyas some handsome winter-blooming species. The most popular among them is undoubtedly the beautiful *Cattleya Trianae*, an Orchid now largely grown, both for private and commercial purposes, on account of the ease with which it can be flowered, its free habit of growth, and the great variation of its blossoms, which are from the purest white to a fine rosy-purple. The plants of this species have just completed their growth, and in a month hence will begin to enrich our houses with their flowers. From the present time less water should be given until the buds make their appearance in the sheaths, when the supply should be increased. Three to five flowers are produced on a stem, and when cut they keep several days in good condition, and can be had continuously until March and April if a sufficient number of plants are grown. This *Cattleya* is followed by *C. Percivaliana*, together with *C. Mossiae* and its varieties, all very showy plants, and requiring similar treatment.

A few very showy *Laelias* lend to the display at this season, and among them are the beautiful *L. autumnalis*, *L. anceps*, *L. albida* and others, which all do well if exposed to the light until the flowers are well developed, which thus attain greater size and a richer color. In many collections we find *Cypripediums* pushing up their spikes, and the old favorite, *C. insigne*, is crowded with buds, as are *C. villosum* and *C. Harrisianum*, though not so abundantly. These varieties are now largely grown for cutting, because the flowers are stout and durable, and remain several weeks in good condition.

Comparatively few *Oncidium*s appear at this season, *O. tigrinum* and *O. splendidum* being, perhaps, the most prominent among them. Both are bright yellow flowering species. *O. varicosum* is also a showy species, with blossoms produced a little earlier than the two varieties above noted. *Calanthes*, when well grown, are among our finest Orchids. Most of them have completed growth, and will now require less water until the spikes present themselves from the base of the bulbs. Where *Phalaenopsis* are grown, they will be found pushing their spikes rapidly. They should be protected from drip as well as direct sunlight; and should be carefully examined for slugs, which do them much harm. *Celogyne cristata* will soon develop its lovely white blossoms. Plants with newly-made bulbs will not need much water until the spikes are seen breaking from their base. This is a charming Orchid both for cutting and decorative purposes.

Summit, N. J.

A. Dimmock.

Oncidium Lanceanum.—This very distinct and handsome species was first discovered on the banks of the Surinam River, in Dutch Guiana, in 1834, by Mr. John Henry Lance, to whom it was dedicated by Dr. Lindley, who, in his *Folia Orchidaceae*, remarks that "this beautiful plant seems confined to Surinam." Such, however, is not the case; for it has been imported of late years from near the Roraima Mountains in British Guiana, and also from northern Brazil, near Manaos, a town situate at the juncture of the Rio Negro with the waters of the mighty Amazon. There are several plants now in flower here, and they form one of the chief attractions of the Orchid-houses. *O. Lanceanum*, like *O. bicallosum*, *O. luridum*, *O. Cavendishianum* and a few others, is remarkable for the absence of pseudo-bulbs. The broadly oblong-acute, leathery leaves, which spring from knotty rhizomes, are a foot or more long, four to six inches broad, and of a dull green, covered with dark spots, and occasionally suffused with a bronzy tint. At one time these spots were supposed to indicate ill-health, but experience has proved their appearance to be quite natural. The stout, slightly-branched erect peduncle is produced a little below the base of the leaf, and attains a length of one or two feet, bearing, in many cases, from twelve to twenty-four

large flowers, which emit a delicious odor akin to that of vanilla or of garden Pinks. The sepals and petals, with wavy margins, are yellow, tinged with green, the upper concave sepal and the two petals being covered with large, roundish, purple-brown blotches, which become confluent at the base, while the two lower elliptic-obtuse sepals are nearly purple-brown throughout, having a streak of yellow appearing here and there. The lip presents a striking contrast to the other segments in its color, which is a beautiful rose-purple on the broad, flattish anterior lobe, passing along a narrow isthmus into deep mauve-purple at the base, where there are three projecting plates or crests, and a triangular auricle on each side, while the short, thick column is rendered conspicuous by its roundish, incurved fleshy wings of a bright, shining purple.

There are several forms of this fine species in cultivation, but the most distinct are *Superbum* and *Louvrexianum*, specimens of which are now also in flower. The former is distinguished by having larger and more brilliantly colored flowers than is usual in the type, but this is probably owing to its geographical distribution, as it is found only in the region of the Rio Negro. The latter variety, however, which is named in compliment to M. D. Massange de Louvrex, of Marche, Belgium, is remarkably distinct, and may be known at once by the pure white apical half of the lip, the deep purple basal portion of which appears to be thus rendered more intense by the contrast.

For many years *Oncidium Lanceanum* was a difficult plant to grow well, but now that cultivators know its requirements, and the conditions under which it grows in a wild state, it is met with in most collections, as it is found to grow just as easily as its congeners. It might be mentioned that in the Rio Negro region, during July and August, which is the dry season, there is scarcely any rain whatever, and the thermometer reaches ninety-five degrees Fahr. in the shade at two o'clock every afternoon, and does not sink below seventy-five degrees Fahr. at night. Taking this into consideration, and also the fact that the plants receive plenty of moisture by evaporation from the rivers along whose banks they grow, and also by the tremendous torrents of rain at certain times of the year, it is evident that they must be cultivated in a warm and moist atmosphere, with a temperature of seventy to eighty degrees Fahr. during the period of growth, and at the same time giving abundance of water. When in flower less water is required, and a slightly cooler atmosphere will tend to keep the flowers in good condition for several weeks. When the flowering season is quite over the plants should be placed in a cooler house, where they may enjoy a good rest for a couple of months, but they must receive a little water at intervals to prevent the growths from shriveling, as the plants have no pseudo-bulbs to retain nourishment. Well drained baskets, with a compost of rough, fibrous peat and moss, with charcoal mixed, is very suitable, as the baskets can be hung from the roof, thus allowing the plants plenty of light.

St. Albans, Eng.

John Weathers.

The Hardy-Plant Border.—It is a common error to suppose that hardy herbaceous plants need little or no care. Hardy plants require as much thought and attention as green-house plants. Many well recommended and ambitious young gardeners have little experience with hardy plants, and thus the work of planting and cultivating them is too often left to unskilled laborers. Proper preparation of ground, careful selection, judicious grouping and association of color for definite purposes, frequent division and weeding out of worthless kinds, and the propagation of the best species and varieties must always be kept in mind, and all this demands personal interest and supervision.

In addition to the propagation of proved varieties, the enterprising gardener will, every year, test a few new kinds in nursery beds to ascertain their hardiness and floral merits before they are planted permanently or rejected. Where, as is frequently the case, the owner is away from home during the warm months of July and August, special attention should be paid to the grouping of certain kinds for spring and fall displays.

The fall of the year is the best time to prepare the ground, and if the soil is not already rich and deep it should be made so. Many kinds are best planted at this season, and the others should be planted as early in spring as possible. The taller growing kinds should be placed so as not to exclude from view, and shut off light and air from the smaller kinds. If any choice varieties do not seem to make much progress, have them housed or stored in a cool frame for the winter, and take up desirable kinds for propagation during the winter or early spring. Cover the borders with leaves, if obtainable, and just lay

enough manure on them to prevent the wind from carrying them away. Or light manure will suffice when leaves are not to be had. It is better to leave the surface of the soil rather rough, or broken up, than smooth and finely raked. It takes rain without shedding, holds the moisture better, and is not so liable to be parched by the sun after a heavy rain.

Wellesley, Mass.

T. D. Hatfield.

Primula cortusoides Sieboldii is one of the brightest colored species, and in this respect stands unrivaled among hardy Primroses. Our first acquaintance with this plant was made when it was grown in pots for decorating the conservatory, and very suitable it is for that purpose, but now that there is no question of its hardiness, and plants are easily procured, one can muster up courage enough to plant them out in the open ground. Care should be taken when selecting a place for the plants, to choose a half shady position where the rays of the sun during the hottest part of the day may not strike them, as in this climate few Primulas can endure complete exposure to the sun. It is well to bear in mind also that this variety is seen to the best advantage when associated with others of the genus, such as *Primroses*, *Polyanthus* and *Auriculas*, and in this way *P. Sieboldii* shines conspicuously bright, and its large flowers of deep rose, over an inch across, borne on many flowered stems just above the foliage, cannot be surpassed for their pleasing effect in early spring. The foliage dies off completely in fall, and this is the proper time to transplant. It should be borne in mind that this species is strictly surface rooting, consequently the roots should be only slightly covered with soil, and should then receive a top dressing of well decomposed manure. This may be removed in spring, just as the plants begin to show signs of starting, as all the nutriment will have been appropriated by the soil; and as a protection the manure is no longer needed. With us Siebold's Primrose bears seed freely, and if this is sown when ripe it soon germinates, and in twelve months makes flowering plants. We have now a fine collection for flowering next spring. Florists have already been at work on this plant, but the progress made toward improved varieties has not been remarkable. The type still holds its own against all the seedling sorts, although some of these are pretty enough and well worth growing. Amongst them are two white varieties, *Intermedia Alba* and *Grandiflora Alba*. These have the merit of being very distinct. Amongst others we have tried are *Ruby*, *Laciniata*, *Lilacina*, *Clarkæflora* and *Purple Queen*, the varietal names of which are sufficiently descriptive. They are the best of some twelve or more varieties usually seen in trade lists.

Passaic, N. J.

E. O. Orpet.

A contrivance for watering lawns is being largely introduced into English gardens where there is a system of water-pipes. It consists of three or four lengths of wrought iron tubing about one and a half inches in diameter, coupled by short lengths of flexible leather or rubber hose. The tubes are pierced at short intervals with wedge-shaped holes large enough to emit a wide-spreading, fine spray. Each length of tube has a pair of small iron wheels attached, which revolve in all directions, so that the apparatus can be turned about with ease. These portable irrigators have this year been introduced into Kew Gardens by Mr. Nicholson, the Curator, and have given great satisfaction, so that the lawns at Kew, which generally brown early in the season on the hungry, gravelly substratum, have been kept beautifully green throughout the dry summer. These irrigators are likely to become generally used in parks and gardens, as a firm of hydraulic engineers in London is manufacturing them on the same principle, calling them the Kew Gardens Irrigator. The apparatus is by no means new, having been in use many years in Paris, but, perhaps, it is not known to the owners of summer-browned lawns in America. There are two or three patterns (one with socket and ball fixings), but the one described above works most satisfactorily. Besides being used for lawn-irrigation at Kew, Mr. Nicholson has turned it to account in watering specimen trees, which have been greatly benefited thereby, especially evergreens and conifers, which, as a rule, do not get nearly so much moisture as they require even in wet seasons. Fortunately, a rational system of tree-cultivation is now practiced at Kew. Formerly, when once a tree was planted, it rarely received further attention, but now they are periodically top dressed with rich soil and thoroughly watered by the irrigators. The beneficial effects of this treatment of the old trees is seen in a short time by the renewed vigor of branch and leaf. It is hoped that this example, set in a public garden, will be followed in private gardens, where trees so generally suffer from neglect.

Kew.

G.

The American Forestry Association.

The Annual Meeting at Philadelphia.

THE American Forestry Congress held its eighth annual meeting in Philadelphia last week, and changed its name. It is now the American Forestry Association. This is an improvement. The Pennsylvania Forestry Association had its fourth annual meeting at the same time and place. The joint sessions were held in Horticultural Hall, and began on Tuesday evening, continuing till Friday afternoon. Hon. James A. Beaver, Governor of Pennsylvania, and the President of the Association, presided in a vital and stimulating manner, which did much to promote the systematic transaction of business. He was sometimes relieved by Hon. H. G. Joly, of Quebec, and Dr. Charles Mohr, of Mobile. Many interesting papers on forestry subjects were presented—more, indeed, than could be read. At least sixteen states were represented by delegates appointed by their Governors, as was also the province of Quebec. The Board of Education of the city of Cincinnati sent a representative, and there were delegates from some of the agricultural organizations of the country. The Pennsylvania Forestry Association and the people of Philadelphia entertained their visitors with a most engaging and satisfactory hospitality. All conditions were favorable, and the meeting was universally regarded as the best one ever held by the national organization.

The work began on Tuesday evening with an address by Hon. Carl Schurz on the general subject of the importance of forests, and of proper forest management, to civilization and national welfare. It was an interesting and impressive presentation of the facts of the condition and treatment of the forests on our public domain, with illustrations from the speaker's experience while he was Secretary of the Interior. He urged the necessity of the permanent maintenance of forest conditions in mountain regions as indispensable to the permanent and useful flow of the streams having their sources in them. After referring to the important economic considerations which should be recognized in national forest management, he spoke eloquently of the obligation of the people of this country to regard themselves as trustees to whom are committed interests of stupendous magnitude affecting the destiny of millions of human beings through all coming time.

The most important action of the meeting was the adoption of the resolutions introduced by Mr. B. E. Fernow, Chief of the Forestry Division of the Department of Agriculture, by which the association voted to petition the Senate and House of Representatives of the United States to pass an act withdrawing from sale the forest lands of the public domain until a Commission, to be appointed by the President, shall have made the necessary examination and reported to Congress what part of these lands should be kept permanently in forest. The resolutions also ask that the army shall be employed to protect the forests on the public lands from spoliation and destruction, if this becomes necessary, until the Commission shall have reported a plan for a permanent system of national forest management.

This is substantially the course that has been advocated by GARDEN AND FOREST, and which has been approved by a large proportion of the leading journals of the country. The readiness with which the American Forestry Association follows Mr. Fernow's lead in this important movement is an encouraging indication of enlightened and practical judgment, and all serious-minded and patriotic Americans should unite in making an effective presentation of the matter to Congress and to the President, in order that effective and speedy action may be secured. Unless this is done, it will soon be too late to prevent the permanent ruin of some of the fairest and most important portions of our national heritage.

A FORCIBLE SPEECH.

The discussion provoked by these resolutions was one

of the most interesting and useful features of the meeting. The proposed plan was opposed by Mr. Lemon Thompson, of Albany, New York, on the ground that it would be more in accordance with the spirit of our institutions and with our national practice hitherto, to sell all such forest lands to individuals who wish to buy them, and also for the reason that, as a matter of fact, the forests would be better protected under individual ownership than if managed by politicians and office-holders, appointed by the Government. Mr. Thompson was often interrupted, but held his ground sturdily until he had said what he wished. Effective replies were made by Mr. Fernow, by Mr. Herbert Welsh, of Philadelphia, Colonel Edgar T. Ensign, Forest Commissioner of Colorado, and others. But the most thorough and convincing speech of this discussion, and, indeed, of the whole meeting, was made by Mr. Richard J. Hinton. Mr. Hinton has recently attended the Senate Committee on Irrigation through the whole course of its investigations, traveling nearly fifteen thousand miles through the mountainous and arid regions of the west for this purpose. During the course of his eventful life Mr. Hinton has more than once happened to be at hand at the right time and place for action, but he probably has not often done a better quarter of an hour's work than in the forcible address in which he advocated the passage of these resolutions. He showed very clearly how impossible it is that individual citizens, or even the separate states, should deal successfully with the problems connected with the management and course of rivers which are thousands of miles in length, and which flow through the territory of a dozen different states. His arraignment of the criminal and stupid indifference which would wantonly exhaust in the life of a single generation the possibilities of our magnificent national inheritance "through a thousand onward years," and his appeal to the American people to act wisely while there is yet time for effective action, was a passage of remarkable beauty and power.

VARIOUS PAPERS.

In his address Mr. Schurz said: "The destruction of the forests of the country will be the murder of its future and its progress. It seems to me that wherever the forests cover the head-waters of great rivers the Government should keep possession. If the possession is gone, then regain it. Look at the valleys of the Hudson and Mohawk—already the flow of these rivers is diminished from twenty to thirty per cent. If the destruction of the forests continues the United States will be as completely stripped as Asia Minor."

Mr. Fernow, Chief of the Forestry Division, read a carefully prepared paper on "Methods of Forestry Reform." It is the one which he read to the American Association for the Advancement of Science a few weeks ago. We quote his observations regarding

STATE FOREST COMMISSIONERS.

"A state which is administering its trust for the people, a government by the people, who believe in education as the best means of advancing their interests, will not object to providing for the education of their agents, which alone fits them to exercise their duties of governing intelligently. What, then, can be of more pressing need in each state than a forest commissioner, whose duty it shall be to collect the facts upon which the forest legislation for his state is to proceed; who will represent the forest interests of the state; who, in gathering information in regard to the distribution, location, condition of forest areas, the rate and method of their decrease or increase, the relations of supply and demand of forest products, and information in regard to the relation of water and soil conditions in his state to forest areas, can also act as an educator of the people with reference to their forestry interests and as the officer in charge of the observance of forestry laws and forest police; and who would manage state (or school) forest lands where such may exist? Whatever legislation we may ask for, the appointment of such an officer is almost an unavoidable condition to insure the enforcement of forestry laws, while the value of his labors as a bureau of information can hardly be exaggerated or their necessity doubted.

"The same agencies may be employed by the government, to produce an economic reform, that are open to private

endeavor, with the one additional agency of compulsion. Education, persuasion and compulsion are all at the command of government. How are they to be employed? To what extent can they be expected each to do its share in producing the desired result?"

Dr. H. Nicholas Jarchow, of this city, read a paper on "Forestry Legislation in New York," in which he said:

"For the state of New York there is an important reason for a systematic business management of the state forests. Systematic forestry can be practiced only to advantage in large wooded areas. The farmer possessing from 100 to 200 acres will, in treating his wood plot, be led only by his personal wants and desires; the teachings of systematic forestry are to him of no avail, except that he may be induced to adopt a culture with a certain rotation. But it is quite different with the large wooded areas, which cannot be used for any other purpose except for raising forest trees."

GEORGIA PINE.

Mr. S. G. McLendon, of Thomasville, Georgia, read a brief, interesting and valuable paper on Georgia Pine, from which we should be glad to quote at greater length, but have space only for this:

"The practical question which invites solution at the hands of practical statesmanship is the proper method of nursing to ripeness the young trees not consumed, which, as I have said, represent from seventy to seventy-five per cent. of the actual number of trees on each acre. These are, many of them, turpentine at entirely too young an age, and almost literally bled to death. The great enemy of the forest, aside from the axe, is fire—fire which comes in the wake of the turpentine and the one which precedes him. A most thoughtless, and I might justly say insane practice, prevails in the pine region, of burning off the woods in early spring, in order that a small lot of worthless cattle may get an early bite of grass. These burnings impoverish the soil by destroying the vegetable matter that would, if left untouched, enrich it, and also destroy the young Pines that spring up from seed. How serious this damage is the future will fully realize. What the best policy to husband this wasting wealth will be I do not undertake to say, but if, without too serious an invasion of the domain of private right, it could be made penal to box trees less than twelve inches in diameter, and penal to burn the woods or set forest fires, I think a decided advance would be made in the direction of preserving our pine.

"The mill man thins out, the turpentine man destroys. The one cuts down only large trees, not over thirty per cent., while the other boxes not less than seventy per cent. Behind the first the forest fire is hurtful, behind the other it is destructive. In the one case it is simple assault and battery, in the other it is murder."

Mr. E. E. Russell Tratman, of Brooklyn, New York, read a valuable paper on "Economy in the Consumption of Railway Timber," of which the two principal suggestions were the use of other materials as substitutes for wood in constructing and operating railways, and the application of means for increasing the durability of the timber used for railroad purposes.

Colonel Edgar T. Ensign, Forest Commissioner of the state of Colorado, had a good paper on "Government Forest Preserves in the West," which was illustrated by large maps on the stage. He said the experience of the Commission, of which he is the head, had made it plain that national control of mountain forest regions, in which large streams used in irrigation have their sources, is a necessity, and that adequate management by the individual states is impracticable. Few men in the country have more knowledge of the practical problems connected with the functions of mountain forests than Colonel Ensign.

Mr. N. H. Egleston, the Recording Secretary of the Association, offered a series of resolutions expressing the sense of the meeting regarding the work of the agricultural colleges of the country, to the effect that they "should regard it as one of their most manifest duties to give the subject of forestry a prominent place in their curriculums, and that every experiment station should engage in investigating and making experiments in those branches of forestry which have special importance in the localities in which they are situated, or which are of general interest in their relations to agriculture and the arts." They were unanimously adopted.

Dr. J. M. Anders, of Philadelphia, read an interesting paper on "The Removal of Forests a Factor in the Causation of Floods."

Hon. Adolph Leué, Secretary of the Ohio State Forestry Bureau, read a carefully prepared and thoughtful paper on "Forestal Schools."

Professor J. T. Rothrock, of the University of Pennsylvania,

delivered an evening lecture on "The Forest Regions of North America," with stereopticon illustrations. These were remarkably beautiful and accurate, and the lecture was one of the most interesting and instructive features of the three days' meeting.

Professor Albert N. Prentiss, of Cornell University, read a paper on "The Hemlock," which we should like to print. He showed that the rate of growth of this tree is remarkably slow, and that it is being rapidly exterminated, as it is everywhere cut off for all the uses for which its timber is so well adapted, while no effort is made to protect the young growth and thus provide for a succession of crops of this invaluable tree.

Miss Grace Anna Lewis read a paper, which attracted much attention, on "The Oaks of Delaware County, Pennsylvania." It was illustrated by the exhibition of many beautiful paintings of the leaves and fruit of the trees. These were by Miss Lewis' own hand.

Mr. B. G. Northrop read an interesting paper on "Arbor Day in Schools."

A curious and interesting incident of the last hours of the meeting was the introduction of a very brief resolution in favor of taking the duty off lumber. This was offered by Mr. J. D. W. French, of Massachusetts, one of the Vice-Presidents of the Association, who supported it in a few moderate and well chosen remarks. There was no other discussion of the subject. There was not much time, indeed, but what there was, was mostly employed in protesting against any discussion of the resolution, and even against its introduction. Last year at Atlanta it was thought that it would not do to introduce it. But the question of a duty on lumber is entirely legitimate in a forestry association.

We have not space to mention all of the papers. More had been prepared than could be read during the meeting, although most of the time was devoted to them, and not much was used in discussion.

THE PENNSYLVANIA FORESTRY ASSOCIATION.

The arrangements for the meeting were chiefly in the hands of the officers of the national organization who live in or near Philadelphia, of the officers of the Pennsylvania Forestry Association and of the local committees. They deserve much credit for the thorough preparation which anticipated every need of the occasion, and of all who were in attendance. The vigor and efficiency of the state organization is highly gratifying and encouraging.

Very appropriately, the opening and the close of the meeting were in the hands of the Philadelphia forestry people. On Tuesday evening the assemblage was called to order by Mr. John Birkinbine, of the state organization, editor of *Forest Leaves*. He introduced Mr. Burnet Landreth, the President of the Pennsylvania Association, who delivered a graceful and interesting address of welcome, in which he alluded to the establishment in Philadelphia of the first agricultural and horticultural societies, and to the work of the great botanists and dendrologists, who early made the city famous. In the absence of the President, Governor Beaver, the response to the address of welcome was made by the First Vice-President, Hon. H. G. Joly, of Quebec, Canada, who said it was not the wish of forestry reformers to protect the woods against the legitimate demands of the lumberman, or the need of forest products for the use of the people, but only against unwise and wasteful methods of appropriating such products. He added, that there is no real antagonism between lumbermen and the Forestry Association, and that they should work together in harmony for the preservation of the forests in order to maintain permanent sources of timber supply. All of Mr. Joly's speaking during the meeting was of a very thoughtful and substantial character.

The afternoon of the last day was devoted to tree planting in Philadelphia's great park. There was a large assemblage on the John Welsh Concourse, near Memorial Hall. Here again, as at the beginning, Mr. John Birkinbine directed the proceedings. Seven handsome and vigorous young Oak trees, grown from acorns from Bartram's Gardens, were planted. The trees were dedicated to John Bartram, Andrew F. Michaux, Dr. Franklin B. Hough, J. Francis Fisher, Alexander von Humboldt, Governor James A. Beaver and Judge Warren Higley; and brief and interesting addresses were delivered by Mr. Charles C. Binney, Mr. B. E. Fernow, Hon. H. G. Joly, Mr. Rodman Paul, Rev. Dr. J. P. Lundy, Professor B. G. Northrop, and Hon. John Peaslee.

A vote of thanks to the Park Commission closed the convention.

The officers for the coming year are: Hon. James A. Beaver, Governor of Pennsylvania, President; Hon. H. G. Joly,

Quebec, First Vice-President; Mr. N. H. Egleston, Washington, D. C., Recording Secretary; Mr. Charles C. Binney, Philadelphia, Corresponding Secretary; Dr. H. M. Fisher, Philadelphia, Treasurer.

Notes.

The Rev. Lyman Phelps writes from Sanford, Florida, of an Allamanda but two years old which covers a lattice twelve feet high and as many wide, and shows more than 500 flowers in bloom.

The twelfth semi-annual Fruit-growers' Convention of California will be held under the auspices of the State Board of Horticulture, in Fresno, commencing Tuesday, November 5th. Special attention will be given to discussions upon raisins and other dried fruits.

Mr. William Hamilton, Superintendent of Parks in Allegheny City—which until very recent years was an exceedingly smoky city—states that the Ginkgo tree thrives as well in that city and Pittsburgh as the Ailanthus. This means that the smoke and dust of the city do it no harm which can be detected.

Many different modes of keeping ripe grapes have been recommended and adopted, but the two great requirements for success, as noted in the *Country Gentleman*, are continued low temperature, a few degrees above freezing, and well ripened fruit. Badly ripened, and poor, watery grapes will not keep long. Packed in dry or baked sawdust, they are excluded from air currents, and are thus easily kept till midwinter in a cold apartment. The *Agriculturist* says that if wilted and then buried in stone jars three or four feet below the surface, they will come out with stems green and fruit plump and bright.

The fashion of celebrating Arbor Day has traveled as far as Australia, at least. At Adelaide the initiation of Arbor Day was signalized by the planting of 800 trees upon the Park Lands by the pupils of the schools. Many private persons also planted trees on that day in various parts of the colony, and no less than 35,000 trees had been applied for at the Forest Office on the day before Arbor Day. The City and Suburban Schools Arbor Committee forwarded a recommendation to the Ministry to provide for the proclamation of an annual holiday, to be called Arbor Day, when every colonist of South Australia should be invited to plant at least one tree, and they suggested that the first Friday in August each year would probably be the most suitable day in that region.

Our experiment stations have made a good many tests with seed-potatoes, using entire tubers, small and large, and a certain number of eyes from different ends of the potato; but the experiments have given no uniform results. The *Gardeners' Chronicle*, in the last number, sums up a discussion of the general subject as follows: "The gist of the matter seems to be that whole sets should be planted, and these should be denuded of all eyes but a few of those at the crown; and the plants allowed ample space, so that the roots may have a large feeding area, and then the potato crop will be far greater than we are accustomed to have, and the number of sets required fewer." We are inclined to think that in this country potatoes would yield more to the acre if planted more thickly than usual.

Isotoma axillaris is an Australian perennial of the Lobelia family, growing to a height of from six to twelve inches, with bright blue spreading flowers nearly an inch across. It was one of the early introductions from Australia, but of late years has been pushed aside, like many other Australian plants, by newer and therefore more fashionable subjects; and it is now rarely seen outside a few old-fashioned gardens. The most attractive feature, nevertheless, this year, of the flower-garden at Dropmore, in England, was a bed entirely filled with this plant. Although a perennial, *Isotoma* flowers freely the first year from seed, and so may be treated best as an annual when it is intended for summer blooming. As it is a sun-loving and drought-loving plant, it might be expected to succeed in the United States even better than it does in England.

Ulmus umbraculifera is one of the most striking and interesting trees of recent introduction. It is a form of the Old World Elm (*U. campestris*), discovered in Persia a few years ago, and sent by a German gardener in the employ of the Shah to Mr. Louis Späth, of the Rixdorf nurseries, in Berlin, who has propagated it largely by grafting on the common Elm. The largest specimen in Mr. Späth's nursery is a tall standard, with a stem ten or twelve feet high, surmounted by a dense, compact and almost globular head twelve or fifteen feet across. The original tree in Persia is said to be large enough to shelter a regiment of soldiers under its wide-spreading branches. *Ulmus umbraculifera*, worked as a tall

standard, has been planted in considerable numbers along some of the new streets in the suburbs of Berlin—a use for which its peculiar habit seems to adapt it.

The most beautiful flowers, this year, in the small pond devoted to the cultivation of aquatic plants in the gardens of the Trocadéro, in Paris, were two yellow-flowered Water Lilies, in the collection of M. Lagrange, nurseryman, at Oulius (Rhône). They were labeled *Nymphaea odorata sulphurea* and *N. Marliacea* (already noticed in GARDEN AND FOREST, vol. ii., p. 408). Both plants are hybrids, evidently between *N. tuberosa* and the Florida *N. flava*, but *N. Marliacea*, as it appeared in this collection, was far the handsomer and freer bloomer of the two. It is certainly one of the most beautiful of all the *Nymphaeas*; and if it proves hardy here it will be a real acquisition to gardens. A striking plant in M. Lagrange's exhibit was a tall double-flowered *Sagittaria*, labeled *S. Japonica plena*. It is a form of the widely distributed *S. sagittifolia* (var. *diversifolia*), from China, and one of the best aquatic plants of its class, with great clusters of pure white flowers, and bold, broad masses of foliage, sometimes more than three feet high. It may be expected to be hardy in the northern States.

At the recent meeting of the British Association at Newcastle, a report of a committee formed for the purpose of collecting information as to the disappearance of native plants from their local habitats was read. The attention of the committee had been in the main directed to the threatened extinction of rare plants, and the report also spoke of the injudicious action of botanists themselves and of botanical exchange clubs, as being potent factors in the changes which had taken place. The committee observed that the dealer and collector figured largely in the disappearance of Ferns, and in conclusion, suggested to natural history societies and field clubs the advisability of keeping careful guard over any rare plants to be found within their respective spheres of action. Canon Tristram referred to the disappearance of plants, and said that all these plants which they found disappearing could be procured by those who wished them from nurserymen, and the collectors who wished to grow them could get more readily from the dealer plants likely to survive and flourish than by collecting them themselves.

M. André, in a recent number of the *Revue Horticole*, calls attention to the value of *Bouvardia Humboldtii* as a summer blooming bedding plant. This charming species, a native of Mexico and introduced in Europe as early as 1874, seems to be practically unknown in the gardens of this country, although in Paris, Tours and other French cities well grown plants in flower are now not infrequently found for sale in the flower-markets during the summer months. A large bed of these plants, furnished by M. Jean Puteaux, of Versailles, has been one of the most interesting and attractive features of the gardens of the Trocadéro during the past summer. The plants were short, stocky, and covered with their terminal racemes of long-tubed, deliciously fragrant, pure white flowers, which contrast pleasantly with the dark green foliage. M. André calls attention to the fact that the plants of this species will continue to produce their flowers during several months if they are copiously supplied with water, and if the flowers are removed as fast as they fade, that the development of seeds may be prevented.

President Horace Davis, of the University of California, recently received an inquiry from Algeria concerning experience on the Pacific coast with grasses for restraining drifting sands. As much of this kind of work has been done at Golden Gate Park, in San Francisco, the experience of Mr. John McLaren, the efficient superintendent of the park, was asked, and his statement has been forwarded to the distant applicant. Part of the information given by Mr. McLaren is quoted as follows in the *Pacific Rural Press*: "The grasses found most successful here are the Sea Bent grass (*Calamagrostis Arenaria*) and the Bermuda grass (*Cynodon dactylon*), both of which have been entirely successful in holding the loose sand. I would plant the Sea Bent in the most exposed places and the Bermuda on the protected slopes. We plant in rows one and one-half to two feet apart and one foot deep. Where practicable, the plow is used, dropping the roots in each alternate furrow. Where the dunes are too steep for plowing, pits are dug with the spade, and, after planting, the sand is trodden firmly with the foot. The plantations have to be examined after heavy wind-storms to replant any roots exposed by the wind. If seeds only can be procured, I would suggest that they be sown in nursery rows and the plants set out the following season." Of course, there are also many shrubs used, and the nursery at the park has propagated a vast number of the *Leptospermum* and other shrubs which have been found serviceable.

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The Nation's Forests.

EARLY in the present year we suggested a plan for the protection and care of the forests situated upon the public domain of the United States, and the property, therefore, of the people. Our suggestions were widely discussed at the time by the press of the country, and received hearty support and endorsement. They were briefly these:

First. That the government should at once withdraw, temporarily, from public sale and entry all its lands upon which forests are growing.

Second. That officers and men should be detailed from the army to protect these forests from fire and theft, as far as it is now practicable to do so, until a permanent forest-organization can be established by the government of the United States.

Third. That the President of the United States should be authorized to appoint a Commission of enlightened men to study the general forest-problem in all its relations, and to present to Congress a scheme of national forest-control and administration.

The American Forestry Association, a body of men and women familiar with the requirements of forest-administration, at its recent meeting in Philadelphia, adopted a resolution, introduced by Mr. B. E. Fernow, embodying the essential features of our plan, and appointed a committee to urge upon the government the necessity of considering this matter. This action of the Forestry Association is important. It brings the whole subject directly to the attention of the President and of Congress in a way which cannot be overlooked. The fact that a simple and economical plan, approved with hardly an exception by the press of the country, has the unanimous support of those persons who possess special knowledge of our forests, and look at them unselfishly and from a national point of view, marks a decided step forward. It is settled, at least, that there is to be concerted action. But it is only a step. Resolutions will not save forests; nor the wisest utterances of the press excite Congress to action. A beginning has been made, and a very good one, but it is only a beginning, and the really hard work is yet to be done. There are still serious

difficulties to overcome before even the most primitive measures of forest-conservancy can be adopted in this country.

The great mass of the people of the United States are ignorant of the history, the requirements and the uses of forests; and are slow, therefore, to respond to appeals made to them for sustained efforts to overcome the indifference of Congress. The number of men and women who know that the prosperity of the country is bound up in its forests, and who are willing to devote their time, labor and money to the promulgation of this fact, is comparatively not large. They live, for the most part, remote from the forests they would see the government preserve. Their interest in these forests is not a personal interest. These far western forests might perish and there would be no perceptible change in the prosperity or in the surroundings of nine-tenths of the people who are now most interested in their preservation. This interest may be a sentimental one, but it is none the less real. It is of that character from which political and economical reforms have sprung, and it is a hopeful and encouraging sign of our national progress that there are men and women in this community who are willing to lend themselves unselfishly to a cause which promises no immediate or personal returns. Opposed to them are men of a very different stamp. These live by despoiling what the others would preserve. They are on the ground; they live upon the forests. Any action of Congress which would check or control their operations in the forests of the public domain would affect at once their personal interests and prosperity. Among these men are some who buy legitimately timber lands from the government and turn the timber into money; others live by pillaging the timber, either openly or under cover of inadequate and badly administered laws. Others, like the shepherds and hunters of California, destroy the national forests for the accomplishment of their own selfish purposes. These various interests are well organized; and the men who live on this accumulated wealth of the nation can afford to pay handsomely to preserve government indifference. They will oppose before Congress, in every way in their power, every effort which can be made to change the laws under which the public lands are administered and disposed of. The opponents of a system of forest-conservancy in the United States have already shown what they can accomplish. There was a bill before the last Congress to make certain changes in the laws under which national timberlands could be disposed of. It proposed to sell the stumpage with certain proper conditions, but not to sell the land. The bill never had the slightest chance. It was killed finally by a member of Congress from Alabama, on the ground that it would work injustice and injury to the people of his state. The truth was that the people of Alabama and of the neighboring states of Mississippi and Florida had been plundering, in one form or another, the public domain for years, and that any change of the law would affect seriously the interests of influential citizens.

It is a difficult matter to oppose successfully all the different interests which have come into existence because the government of the United States has allowed its forests to perish rather than to make a serious effort to protect them; but now that a plan of action has been adopted by the Forestry Congress to which no unselfish opposition can be made, there is at last something definite to work for. The next step to be taken is to increase the popular knowledge of the forest and of its importance, that Congress, influenced by popular demand, may be induced to consider seriously a national system of forest-management; and then the matter being once fairly before Congress, a fight must be made between the people on the one side and a well organized and well equipped body of interested men on the other. There is no doubt which side will win in the long run, and there would be no grave apprehension of ultimate success if forests, especially in dry regions like western America, once destroyed could be restored. But in the case of these western forests delay is fatal, and the fact that they may be exterminated before

we are prepared to preserve them is the serious danger the advocates of forest-preservation have to encounter. More real progress, however, has been made during the past year than has been made before, and this fact is at least hopeful. It now remains for the members of the Forestry Association to put forth their best efforts and use all their influence to carry out the work they have begun so successfully.

Holiday Notes in Southern France and Northern Italy.—III.

AFTER Turin, nothing of importance or of much interest was noted until Vercelli was passed, where a long hedge or two of *Hibiscus Syriacus* furnished lines of bright color as the train passed along. In England this beautiful shrub flowers too late in the season; and generally before the blossoms have had time to open fully, they are destroyed by the cold and wet of late autumn. On the left, after crossing the Sesia, the Alps come into view, the magnificent Monte Rosa group being the most conspicuous. In the neighborhood of Magenta, large tracts of low lands—under water for two months in the year—are devoted to the cultivation of Rice, the cutting of which had commenced the first week of September. The drier spots—after the Rice district was passed—were planted with endless rows of pollarded White Mulberries; the importance of the silk industry to this part of Italy being indicated by the vast extent of land covered by these plants. Between the rows Indian Corn, and occasional Vines, were grown. In the region about Brescia, beautifully situated at the foot of the Alps, Vines were trained to climb tall trees, the long canes being festooned from one stem to another, usually at a sufficient height above the ground to allow of plowing underneath them. Various trees were used as Vine-supports; among them we noticed the Walnut, Maple, White Mulberry and Manna Ash (*Fraxinus Ornus*). Contrary to our expectations, we saw but few so-called Lombardy Poplars in the plains of Lombardy. The White Willow (*Salix alba*) and the Black Italian Poplar (*Populus nigra*) were, however, very common. In a few barren looking places—and these were by no means frequent in the fertile, well cultivated plains—a little color was afforded by a pretty pink flowered *Epilobium rosmarinifolium* (a really pretty plant for the herbaceous border), and one of the Evening Primroses (*Oenothera biennis*). Giant plants of Hemp occurred as weeds here and there in the fields of Maize, amongst which, too, pumpkins of huge dimensions were conspicuous by reason of their bright color.

At Desegnano, at the south-west angle of the Lago di Garda, the largest of the north Italian lakes, an admirable survey of that beautiful stretch of water was obtained. A few miles further, near San Martino delle Battaglie, on the right, is the monument commemorating the battle of Solferino. Fine groups of Cypress (*Cupressus sempervirens*), the form with a compact, flame-shaped habit, surrounded the monument and constituted a striking feature in the landscape; the battle field itself is some five miles away. Verona, next to Venice the principal town in Venetia, is situated at the base of the Alps; Cypress of large size, standing out clear against the sky on the hill-sides, are the most striking objects in the landscape. At Padua, close to the station, *Photinia Lindleyana* has attained tree-like dimensions, and must be a fine sight when in flower. To the left the Tyrolean Alps are visible in the distance, and the traveler is fully occupied with far-away views until Venice, coming into sight, claims all his attention, with its dark blue line of towers and churches rising from the sea.

After consulting guide books as to the location of the Botanic Garden and engaging a gondola, we passed through the Grand Canal, by churches and palaces far too numerous to remember, and through narrow, dirty water-ways, and landed close to the church of San Giobbe, adjoining which (Bædeker had informed us) "is the entrance to the former Botanical Garden, famed for its gigantic Cacti, and now a nursery garden." Instead of a nursery, however, we found a machine factory at work, and although through the half opened door we could see some of the old trees still standing, the doorkeeper refused to allow us to enter the premises without permission from the Direction. He informed us, however, that the Botanical Garden had been removed to a spot near the Abbazia della Misericordia, and so we again journeyed on—through the Ghetto, by no means so squalid and unlovely a quarter as the lower parts of many cities we have seen—by lonely, deserted canals until we reached our destination. A ring at a door in a blank wall by one of the officious idlers who seem to swarm everywhere in Venice, and we were admitted into what at first

we refused to believe was the Botanic Garden. A small square piece of land with a few fruit trees, a few annual and perennial flowering plants, a few vines, gourds, etc., evidences of neglect at every corner; this was the spot we had spent so much time and trouble to visit! The only interesting objects were a huge bush of *Jasminum grandiflorum* in flower, planted out in an open-sided conservatory, and a finely flowered example of *Ipomœa pandurata*, here grown under the name of *I. bulbosa*. The Jasmine is largely grown in Belgium as a winter flowering pot-plant for the English and French markets.

We saw singularly little vegetation on the walls skirting the numerous canals through which we passed; the Pellitory (*Parietaria officinalis*), common throughout Europe, and the Samphire (*Crithmum maritimum*), the fleshy leaves of which are made into the well-known pickled condiment, were the most common. Here and there *Campanula pyramidalis* was conspicuous, with its somewhat strict panicles of handsome blue flowers. None of the white flowered form was seen.

The Giardino Reale, prettily situated on the edge of the lagoon beyond the south end of the Grand Canal, can boast of some fine trees. Among the best are large-leaved Privets (*Ligustrum lucidum*), *Paulownia imperialis*, *Lagerstrœmia Indica*—in flower at the time of our visit—*Magnolia grandiflora*, Deodar (*Cedrus Deodara*), *Kœlreuteria paniculata*, with its large, spreading, upright panicles of red, bladderly fruits, and the Judas tree (*Cercis Siliquastrum*). The turf was thin and poor and the grass long and neglected, giving the whole place an untidy aspect.

The Giardini Pubblici are situated at the extreme south-east of Venice, and are most expeditiously reached by small steam launches, which run at frequent intervals from the grand canal. They were laid out under Napoleon I. in 1807, on space obtained by the demolition of several monasteries. Here many trees and plants of interest were noted. From Garibaldi's statue—on the base of which the Maidenhair (*Adiantum Capillus-veneris*) was growing, apparently self-sown—runs an avenue of Locusts of a curious form. The terminal leaflets on these trees were much developed at the expense of the lateral ones, which were most frequently altogether suppressed. This tree, smaller than the type, is common in European nurseries under the name of *Robinia monophylla*. In the shrubberies on each side of this avenue are huge bushes or small trees of *Ligustrum lucidum*—one of the most valuable evergreens in southern Europe—*Photinia serrulata* and *Euonymus Japonicus*—green-leaved, golden and silver variegated forms, all fruiting freely. The Paper Mulberry (*Broussonetia papyrifera*) here attains a large size. In open spots were splendid bushes of Oleander (*Nerium Oleander*) in full flower, masses of the brilliant scarlet *Salvia splendens*, the gorgeously colored *Amaranthus tricolor*, about nine feet in height, *Canna Ehemanni* in fine flower, and a glorious mass of *Ipomœa Quamoclit*. Roses, with a crop of funnel-like pieces of zinc (fastened round the shoots) filled with soil and covered with moss to retain the moisture, had a strange appearance. This clumsy method of propagation we saw practiced in many places during our wanderings. Results must have been equally good and the labor involved in watering not nearly so great had the bushes been layered in the ground (the layering done in plunged pots if desired), after the common English plan. *Sophora Japonica*, a tree perfectly hardy and free flowering in England, was conspicuous by reason of its long, constricted, bead-like pods; in Great Britain our summers are neither hot enough nor long enough to allow of its fruiting. *Buddleia Lindleyana*, a graceful and pretty shrub, is here quite at home; in England it is killed in most places every few years unless grown against a wall in a sheltered spot. A group of Pines, with *Wistaria Sinensis* climbing among the branches high above the ground, looked picturesque, the light green of the climber contrasting markedly with the dark green of the Pine needles. *Pittosporum tobira*, a Chinese plant with very fragrant white flowers, grows as freely here as does the Cherry Laurel in England, and the commonly cultivated green-house plant, *Habrothamnus elegans*, produces its red-purple panicles in great profusion as a shrubby plant in the sunny south. A few very fine *Libocedrus decurrens*, *Melia Azedarach*, *Albizia Julibrissin*, *Eriobotrya Japonica*, groups of *Celtis australis*—the Micoucoulier of the Provençal poets—a massive belt of *Ruscus hypophyllum*, larger than we ever saw it in England, nearly complete the list of trees and shrubs which we saw in this place. The general condition of the park was hardly satisfactory; each shrub or tree was allowed to struggle for light and air unheeded, and strong growing trees, such as Poplars—altogether out of place in restricted areas—were killing really good plants. No thinning or pruning seemed to be

practiced, and, in some cases, a regular jungle of miserable specimens was the result.

In the Venice market, one much cleaner, more spacious and better arranged than those of some larger cities, fungi, of species and genera eaten elsewhere by only a few enthusiastic fungophagists, were offered in quantity, each seller exhibiting a stamped official certificate of the day's date to the effect that his fungi were wholesome and that he was authorized to sell them. Many Cucurbits, never grown in Great Britain as articles of food, were here, such as Hercules' Club (*Lagenaria gigantea*), the Bottle Gourd (*Lagenaria vulgaris*), *Momordica Charantia*, spiny and green outside, bright red within; and perhaps Pumpkins should also be included in this category. Of this last named vegetable quite a bewildering variety in color, form and size were offered for sale. Baked pumpkin formed the whole stock in trade of many peripatetic merchants, and so did boiled sweet potatoes. Figs of excellent quality were abundant at a penny per pound, good apples brought the same price, and peaches, in enormous quantities, were offered at threepence per pound. Pungent green (unripe) capsicums and yellow sweet ones were marked a penny a pound, and shelled haricot beans, in variety, at low prices. Aubergines, pomegranates, with branchlets attached, the fruits of the Service tree (*Pyrus Sorbus*) and watermelons complete the list of fruits. Excellent vegetables were plentiful, endives showing remarkably good cultivation. Celery was, however, quite green. Apparently not the slightest attempt is made to bleach it.

Kew.

George Nicholson.

The Art of Gardening—An Historical Sketch.

XII.—Roman Country-Seats.

WHEN we pass from the Imperial City and its suburbs to the country-seats of its wealthy citizens, we find something radically novel and national. All communities had possessed sacred groves and small gardens of utility and ornament. The Phœnicians had dwelt in suburban villas. The Persians had created wide semi-natural parks, and the Greeks had owned urban pleasure-grounds, most splendidly developed, in such late colonies as Alexandria. But in the latter days of Rome, private citizens seem first to have established themselves in numbers in distant country-seats, marked by an almost impossible luxury in the way of architectural and of natural or semi-natural beauty. Here, once more, we read in the history of gardening a reflex of the social conditions of the place and time. Rome's unprecedented power, gained while the Republic still existed, had brought enormous piles of gold into private coffers, and wealth, authority and travel had united to develop intelligence and taste. Then, when political changes put imperial masters over those who had ruled themselves, they were more and more strongly impelled to flee from the court where their minds and tongues were fettered; where their conscience was perpetually outraged, and where their bodies were often in danger, too. It was frequently the part of wisdom to seek retirement in the country; and we can easily see how its attractions must have perpetually appealed to highly cultivated men, not yet weaned from ideas of freedom, and able to surround themselves, in the heart of Tuscany or by the shores of Como, with all the comfort and splendor of Rome itself.

Fortunately, detailed descriptions of some of these great Roman country-seats have come down to us from the pens of their enthusiastic owners. In a letter to Gallus, Pliny, the younger, speaks of his villa at Laurentinum, on the sea-coast, seventeen miles from Rome, portraying its position close to the water; its little garden with Box-hedges, patched with Rosemary where the salt air had killed the Box; its tennis-court; its long *pergola*, with a sanded path, so smooth that one might walk upon it barefoot; its isolated banqueting-room above the shore, and its Fig and Mulberry trees.

But he paints a much more splendid picture when, writing to Apollinaris, he describes his larger estate in Tuscany. It lay at a "great distance from the sea, under one of the Apennine mountains." The climate was so cold in winter that Myrtles and Olives would not flourish; but the summers were "exceedingly temperate." The view is dwelt upon at length, with its distant mountains in forest, and its nearer fertile little hills, its plains covered with vineyards, "terminated by a border, as it were, of shrubs," its "never-failing rills," and the infant Tiber traversing the plain. The house need not be described. Its principal front looked full south, and was adorned with a spacious portico. "In the front of the portico is a sort of terrace, embellished with various figures, and bounded with a Box-hedge, from whence you descend by an easy slope,

adorned with the representation of divers animals in Box, answering alternately to each other, into a lawn overshadowed with the soft, I had almost said, liquid Acanthus. This is surrounded by a walk enclosed with tonsile evergreens, shaped into a variety of forms. Beyond it is the *Gestatio*, laid out in the form of a circus, ornamented in the middle with Box cut in numberless different figures, together with a plantation of shrubs, prevented by the shears from running up too high. The whole is fenced in with a wall covered by Box, rising by step-like ranges to the top. On the outside of the wall lies a meadow, which owes as many beauties to Nature as all I have described within does to art, at the end of which are several other meadows and fields interspersed with thickets." The dining-room was at one extremity of the terrace, commanding a beautiful outlook. Near it stood a small isolated structure shaded by four Plane trees, in the middle of which rose a fountain with a marble basin, the overflowing waters from which kept the Planes and the lawn fresh and green. This building contained a private dining-room and bed-chamber, and was faced by another portico, another little room, lavishly adorned, and another fountain. After describing other portions of the house—private rooms, hot and cold and tepid baths and enclosed porticoes, one "resembling a grotto"—Pliny says: "In front of these agreeable buildings lies a very spacious hippodrome,* entirely open in the middle, by which means the eye, upon your first entrance, takes in its whole extent at one view. It is encompassed on every side with Plane trees covered with Ivy, so that while their heads flourish with their own green, their bodies enjoy a borrowed verdure; and thus the Ivy twining round the trunk and branches, spreads from tree to tree and connects them together. Between each Plane tree are planted Box trees, and behind these Bay trees, which blend their shade with that of the Planes. This plantation, forming a straight boundary on both sides of the hippodrome, bends at the farther end into a semi-circle, which, being set round and sheltered with Cypress trees, varies the prospect and casts a deep and gloomy shade, while the inward circular walks (for there are several), enjoying an open exposure, are perfumed with Roses, and correct, by a very pleasant contrast, the coolness of the shade with the warmth of the sun. Having passed through these several winding alleys you enter a straight walk, which breaks out into a variety of others, divided off by Box-hedges. In one place you have a little meadow; in another, the Box is cut into a thousand different forms—sometimes into letters, expressing the name of the master, sometimes that of the artificer, while here and there little obelisks rise intermixed alternately with fruit trees; when on a sudden, in the midst of this elegant regularity, you are surprised with an imitation of the negligent beauties of rural nature, in the centre of which lies a spot surrounded with a knot of dwarf Plane trees. Beyond these is a walk interspersed with the smooth and twining Acanthus, where the trees are also cut into a variety of names and shapes. At the upper end is an alcove of white marble shaded with vines, supported by four small Caryatan pillars. From this bench the water, gushing through several little pipes as if it were pressed out by the weight of the persons who repose themselves upon it, falls into a stone cistern underneath, from whence it is received into a fine polished marble basin, so artfully contrived, that it is always full without overflowing. When I sup here this basin serves as a table, the larger sort of dishes being placed round the margin while the smaller ones swim about in the form of little vessels and water-fowl. Corresponding to this is a fountain which is incessantly emptying and filling; for the water, which it throws up a great height, falling back again into it, is, by means of two openings, returned as fast as it is received. Fronting the alcove (and which reflects as great an ornament to it as it borrows from it) stands a summer house of exquisite marble, whose doors project and open into a green enclosure, as from its upper and lower windows the eye is presented with a variety of different verdures. Next to this is a little private closet (which, though it seems distinct, may be laid into the same room), furnished with a couch, and, notwithstanding it has windows on every side, yet it enjoys a very agreeable gloominess by means of a spreading vine which climbs to the top and entirely overshades it. Here you may lie and fancy yourself in a wood, with this difference only, that you are not exposed to the weather. In this place, also, a fountain rises and disappears; in different quarters are disposed several marble seats, which serve no less than the summer-house as so many reliefs after one is wearied with walking. Near each seat is a little fountain, and throughout the whole hippodrome several small rills run wheresoever the

* *Circus* and *hippodrome* have not in these descriptions their primitive Greek meaning, but denote ornamental spaces, surrounded by walks or drives.

hand of art thought proper to conduct them, watering here and there different spots of verdure, and in their progress refreshing the whole." Does the reader wonder, although only the grounds, and not the splendid house itself, have been portrayed, that Pliny had a "very great passion for this villa," which, he says, "was chiefly built or finished" by himself? Or does he marvel that when the great Renaissance of art in Italy occurred centuries later, Pliny's description found a score of commentators and illustrators on paper, or that numerous attempts were made to reproduce the beauties it portrayed?

New York.

M. G. Van Rensselaer.

New or Little Known Plants.

The Japanese Flowering Apple.

THERE appeared on page 260 of the present volume, among the notes of our correspondent at the Arnold Arboretum, an account of the different varieties of ornamental Apple-trees cultivated in that establishment.

No description, however, can give even a faint idea of the wonderful beauty of these plants at their flowering-time, and even the most successful picture fails to show the delicate coloring of the masses of bud and bloom which smother the branches in early spring. One of the most beautiful of these small Apple-trees is that Japanese variety of *Pyrus baccata*, brought by Von Siebold to Europe, and known generally in nurseries as *Pyrus Malus floribunda*. Our illustration, made from a photograph of a tree of this variety which grows in a garden near Boston, shows the habit this plant assumes when it is nearly fully grown, with its long, spreading or upright, wand-like branches and its countless clusters of flowers. The trees are even more beautiful before the flowers are all expanded, as they were when our picture was made, and when the bright red flower-buds mingle and contrast with the pure white petals. There is no tree more beautiful in bloom than this Apple, and none better suited for planting on the margin of a large shrubbery or as a single specimen on the lawn or in a small garden. There is no question of its hardiness; it grows, in good soil, with great rapidity, and it flowers year after year with always increasing profusion.

Entomological.

A Destructive Cornel Saw-fly.

(*Harpiophorus varians*, Norton.)

DURING the past two or three years great injury has been done to the foliage of several species of Cornus by white saw-fly larvæ, which, until the past summer, have remained undetermined. These insects have been especially destructive at the Arnold Arboretum and in its immediate vicinity; but, at other places for twenty miles or more from Boston, their work has been apparent. Indeed, the abundance and destructiveness of these larvæ have caused some people to hesitate about planting specimens of Dogwood for ornament, since, by the end of July or early in August, the plants are apt to be either entirely defoliated or to have their foliage so badly eaten as to become very unsightly. Specimens of the larvæ had been sent to various entomologists for determination, but without result; and other specimens kept in confinement had passed the last moult, but died during the winter or spring without pupating. Early this spring, however, upon breaking a piece of partly decayed wood picked up in the vicinity of Cornus bushes, I found a number of these larvæ within it. Many of them had made tunnels from one to several inches in length, the longest borings being in the most decayed portion of the wood. When taken out and exposed to warmth and light the larvæ moved in a sluggish manner.

Several pieces of wood containing these larvæ were collected and placed in a tight box to await further developments. In the latter part of May the larvæ began to pupate, both in the wood and on the bottom of the box, without making any cocoons, and in a short time the saw-flies began to emerge. The insect proved to be *Harpiophorus varians*, described by Edward Norton as early as 1861 (*Proc. Boston Soc. Nat. Hist.*, vol. viii., p. 156), from specimens collected at Farmington, Connecticut.

The saw-flies were seen flying about the Cornels in the

Arboretum during the first week of June. On June 10th the first eggs were discovered and within a few days they were quite abundant. The eggs are pale green, oblong, and about four one-hundredths of an inch in length. They are deposited singly within the tissue of the leaf on the upper side. From one or two dozen to three or four hundred eggs may be deposited within a single leaf without any very definite order, although most of them are usually disposed in lines parallel with the midrib, or with the principal veins. Each egg makes a little swelling, noticeable on both the upper and the under sides of the leaf, and, with a little practice, egg-bearing leaves may be readily detected.

On hatching, the larvæ emerge on the under side of the leaf. They are then about six one-hundredths of an inch long and pale green in color, with yellowish head and black eyes. When at rest they keep close together, coiled up on the under side of the leaves; and they appear to feed only in the cooler parts of the day, in cloudy weather, or perhaps at night. Of the first leaves attacked, they eat only the more tender parts, and the leaves are left somewhat skeletonized; but as the larvæ get older they devour every part of the leaf down to the midrib. After the first moult, when they are about twelve one-hundredths of an inch long, the larvæ secrete a peculiar, very white efflorescence, by which the back and sides become covered. This is constant after each moult until the last.

This efflorescence is removed by the slightest touch, and when brushed off, the color of the body is a pale greenish white. The head, after the first moult, is black, and the legs and under side of the body yellow. At full growth the average length of the larvæ is about an inch. Some are smaller than others, however, and this possibly indicates the difference of sexes.

When the larva has cast its skin for the last time a complete and surprising change has taken place. All trace of white is gone, and the body is greenish yellow on the back and yellow beneath and along the sides below the spiracles. On each segment along the back are two large and two small black spots, and upon the sides, close above the spiracles, is a row of nearly square, black spots, one for each segment, but so placed as to lap over from one segment to the next.

The terminal plate above the ventral segment is black. The legs and prolegs are yellow, the former having a reddish spot on the outer side near the base. The tips of the claws are black. The great change produced by the last moult has led some observers to suppose that there are two distinct species.

Full growth is attained by most of the larvæ early in August, but some may not reach maturity until much later, and this season a few were noticed to pass the last moult about September 20th. The season last year was not so advanced, and, in some places, large numbers of larvæ were found in September. The larvæ eat very little after the last moult, and very soon they leave the plant and wander away in search of suitable places in which to hibernate. Stray pieces of decaying wood, fence posts and rails, dead branches and the corky bark of old trees are selected. In the Arboretum, many were found even boring into the soft pith of dead stems of Elder bushes. Sometimes two or more occupy one burrow. It is quite possible that some larvæ go into the ground to hibernate, but none have been discovered there.

Specimens confined in a large glass jar refused to enter some soil placed at the bottom, but when pieces of soft wood were put within reach the larvæ eagerly bored into them, and a number also disappeared within the cork stopper of the jar. Once in their burrows, the larvæ become much contracted, and remain so until pupation, which usually occurs only a week or two before the perfect insects appear. The males of the latter are considerably smaller than the females, and in the shape of the abdomen they are less pointed, but, otherwise, they closely resemble the females. These may be identified by the following characters: The abdomen is flattish and reddish brown, sometimes quite dark; the thorax and head shining black; the antennæ, about a quarter of an inch in length, have the three basal joints rusty colored, the fourth and fifth joints black, and the four terminal joints white or yellowish white. The first two pairs of legs are white at the base, the femora are black and red, the tibiæ and tarsi light brown, the latter often very light. The last pair of legs are usually white at base of femora, the rest being black or reddish and tipped with black; the tibiæ are red tipped with black, and the tarsi very light brown or yellowish white. The wings are clear, the outer half having a brownish or smoky tinge, and they expand nearly three-quarters of an inch in the males and almost an inch in some of the largest females. In length the bodies of the former are somewhat more than one-third of an

inch, and those of the latter a little less than one-half of an inch.

In a revision of the saw-flies (*Trans. Am. Ent. Soc.*, vol. i., p. 236), published in 1867-68, the habitats given are Connecticut, New York, Virginia and Illinois, showing that its known range at that time was widely extended.

The best, cleanest and most effective remedy we have tried is the powdered white hellebore. An application of this powder upon the foliage of infested plants soon caused the ground beneath to become covered with dead and dying

that the family to which it belonged was not ascertained.

Much good service seemed to be done by several species of bugs belonging to the family of *Pentatomoidæ*, which attacked and destroyed many larvæ, in the imperfect and mature stages, by perforating them with their slender beaks and sucking the juicy contents of their bodies. *Euschistus fissilis*, Uhler, and a closely related undetermined species, were especially noticeable, and *Negara hilaris*, Say, had the same habit, but was less common.



Fig. 138.—A Cornel Saw-fly—(*Harpiphorus varians*.)—See page 520.
Larvæ before and after last moult. Larvæ hibernating in decaying wood. Female Saw-fly, enlarged.

larvæ. Kerosene emulsion would, undoubtedly, also be effective, as well as Paris green and London purple. But careful experiments should be made with the arsenical remedies, to determine the dilution necessary to prevent injury to the foliage. Where there are but a few plants, the egg-bearing leaves, or the leaves upon which the young are clustered, might be picked off and destroyed. Among the natural enemies of the insect is a very minute fly, which was observed apparently in the act of ovipositing upon its eggs. Unfortunately, the specimen was lost, so

Two of the most beautiful of the species of *Cornus*—*Cornus florida* and *C. Mas*—have thus far escaped injury by these larvæ. *C. alternifolia* also has been untouched. But the foliage of *Cornus sericea*, *C. alba*, *C. stolonifera*, *C. paniculata*, *C. sanguinea*, *C. asperifolia* and one or two others has been greedily devoured. In this region groups of these plants often appear as if they had been visited by fire. The accompanying figure of *Harpiphorus varians* is from a drawing made by Mr. C. E. Faxon.

J. G. Jack.
Arnold Arboretum.

Foreign Correspondence.

London Letter.

THE event of the past week has been the great exhibition of vegetables at the Royal Horticultural Society's gardens, held in conjunction with a conference on vegetables. It was highly successful, there being a large concourse of visitors, chiefly practical gardeners, to witness a collection of vegetables that has probably never been surpassed in variety or quality in London. The remarkable point about this show was the fact that it had been organized and brought together without the aid of prizes or any reward whatever, beyond the thanks of the Society and the gardening public, so that it tends to prove that there is still abundant energy and resource among English gardeners in this direction, even if the Society itself is not flourishing as much as it did a generation ago.

I will not attempt to detail this enormous vegetable exhibition, because I think your readers are not interested enough in the sorts we grow, and, beyond the multitudes of varieties of every class of vegetables, I must confess that there was little that was novel or out of the ordinary run. I was on the lookout for something new, but failed to see the shadow of anything I had not seen before. I did not even see a dish of the new Chinese vegetable, *Stachys tuberifera*, or Spirals, as the tubers have been appropriately called. It was expected that there would have been a good show of Spirals, but somehow the public has not yet taken to them. Messrs. Vilmorin, the great seed-firm of Paris, showed a few things that seemed to attract everybody's attention, none more than the enormous Capsicums, named Large Bell and Golden Queen. Both these sorts had fruits quite four inches in length and as much across, the one being a bright red, the other a golden yellow. They are therefore highly ornamental and quite worth growing for decoration. There was a large collection of Capsicums from the same firm, but these were the most noteworthy. Messrs. Vilmorin also showed some varieties of Sweet Maize, which, to most people here, were novelties, and are quite likely to find favor if they can be cultivated. One called Extra Early Sweet Maize has a sweet, pleasant taste, even uncooked, and would be delicious after leaving the hands of a skillful cook.

Another novelty was the Melon Pear, an absurd name for the fruit of *Solanum Guatemalense*, which has recently been introduced, I believe, from the West Indies. It is a kind of Egg Plant, but I am told that the fruits, which are about the size and shape of turkey's eggs, and ivory white, are delicious in flavor and suitable for a dessert fruit. It requires to be grown, no doubt, in stove heat.

It will give you some idea of the exhibition when I state that the "Committee of Selection" awarded considerably over 200 certificates of merit to as many varieties which were necessarily not all new, but were selected for first rate quality. The certificate is intended to be a stamp of excellence, so that the public may have some authoritative and independent assistance in making selections. The reports of the committees will be published in a convenient form in due time, and they will undoubtedly be valuable, particularly to amateurs who do not employ professional gardeners. Though September is, on the whole, the best time of the year for a vegetable exhibition, the summer vegetables, such as Peas and Beans, could not be well represented, which was to be regretted.

A conference of growers and others interested in vegetables was held on each day during the exhibition, and the papers read and discussed were all of a practical nature, and they will, like the report, furnish sound information on their respective subjects when published. Among the papers were those by Shirley Hibbard, on Asparagus culture; H. J. Veitch, on the production of new varieties, which was supplemented by good information on the subject by H. Vilmorin, of Paris. Others read papers on Salads, food of plants, improvements in Peas (by the well-known raiser, Laxton, of Bedford), improvement in Potatoes, and on the supply of vegetables for a large family all the year round. All these papers, and the discussions thereon, will be awaited with great interest by gardeners.

During a walk round Kew Gardens to-day, in search of novelties, I came across several most interesting plants in bloom, and the one that most attracted me was Pringle's new Tiger Flower (*Tigridia Pringlei*). It was in full bloom in company with its well-known relative, *T. Pavonia*, from which, however, it may be distinguished at a glance although there is similarity between them. Botanically, the two plants may be distinguished from each other by the different form of the petals and other parts of the flower, besides other less ob-

vious characters. From a garden standpoint it is quite an acquisition, because of its very brilliant color, the sepals being as bright a scarlet as it is possible for a flower to be—so bright, indeed, that the old species and its varieties are dull in comparison with it. Its growth is also dwarfer. The figure given of it in GARDEN AND FOREST admirably represents the plant. The bulb nurserymen are already inquiring for it, as they recognize in it "a good thing."

Another first-rate open-air bulb is the still rarer *Crinum Powellii*, a very beautiful hybrid variety, raised some years ago by a Mr. Powell, who hit upon the happy idea of intercrossing the common *C. Capense*, which is quite a hardy semi-aquatic plant with us, and the much more tender and far lovelier *C. Moorei*. The result of this cross is a plant possessing the hardiness of *C. Capense* and the splendid flowers of *C. Moorei*. In fact, some think that Powell's hybrid is even finer in flower and color than its tender parent. I saw it the other day in an open-air border in a cold part of Sussex, where it had wintered two years and was this season very robust. It had a stem a yard high and bore a half dozen very fine flowers, sweetly scented and of a deep rose pink. The leaves are as narrow as those of *C. Capense*, and it flowers continuously for six weeks. It is decidedly a plant to make a note of, and I believe it would be perfectly hardy in America.

W. Goldring.

Cultural Department.

Rot in Iris Germanica.

IN the cultivation of *Iris Germanica*, which has fleshy, running root-stocks, it is not rare to find a more or less extensive rotting of the root-stocks. The rot renders the affected portion soft and mushy; white, not changing the natural color, and highly offensive. Any portion of the root-stock may be affected, but it is more commonly the older portion, the newer, growing tips being freer from attacks. A large number of maggots were found in the rotten portion of some plants. On showing these to an entomological friend, he said they were the larvæ of a fly which lays its eggs in decaying tissue, and they were to be considered as an effect, not a cause, of the decaying condition.

During the past wet summer serious attacks of rot were seen in some instances. In a friend's garden, in June, large, established clumps of *I. Germanica* were literally rotted away at the roots, so that large masses could be pulled up by a slight twitch of the yellowish, sickly looking leaves. This garden is situated in strong loam in rather low-lying flat land. My own collection, consisting of about one hundred and fifty plants, is growing on a slight slope on strong loam with a sandy subsoil. A few of my plants were badly affected with rot, but none died. Most plants on examination showed slight or considerable injury in June, but have since recovered, and in transplanting them recently all were in good condition, slight traces of rot only being observable. Besides *I. Germanica*, many closely allied species having similar fleshy root-stocks have been observed to show indications of rot similar to that above described; but I have seen no such indications in bulbous species, or species like the *I. lavi-gata* (*Kämpferi*), which have dense, tough, abbreviated root-stocks.

The remedy to apply appears to be removal to a drier, well drained soil, where these Irises will thrive. An occasional extra wet season like the present one will cause some injury in almost any spot; but as the decay is due to super-moisture rather than disease, serious losses need hardly be feared if a suitable situation is selected. In winter it is best to protect German Irises with a light covering permitting a free circulation of air to prevent the retention of moisture. Evergreen branches or salt hay are desirable, as they lie loosely and do not easily rot.

In importing Irises with fleshy rhizomes from Europe I have met with some quite heavy losses, and have seen frequent damage from rotting, doubtless on the journey; whereas other roots, such as Narcissus, Tulips, etc., in the same package with the Irises, have been, in the instances observed, in a perfectly sound condition. It would be a great advantage to purchasers if dealers, in sending such Irises for any considerable distance, would make sure that they are perfectly dry before packing, and then pack them in well dried material. Peat would be desirable for a packing material in such cases, as its antiseptic properties would tend to counteract rotting. A preliminary artificial drying of roots and packing might even be desirable.

Boston.

Robert T. Jackson.

Plants for Forcing.

UNDER this heading it is not intended to present a catalogue of plants suitable for forcing for winter flowers, but rather to call attention to a few well known species as a reminder of the preparatory work, necessary at this season, to get the stock in proper condition for future operations.

The forcing of various plants for winter bloom has been much practiced in the past few years, not only among commercial growers but also in private establishments, and, in consequence, the demand for bulbs, hardy shrubs and other plants for this purpose has largely increased, though it may be said that among commercial growers, at least, the forcing of bulbs seems to have been overdone, and the inevitable reaction appears to be setting in.

This, however, does not affect the utility and propriety of forcing these plants for house decoration, for cut flowers, or

common with all bulbous plants for winter use, it should make the roots first, before the top begins to grow. Otherwise the growth will be weak and the flowers few.

With the Lilies this root-growth may be secured by placing them out in a cold frame after potting, and plunging the pots in coal-ashes, sand or soil, as may be most convenient. They should be allowed to remain in this condition until active root-growth takes place (usually in three or four weeks after potting). They may then be brought into a temperature of fifty-five to sixty degrees, until the flower-buds begin to form, when the temperature may be increased from ten to fifteen degrees without injury to the plants. In fact, I have known *L. longiflorum* flower very well after it had been subjected to a much higher temperature than this.

In potting these Lilies any good loam may be used, with the addition of some short, thoroughly rotted manure, and if



Fig. 139.—Japanese Flowering Apple.—See page 520.

to brighten up the conservatory during the dull days of winter; and it is to this end that the following suggestions and remarks are offered.

In a very prominent place among plants for this purpose is found *Lilium longiflorum*, and also the so-called Bermuda Lily, *L. Harrisii*, the latter being best for early forcing, though *L. longiflorum* will fully repay those patient enough to wait until later in the season for its lovely blossoms, as they have more substance, and, consequently, last longer than those of *L. Harrisii*. The flowers of the latter, however, are larger and are produced in greater profusion.

If required for an early crop, say about the holidays, *L. Harrisii* should be potted in August, so that it may become well rooted before it is brought into the hot-house, as, in

the soil is very heavy, enough sand should be added to render the mixture open, the fact being kept in mind that these plants prefer a tolerably rich compost. As the plants should not be repotted after active growth has commenced, they should be put in pots large enough to contain sufficient nourishment to mature the flowers, with a little assistance in the form of liquid manure at intervals after the flower-buds appear.

For a fair sized bulb of *L. longiflorum* (from six to eight inches in circumference), a six-inch pot will be large enough, but if the bulbs are larger it will be necessary to use eight-inch pots for them, to prevent their becoming starved and losing some of their lower leaves before the flowers are ready to open. The drainage of the pots must be kept in good order, for while enjoying an abundance of water when

making their growth, the roots soon suffer if the soil becomes sodden.

If lifted plants of *Deutzia gracilis* are to be used for forcing, it is now time to secure them, so that they may be potted or planted in boxes and stored away in a cold frame until needed.

This *Deutzia* is among the easiest plants to force, but, if used to any great extent, it is better to grow it in pots for this purpose. If the plants are plunged out-doors in summer they need but little attention. By growing them in this manner the roots are well established, and, in consequence, finer flowers are produced. Besides, the flowers last longer than those on plants which have been lifted from the open ground in the fall and potted up. Some shapely little Lilacs in pots will also make charming objects for conservatory decoration, and these may be readily forced in a Rose house, after they have been treated in much the same way as the *Deutzias*.

Imported clumps of *Astilbe Japonica* are still used largely for winter and spring forcing, and are usually stronger and therefore better than home-grown plants. They should be potted up as soon as received (which is usually about the beginning of November), and require but little heat to start them into growth, though naturally they will not start in so short a time in midwinter as toward spring. Their feathery, graceful spikes of bloom are acceptable at any time, and form a welcome addition to almost any arrangement of cut flowers.

The *Astilbe* is of the easiest culture, the chief requirements for growing it being a light, rich soil, full exposure to sunlight and an abundance of water.

Holmesburg, Pa.

W. H. Taplin.

Water Cress Under Glass.

WATER CRESS is not, necessarily, a plant that can grow only in water; it can be grown from the same roots all winter by any one who can grow a plant. No special care or preparation is necessary. It thrives in cool green-houses, and will grow very rapidly in abundant heat. I have raised Water Cress in this manner for several years, and have it now ready for market, fresh, clean, tender, pungent, in sprays more appetizing than when it is taken direct from its home in or near running water. Cuttings or slips of Cress, preferably the terminal shoots, four inches apart, should be planted about September 1st in the green-house bench in rows five inches apart. The first cuttings are made in about one month or six weeks, leaving a long stub of the first growth and the root undisturbed, and from these will again start another growth, which can be gathered as before.

No special treatment is required. Any soil that will raise good Lettuce will raise Cress; any kind of fertilizer used for vegetables stimulates the growth of this plant; six inches of soil, which should be kept free from weeds, is deep enough for it to grow in.

It is tender in the winter months, and is much better when grown in this way. Those who have used Cress gathered in late fall or in early spring, have noticed the tough leaf and dark foliage of plants grown out-of-doors. No more water should be used than is necessary to keep the level ground damp, not wet.

It is a profitable crop to raise. I retail the strawberry baskets, in which I put the freshly-picked sprays, at ten cents each, and there are from three to five cuttings, according to the temperature at which the Cress is grown. It also grows well in frames, when the thermometer does not fall to thirty-two degrees; but if raised with heat, it grows more rapidly. I transfer my roots from the green-house to hot-beds in March or April, and there they continue their growth.

Any one having even the smallest space at command can grow Cresses. They will flourish in a box or large pot or vase, filled with rich earth, if the roots are strong, in a corner of the conservatory or in a sunny window, and yield a treat both to the sight and taste. Let those try it who love a healthful salad-plant.

West Springfield, Mass.

W. H. Bull.

Oxalis.—The genus *Oxalis* is a very large one. We are told by the most recent authorities that it contains upward of 220 species, one of which, the common Wood Sorrel of Britain, is often spoken of as the Shamrock, as it is found growing in great luxuriance in Ireland. We have seen it covering acres of ground in moist shady woods, and it is not a matter of surprise that the honor of being a "national plant" is sometimes accorded to *Oxalis acetosella*. Here in the eastern states we have also an *Oxalis violacea*, a very pretty plant, with a small bulbous root. It is very suitable for naturalizing in shady places or on rock-work, where the pale violet flowers present in spring a pleasing appearance. We have culti-

vated here for several years another charming species. This is *O. lobata*, a native of South America, and said to be hardy in England, but we have never dared to risk it out here during winter; and, moreover, the heavy rains would completely disfigure its delicate beauty, for foliage and flowers are borne on slender stems about four inches high. The flowers are the size of a dime and the brightest yellow imaginable. In the greenhouse this plant lasts for fully two months in bloom, with a constant succession of flowers. Another plant, *O. Bowei*, perhaps the showiest of the genus, deserves mention as an excellent pot plant. Its foliage is very large, often three inches across, and surmounted by a stem bearing flowers of a bright rose color. These, like all others of this family, close up in the evening to reopen the next day to the genial influence of light and warmth. *O. Bowei* is a bulbous plant also, and is increased rapidly by this means, for where one is planted now there will be five a year hence. After the leaves die down the bulbs should be kept perfectly dry until it is desired to start them again, and by judicious planting at intervals in rich soil, using six-inch pots for three bulbs, *O. Bowei* can be made to flower all through the dreary months of winter, and is a very suitable subject for conservatory or room decoration.

Passaic, N. J.

E. O. Orpet.

Orchid Notes.

Lælia grandis.—This very distinct and handsome *Lælia* first appeared in cultivation in 1849, when M. Morel, of Paris, received a few plants from near Bahia, Brazil, through M. Pinel. In May of the following year a plant flowered with him and was exhibited in London at one of the Regent Park shows. After this event, however, it seems to have disappeared altogether until about 1864, when Messrs. Low & Co. succeeded in importing a limited number of plants through their Bahian collector. Although lost so many years from cultivation since its first appearance, its name, however, was kept up, having been applied to a form of *Lælia purpurata*. Within the last few years *Lælia grandis* has been often imported, but never in very large quantities, and it is this fact which accounts for its scarcity even at the present day.

For the last two months and a half, plants of this species have been in flower here, and have been a great attraction. They have clavate, fusiform stems, which become furrowed when old, bearing a single oblong-elliptic, very leathery leaf of a deep green, while the peduncles which emerge from a large greenish sheath on top of the stem usually bear five flowers, each from four to five inches across. The sepals and petals are nankeen-yellow, the former being lanceolate-acute, wavy and recurved at the tips, while the latter are broader and more crisped on the margins. The trilobed, funnel-shaped lip is creamy white, suffused pale rose and conspicuously veined with purple lines which diverge on the anterior lobe. It might be mentioned that great variation in color exists in the flowers of this species as in others. Sometimes the sepals and petals are veined with purple, especially on the outer surface, while the color of the lip varies from very pale to deep rose-purple.

This species should be treated like *Lælia purpurata* in many ways and may be grown with that species. During the flowering season, which lasts from July to September, the plants require not too much water, although growing slowly. At the end of this period more rapid growth begins and consequently more attention to watering is necessary. Being a native of a warm, moist climate, the winter temperature should be about sixty or sixty-five degrees Fahr., and this may be allowed to rise several degrees during the spring and summer when the sun becomes more powerful.

Grammatophyllum Measuresianum (new species).—This remarkable species has been recently introduced from one of the Philippine Islands by Messrs. F. Sander & Co., St. Albans, England, and dedicated to R. H. Measures, Esq., of The Woodlands, Streatham. A great number of plants having been already distributed among various collections, the following remarks may be, therefore, of more than ordinary interest:

G. Measuresianum is characterized by its masses of oblong, elliptic, slightly compressed pseudo-bulbs, clothed with silvery membranous sheaths, and varying in length from eight to sixteen inches, more or less furrowed when young, and deeply wrinkled when old. Each pseudo-bulb bears at its summit from four to six deep green, persistent, broadly lanceolate, acute leaves, eighteen inches or two feet long. In a wild state from sixty to seventy flowers, each about four inches across, are borne in April on stout, erect scapes, which spring from the base of the pseudo-bulb and are from five to seven feet tall. The narrower petals vary in color from cream to greenish yellow,

and are handsomely blotched with dark brown or blackish purple, the incurved tip of each sepal invariably having a large blotch of the same color. The small lip is pale creamy yellow, with a purple stain outside at the base. The bluntly ovate incurved side lobes are each traversed by seven sepia-brown parallel lines, and the disc, which is covered with fine white hair, has two parallel elevated keels or ridges which terminate in a small, hairy protuberance in the centre of the very small middle lobe, which is oblong in shape, creamy white and lined with purple-brown, while the slender, arching column is white, tipped behind and streaked in front with purple. On each side of the yellow pollen masses, which show through the anther case, is a small purple spot, thus giving the column the appearance of some insect peeping out from between the incurved side lobes of the lip.

It is a peculiar fact, and one worthy of notice, that the first five or six flowers at the base of the peduncle are always abnormal, that is, abnormal in differing from the other flowers, but natural in being always present. These lower flowers possess only two sepals and two petals, all larger and more thickly blotched than in the normal flowers. The column is also present and normal, but the lip and third sepal are entirely absent. I have seen a dried flower of *G. speciosum* having only four segments and a column, but in all the other species known, with the exception of *G. Fenzlianum*, which lurks in some obscure German herbarium, I did not see this peculiarity at all. Neither has it been mentioned in the description of any other species, so far as I can find out, a fact which in itself indicates that abnormal flowers have not been noticed, or surely such a fact would have been mentioned. *G. Measuresianum*, then, possesses the distinction of always having abnormal flowers at the base of the peduncle. Now the question arises, what is the object of these abnormal flowers? In nature everything has its use, but what is the use of these flowers? It is not possible that they can be female, while the others are male, for two reasons. First, because the column is precisely the same as that in the ordinary flower, having its pollen masses and other organs intact; and, second, because the pedicels of female flowers, as in *Cynoches* and *Catasetum*, are, as a rule, much thicker, on account of containing the ovary. But in the abnormal flowers of *G. Measuresianum* there is no difference whatever in the thickness and length of their pedicels and those of the ordinary flowers. If, then, these lower flowers are not female, what are they? Perhaps time will show.

At present little can be said about the cultivation of this species, but, judging from the strong and numerous growths thrown up by the imported pieces here in the nursery, one may safely say that it will not be a very difficult subject to manage. Some of the pieces are done up in well drained teak baskets in a compost of rough, fibrous peat and sphagnum, while others are hung up just as they arrived, in a warm, moist house. No water, or only very little, is given yet, the moisture of the atmosphere being apparently sufficient for their wants, as the pseudo-bulbs have become nice and plump and send out their growths. It might be mentioned that in its native country this species is always subject to plenty of sun and abundance of water during the season of growth, and the sight some of the plants present may be imagined from the fact that the collector saw one piece with fifteen spikes over five feet high, each bearing about seventy fully expanded flowers.

St. Albans, England.

John Weathers.

The Forest.

The Mountain Forests of Vancouver's Island.

THE forests of the mountains in the interior of Vancouver's Island differ materially from those of the low grounds near the coast, while as one travels inland the Douglas Fir (*Pseudotsuga taxifolia*) is the chief tree until an elevation of about 800 feet is reached. It then becomes insensibly intermixed with the western White Pine (*Pinus monticola*) and a sprinkling of Red Cedar (*Thuja gigantea*). Within a few miles of Departure Bay, where all steamers bound for Alaska take in coal, rises Mount Benson, attaining the height of 3,360 feet, at about eight miles in a direct line from the coast. The lower slopes of this mountain are covered with Douglas Fir of enormous size, many of the trees being nearly 300 feet high and over eight feet in diameter. The chief undergrowth is the Bracken (*Pteris aquilina*, var. *lanuginosa*), which is generally from four to six feet high, and so interlaced that to force one's way through it, without first tearing it apart with the hands, is impossible. After this is passed the undergrowth is composed of Salal (*Gaultheria Shallon*), which is, if anything, more difficult to get through. Amongst the Salal

the trees stand closer together, and are much less in diameter, but tower straight as arrows to an immense height. Here the Pine becomes quite frequent and the Salal more interesting, for, in great profusion, the rare *Boschniakia Hookeri* is growing as a parasite upon its roots.

Then, as one ascends still higher, the western Hemlock (*Tsuga Mertensiana*) comes in, and our forest is composed of four species. Gradually the trees grow less in size, until, as the summit is neared, they become stunted, but still healthy and vigorous. On the summit two species appear, as if they were new creations. These are *Tsuga Pattoniana* and *Abies amabilis*.

Later explorations on other mountains showed that the same trees kept their relative position, but toward the north were found at a decreasing altitude. It was ascertained that the forest-trees of one mountain were those of another, and that *Tsuga Pattoniana* and *Abies amabilis* were the rule, and not the exception, as they were in company on every mountain and were the last to disappear at an altitude of about 5,500 feet. Above this very few trees are found, but it was quite evident that their absence is not caused so much by cold as by the immense snowfall of the moist winter, which leaves the mountain summits covered to a great depth in the spring. Close to snow of unknown depth, trees, with a diameter of two feet, are growing vigorously on Mount Arrowsmith, while above them all is snow or depauperated and broken trees, flattened down by the snow, growing while they can, and lying dormant the remainder of the year.

Without exception, the forests of Vancouver's Island are the finest now in Canada. It is sad to think that these noble forests are being devastated year after year by fires started by men who are "improving" the land, and what it is impossible to do with the axe is being done with fire. In every part of the island the timber is sound and fit for market, and it might be kept so but for the recklessness of irresponsible men. For every tree destroyed by the axe a thousand are being destroyed by fire, and year by year the number is increasing. During the last half of July and August and early September (1887) the whole country was enveloped in smoke, and fire met the traveler at every point. A few years more and these noble forests will be but the blackened remains of a glorious heritage, as every year increases the power of the fire and gives it more prepared fuel for the next season. It is not alone on Vancouver's Island that this destruction is going on.

The Olympian Mountains, on the other side of Puget Sound, in Washington, are being denuded in precisely the same way; and this autumn (1889), over nearly the whole of British Columbia and northern Washington, the sky was obscured for six weeks by the dense smoke of the forest-fires raging in all parts of the country.

Ottawa.

John Macoun.

Forest Fires in Northern Canada.

NORTHWARD of the deciduous and mixed forests of southern Canada, a vast belt of conifers, about 700 miles in breadth, stretches for 4,000 miles from the eastern coast of Labrador to the Rocky Mountains and continues beyond them into Alaska. The northern zone of this belt consists of Black and White Spruce and Tamarac, but as we go south these become mixed with Banksian Pine, Balsam Fir, and in the east with White Cedar, and finally with Red and White Pine. Excepting near the verge of the forest, there is also a greater or lesser mixture of Aspen, rough-barked Poplar, White Birch and the various northern Willows, but in a general way this belt may be described as a coniferous forest.

Notwithstanding its immense extent, it may be said that fire has run through every part of it at one period or another. Forests of this kind are particularly liable to destruction by fire. The trees are comparatively small, and where they do not stand closely together the branches grow all the way down to the ground. The open spaces, no matter how rocky, are covered with reindeer mosses, which in the summer-time are as dry and inflammable as tinder, while the deep carpeting of the yellow mosses among the trees is equally dry, and helps to give body to the flames.

The Indian hunter or wild Indian of the north, knowing how destructive forest-fires are to the animals on which he depends for food and fur, takes all possible care to prevent them, yet if one ascends a high hill in any part of these regions, so as to obtain an extensive view of the country, he will find the normal condition of the woods to be "patchey," or to consist of areas of second growths of various ages mixed with others of older timber. The latter may have attained its full growth, and yet not represent the original forest, as it has probably sprung up on ground which had been burnt over at

a time more remote than would represent the life of any of the trees standing upon it. The writer has crossed the entire breadth of our northern forests in many parts, and has found these conditions to prevail everywhere.

Knowing the care which the Indians have always exercised, and the fact that the country had not been invaded by white men, the question arises—what caused these fires which have in turn swept over every part of the enormous country—and not only once, but again and again since a very early period? My answer is that forest-fires are a natural phenomenon, and that the conditions which we find in our northern woods could not otherwise have been attained. These fires have had an effect on the formation of the soil, on the rotation of crops of trees—so necessary to their healthy condition—and on the dispersion of their seeds.

We have both direct proof, and also the evidence of the trees themselves, that forest fires have originated without human agency, and that they have been going on ever since the present species of trees existed—if, indeed, they have not played a part in producing some of their characters. Lightning has been the commonest cause of these fires, although in some cases they may have originated from spontaneous combustion, due to the decomposition of pyrites, which is known to have set fire to beds of lignite in the Saskatchewan region.

In the northern states and the inhabited parts of Canada it is not uncommon for lightning to strike barns and houses and set them on fire in the hot months of summer. This is the season when our northern forests are dry and ready to burn, and we should naturally expect similar accidents to occur among them with at least equal frequency in proportion to area. Examples have been observed where the fire which has destroyed a large area has been traced back to a tree which had been struck by lightning. With an experience of over thirty summers spent in these woods, I have only once actually witnessed a case of this kind. The lightning on this occasion was plainly seen to strike the brink of a wooded bluff near Red Rock, on Lake Superior, and to set it on fire. Owing to the very small number of human beings in these regions, the chances of these occurrences being witnessed are very few as compared with civilized regions, yet the Indians tell me that they frequently happen.

Referring to the evidence afforded by the trees themselves, that forest fires are a natural phenomenon, I shall mention the case of the Banksian Pine. The cones of this tree are hard and remain closed as long as the tree lives. The older ones become weathered and covered with lichens, often indicating great age. The tree may fall down and rot, and the cones fall from the decayed branches, yet they will not open. But if the tree should become scored by a forest-fire, they will immediately gape open, and the healthy seeds will become scattered far and near by the wind.—*Robert Bell, Assistant Director Geological Survey of Canada, in "Forest Leaves."*

Correspondence.

The Lynn Public Forest.

To the Editor of GARDEN AND FOREST:

Sir.—A large proportion of the German cities, if not, indeed, the most of them, have their public forests. These date back to the earliest days, when woodland was held in common to supply the people with fuel and timber. Fortunately the cities have retained their titles to large portions of these adjacent forest tracts, which, administered on scientific principles, are now sources of considerable revenue. But their chief value lies in their service as delightful rambling grounds for the people, and to their existence is largely due the healthy love of Nature and of out-door life that characterizes the Germans. One of the pleasantest features of the city of Leipzig, for instance, is the noble pleasure-ground called the Rosenthal. This is a park consisting of a great central meadow surrounded by woods. The park is continued for miles out into the country by the city forest, which is intersected by rambling paths and roads. In the midst of it stands the famous Thousand Year Oak.

The early towns of New England likewise held their woodlands and pasture lands in common. The second settled town in the Massachusetts Bay colony, now the city of Lynn, had for its common woodland a wild and rugged tract that, from the slight fringe of civilization which had established itself on the shore, began at the feet of the outer crags of rocky hills and stretched away indefinitely into the vast wilderness of the continent. This woodland was held in common until 1706, the proprietors of Lynn being free to enter it and cut all the fuel and timber required to meet their needs. At that date the

tract was divided up among the land owners, subject to the restriction, which still remains, that any man might cross the territory of any other whenever convenience demanded. The greater portion of this territory, within the municipal limits of Lynn, remains in very nearly its original state. It occupies the north-westerly portion, which is a region of rock-ribbed hills, with bold ledges and precipitous crags, the intervening glens and valleys coursed by clear and rapid brooks and rills, and having in their depths extensive swamps and ponds. Its wildness is in marked contrast to the densely populated and bustling city close at hand, whose masses of buildings back up into the outer valleys of the territory.

This region is now to return to its original character of a woodland held in common, with the function, in addition, of a free public pleasure-ground. Its dedication to this purpose has proceeded through successive steps by a sort of evolution. Lynn has been exceptionally fortunate in her public-spirited citizens—men enterprising, progressive, of liberal ideas and cultivated minds. Their life-long acquaintance with this region naturally endeared it to them, and made them ardent lovers of Nature. When the growth of the city demanded a more extensive and systematically planned source of water supply, attention was directed to the valleys of this uninhabited territory, and a magnificent scheme was adopted, sufficient to meet the wants of the public for many years to come. The series of storage basins constructed in the valleys created a number of beautiful and natural looking lakes that, expanding and meandering among the abrupt hills, enhanced the beauty of the landscape. With wise forethought, the Water Board took possession of the lands adjoining the ponds, that they might remain forest covered, making the water supply more steady and preserving it from contamination through private occupancy.

In the meantime the project of converting the remaining portion of the region into a free public forest took shape among a number of citizens by the organization of an unincorporated body called the Public Forest Trustees, whose purpose was to hold in perpetuity, for the free use of the public, all portions of this territory that might be acquired either by gift or purchase. A number of detached parcels were thus secured, the most important of which was the strikingly picturesque and romantic tract around, and including, the famous Dungeon Rock, where pirates' treasure was supposed to be buried, and which for many years, until very recently, was the scene of the excavations of the deluded searchers, the Marbles, operating under spirit guidance through mediums. But, without the right of eminent domain, there was but little prospect that under this plan enough contiguous land could be secured to form a continuous forest-territory, before much of the woods had been hopelessly ruined. Fortunately, public sentiment in favor of the project had been educated to such an extent that the City Council lately decided to take advantage of the Public Park Act of Massachusetts, an appropriation of \$30,000 for the purchase of lands was made, which, in addition to private subscriptions, gives a fund of something like \$50,000 for the purpose. A Board of Park Commissioners, comprising just the right men for the place, has been appointed, and these are now proceeding to take the lands by the right of eminent domain legally conferred upon such bodies.

The Park Commission, the Water Board and the Public Forest Trustees will act in harmony in the improvement and administration of the region as a public forest, which it will be, pure and simple, with no attempt to incorporate the ordinary park features into its plan. There are about 800 acres of land to be taken by the Park Commission, which, with the 200 acres or so held by the Public Forest Trustees and the territory already taken by the Water Board, including about 200 acres in the ponds, will make a total of something like 1,400 acres, which perhaps may be considerably increased by lands which it is desirable for the Water Board yet to take.

The character of the forests is chiefly that of a young and thrifty growth of Oaks and other hard woods, with an abundance of Maples in the swamps, and many groves, clumps and groups of beautiful Pines and Hemlocks, some of which are of considerable age and size. There are passages of romantic sylvan beauty; and numerous legends and traditions, as well as historic incidents, add to the interest of the place. The highest points in the region are somewhat less than 300 feet above the sea-level, but the neighborhood of the ocean gives their altitudes full value, and the various prospects commanded are extensive and unusually impressive. From one eminence there is a broad view over the ocean, on which the rocky peninsula of Nahant seems to be floating, and the populous city spreads out close at hand, in contrast to the

woodland quiet amidst which the beholder stands; from another the prospect to the southward ends with the graceful contours of the Blue Hills of Milton, toward which the vision is gently carried from the rugged woodland foreground by the broadening landscape, and the seaward opening valley frames a vista of the shore-line curving southward to far beyond the entrance of Boston Harbor. Again, there are views over the forest amphitheatre that forms the main feature of the region, with nothing to be seen but wood, water and rock; all traces of civilization are shut out, and on every side the tree-covered hills undulate indefinitely into the distance, so that it seems as if the entire continent might still be the wilderness it was when the Puritans first came here. When the atmosphere is clear Mounts Wachusett and Monadnock stand out sharply in the distance.

It is proposed to develop this region for the convenience and pleasure of the public very simply, in accordance with its wild and natural character. Roads and walks will make the most notable portions easily accessible, and there will be nothing to prevent the visitor from wandering across country to his heart's content. A service of public carriages will be established to make the tour of the forest at cheap rates of fare for the round trip, and passengers will be dropped at successive points wherever they may desire, to continue the excursion in succeeding vehicles on the same tickets. The conditions are favorable for the development of a beautiful forest-growth, and it is intended to apply the most approved forestry methods in the administration. It has been suggested that "the Lynn Commonwood" would be a most appropriate name for the forest, having a historical significance in indicating its original function while also expressing its present character as a public pleasure-ground.

This forest will be the largest area dedicated to public park purposes in New England. Lynn has thus led the way in establishing the first public forest, and has set a noble example which ought not to be without effect upon other communities. Although a local enterprise, its benefits are far more than local. Its value to the neighboring New England metropolis can hardly be overestimated. Lynn is already, geographically, a portion of Boston, and will be knit closer together with the central city as years go on. An eminent landscape-gardener, in a recent examination of the place, predicted that it would become to Boston what Fontainebleau is to Paris, and Richmond and Windsor are to London.

Boston.

Sylvester Baxter.

The Disappearance of Wild Flowers.

To the Editor of GARDEN AND FOREST:

Sir.—You speak in reference to the practice of digging large quantities of popular wild plants from the woods and marshes, and thus nearly, or quite, exterminating some species from certain regions. Many a botanist and lover of nature regrets to see his favorites disappear. In this part of Michigan large orders have been filled from time to time for wild plants. Changes are taking place very rapidly in this part of the state. Swamps and marshes are often drained; then, during some very dry season, fire spreads, accidentally or otherwise, burning deep into muck and sphagnum, destroying many native herbs and shrubs.

Proprietors are still making extensions to their clearings; of course, paying no attention to Trillium, Cyripedium, Isopyrum or Hepatica. They are preparing more land to raise more wheat and corn, and grass to support more cattle to get more money to pay debts or buy more land. If we knew certainly where these clearings were soon to be made, there would be little harm in digging wild plants from them. If we could foresee what woodlands, marshes or ponds would remain "unimproved" for a long time to come, we could make attempts to save some of the gems which thrive there. But, here lies the trouble; we can seldom know what changes will take place in this new country. So far as we are concerned, in central Michigan, it seems about as well to collect choice plants, and let those have them who appreciate and will care for them, as to leave them with the chance that they will soon be burned over or plowed under.

Agricultural College, Mich.

W. J. Beal.

Trypeta Pomonella in New Jersey.

To the Editor of GARDEN AND FOREST:

Sir.—In your note on Dr. Hoskins' article on *Trypeta pomonella* you say it has been known many years in the West, but is not reported as injurious in this part of the country. I have a tree of Jersey Sweet, the fruit of which is invariably so badly infested with the maggot as to be absolutely worthless, and this has been the case for several years. A tree of Golden Sweeting

standing next to it is also more or less infested every year, so that I hardly ever dare to eat one unless I inspect it closely. If the apples are gathered and allowed to stand in a barrel for a week to become mellow, they then show the devious tracks of the disgusting pest through the skin, which is discolored, and if the apples are cut, they will be found often entirely riddled and honeycombed. I have seen apples in Connecticut badly infested with them, and, perhaps, Mr. P. M. Augur, the official pomologist of that state, could tell of Fameuse being entirely ruined by them. I consider it the worst pest we have to contend with in connection with the apple, because it is so minute that its presence is often not suspected till the mischief is done. Many persons have doubtless eaten infested apples in blissful ignorance of the presence of these loathsome insects, as they are hardly visible in their early stages, or in the early stage of their work, so near the color of the flesh of the apple are they. This is the reason, doubtless, why Dr. Hoskins has failed to find them. If in cutting the apples he should dislodge them and get them against the discolored flesh, a sharp, steady look would doubtless be rewarded by seeing them squirm, but, as they are of the color of the apple's flesh, it requires a keen eye to see them. They are small, but powerful for destruction. I have very seldom found them here except in the apples named, but I have seen Fameuse apples in Connecticut destroyed by them. I first noticed them about half a dozen years ago, and was induced to study them and find their authorized name.

E. Williams.

Montclair, N. J.

The Dwarf Weeping Willow.

To the Editor of GARDEN AND FOREST:

Sir.—The Willow spoken of by Professor Budd, of Iowa, as the "Napoleon Willow," is likely, if as hardy as reported, to be an extremely popular tree. But why "Napoleon"? Is it of the species or variety said to hang over the famous grave at St. Helena? This I have supposed to be the common and decidedly tender tree, which can hardly be grown north of Massachusetts, and not very successfully there. My young trees, from cuttings sent by Professor Budd, do not resemble this, having smaller, shorter and darker foliage. They are not yet tall enough fairly to test their hardiness against cold; but as Iowa has as hard winters as northern Vermont, I hope to find them a success. I hardly know of any tree that would meet with a wider sale than a true iron-clad Weeping Willow, and a moderate degree of dwarfness would be an added merit.

Newport, Vt.

T. H. Hoskins.

Recent Plant Portraits.

TULIPA MAXIMOWICZI, Rgl. *Gartenflora*, October 1st; a delicate species, with narrow leaves and small flowers, with acuminate scarlet perianth-segments; a native of Bokara, and closely related to *T. linifolia*.

TULIPA BATALLINI, Rgl. *Gartenflora*, October 1st; a yellow flowered Bokaran species.

Botanical Magazine, October.

DRACENA MARMORATA, t. 7078; a fine tropical species from Singapore, whence it was introduced to Kew in 1882, and flowered there for the first time last year. "The most striking characteristic of the present plant, from a horticultural point of view, is its very large, sessile, plicate, bright green leaves, copiously marbled with white."

PRIMULA PUSILA, t. 7079, A; a common and widely distributed alpine species of the Himalaya, found at elevations of 13,000 to 16,000 feet, where "it forms considerable tufts. Its sapphire-blue flowers are very attractive." Sir Joseph Hooker calls attention to the fact that, unlike many Primroses, it shows through its wide range of distribution no inclination to vary from the type form.

PRIMULA PETIOLARIS, t. 7079, B; of this plant Sir Joseph Hooker remarks "that it is one of the commonest and most variable of the Primroses of India, or perhaps the world. It abounds under innumerable forms throughout the Himalaya, at elevations of 8,000 to 14,000 feet from Garwhal to Bhotan, varying from a dwarf Alpine no bigger than a penny piece, with sessile leaves and flowers, to a coarse herb, with long petioles, spatulate-obovate or orbicular-cordate leaves a span long, and umbelled flowers on a stout scape." The variety figured is that known as Nana. It is represented with short-petioled leaves and short-stemmed pale purple flowers, with a yellow eye.

FRITILLARIA BUCHARICA, t. 7080; a handsome and interesting species, with leafy stems, and lax, many flowered racemes of greenish white, campanulate flowers, rather less than an inch long. It is one of the plants discovered by Dr. Albert Regel in central Asia.

Notes.

An ever-blooming Rose of dwarf habit, with bright pink semi-double flowers, called *Rosa semperflorens Fellenberg*, is used largely in Berlin for the decoration of flower-beds in public squares and private gardens. It remains in bloom throughout the entire season, and appears to be admirably suited for the purpose for which it is used.

The increase in the cultivation of the Chrysanthemum in this country, of late years, is something almost fabulous. It is certainly our most popular flower, and Chrysanthemum exhibitions to be held during the coming month are already arranged for at Charleston, Chicago, Boston, Philadelphia, Detroit, Cincinnati, Indianapolis, Orange, Montreal, and at several of the smaller New England cities, like Worcester, Springfield and New Haven.

A correspondent of *The Garden* (London) calls attention to the beauty of a bed of the Hybrid Tea Rose, Grace Darling, which he had seen blooming in the gardens at Kew during the last week of September. Grace Darling is one of the most beautiful Roses of its class, and was to be seen during the past summer in great beauty and profusion in the flower markets at Carlsbad, in Bohemia. It is a plant of robust habit, with good foliage, producing clusters of fragrant flowers. These, when well grown, are compact in habit, with bright peach-colored petals, shaded to creamy white.

Our attention has been called recently to a charming combination of autumn colors, produced by a plant of the Chinese Wistaria, running through and over a tall mass of the Stag-horn Sumach. The dark rich green of the Wistaria serves to bring out and intensify the scarlet tints of the Sumach. The converse of this effect may be produced by a Virginia Creeper rambling over a Red Cedar-tree—a natural combination often found in the woods and by the roadsides in our eastern states. This natural mingling of scarlet and dark green produces one of the most beautiful effects of autumn color which can be seen in America.

Shortia has long been regarded as one of the rarest plants in the North American flora. Now, however, it is known to be so common, in at least one region, that a long established vernacular name for it is in common use among the few families of mountaineers who inhabit the valleys at the headwaters of the Savannah River, where Shortia is found. Galax, the near relative of Shortia, is known almost universally to the people of the southern Alleghany Mountains as Coltsfoot, from a fancied resemblance of the leaf to that of a colt's foot. The smaller leaf of Shortia, which resembles somewhat the leaf of Galax, is called "Little Coltsfoot."

A hybrid Rhododendron, raised several years ago in Mr. John Waterer's nurseries at Bagshot, in England, is a plant of much promise. It is the result of a cross between the Himalayan *R. Dalhousianum*, and the well known variety of Catawbaianse hybrids, *R. album elegans*. The hybrid has large, deep green foliage; it is a free bloomer; the flower trusses are large, and the individual flowers, which are pure white, faintly marked with small pink spots on the upper lobe of the corolla, are large and possess great substance. This hybrid is quite hardy at Bagshot and there is a chance that it may prove so here in the northern states. It can, in any case, be grown here in a cool house, or with winter protection in a pit or cold cellar.

Maréchal Niel rosebuds, grown in the open air in southern Austria, are sold in large numbers during the summer months in some of the health resorts in Germany. They are often fine specimens, and not infrequently are tastefully arranged with the red and green foliage of the changing Virginia Creeper—a favorite arrangement being three buds on a fan-shaped mass of leaves made to be held in the hand. The beauty of the buds is often sadly marred, however, by the custom which prevails in some places of turning back artificially the outer rows of petals for the purpose of increasing the apparent size of the flowers. A combination of Maréchal Niel roses, with sprays of the foliage of the Purple Beech, is a favorite one, and the contrasting of the two colors produces an excellent effect.

The death is announced of Mr. John Ball, the distinguished English botanist. His studies were devoted largely to botanical geography and to philosophical questions relating to the origin and descent of existing floras. Mr. Ball's best known works are "The origin of the Flora of the European Alps," published in 1878, and his "Contributions to the Flora of the Peruvian Andes, with remarks on the history and origin of the Andean Flora," published in 1885, in the journal of the Lin-

næan Society. He accompanied Sir Joseph Hooker, in 1871, in his scientific mission to Morocco, publishing on his return a catalogue of the plants discovered, with critical introductory observations (his first attempt to explore the chain of the Greater Atlas was made as early as 1851). Mr. Ball traveled extensively and was a practiced and accurate observer, and one of the very best books of recent travels is the one in which he described his South American journey, which carried him round that continent. Mr. Ball was in North America in 1884 at the meeting of the British Association at Montreal, and of the American Association at Philadelphia, later, accompanying his old friend and correspondent, Dr. Asa Gray, on the last journey the Cambridge Professor made to Roan Mountain and other points of botanical interest in North Carolina. Mr. Ball belonged to a school of botanists of which only a few members remain; and he was almost the last of his associates and contemporaries.

Death has ended, too, the long and brilliant career of Leo Lesquereux, the Nestor of our botanists and the most distinguished student of palæontology in the United States. He died last week in his home in Columbus, Ohio, in his eighty-third year. Professor Lesquereux was one of the Swiss naturalists attracted to America by Agassiz, whose assistant he became at Cambridge in 1848. Subsequently he removed to Ohio, and devoted himself almost exclusively to the investigation of fossil plants. His best known publications are a "Catalogue of the Fossil Plants which have been named or described from the Coal Measures of North America," and the "Coal Flora," which formed part of the Report of the Second Geological Survey of Pennsylvania. He contributed a large number of papers upon fossil botany to the reports of the different Government surveys of the western part of the continent. Professor Lesquereux's principal contribution to present botany was his "Catalogue of the Plants of Arkansas," joined to his botanical and palæontological report to the geological survey of that state.

The growth in popularity in Europe of the Tuberous Begonia can hardly escape the notice of the most casual observer. The plants are now seen everywhere. They form the most attractive feature in the flower-beds of city squares in central Europe; they decorate the most pretentious of the ugly gardens of the great hotels, and they may be found growing and flourishing in pots on the window-sills of the smallest cottages in remote Swiss villages. They are gradually driving out the old Scarlet Geranium from cottage gardens. This sudden leap into popularity is surprising because it is barely a quarter of a century since the species from which this new race of Begonias sprung were entirely unknown; and in all the history of floriculture there is not another case of a new race of plants taking at once such a hold upon popular affection. There is danger, however, that the florists will spoil these pretty plants as they have spoiled so many others in their pursuit of novelties, and of new and startling forms and varieties. The double flowered Begonias, which are just now all the rage, are far less attractive than the single flowered varieties; and there is danger, too, that even the single flowers may be made too big and ungainly for harmonious combination with the plants which bear them. The charm of a Begonia flower is in looking like a Begonia flower, and not like a small Hollyhock or a deformed miniature Rose; and yet the best claim the advocates of these double flowers make is that they look like something which they are not—a Rose or a Hollyhock. Still, as long as the public continues to consent to pay three or four times as much for the double flowered varieties as for those with single flowers, the florists can hardly be blamed for devoting their energies to their production.

Catalogues Received.

C. E. ALLEN, Brattleboro, Vt.; Seeds, Plants and Small Fruits.—J. A. DE VEER, 183 Water Street, New York; Choice Holland and Miscellaneous Bulbs, Seeds, Plants, etc.—F. W. KELSEY, 208 Broadway, New York; Hardy Trees, Shrubs, Roses, Bulbs, etc.—HARLAN P. KELSEY, Highlands Nursery, Highlands, N. C.; Plants and Flowers of the Southern Alleghany Mountains.—JOHN LAING & SONS, Forest Hill, London, S. E., England; Dutch, French and other Bulbous Roots, Fruit Trees, Roses, Shrubs, Begonias, etc.—J. L. NORMAND, Hill-Side Nursery, Marksville, La.; Oriental Plums, Peaches, Pears, Vines, etc.—REASONER BROTHERS, Royal Palm Nurseries, Manatee, Fla.; Tropical and Semi-Tropical Fruit Plants, Bamboos, Aquatics, Conifers, Palms, Cacti, etc.—E. W. REID, Bridgeport, O.; Small Fruits, Apple, Pear, Plum, Peach, Quince and Deciduous Trees, etc.—GEORGE RICHARDSON, Lordstown, O.; Rare Water Plants.—G. L. TABER, Glen St. Mary Nurseries, Glen St. Mary, Fla.; Fruit Trees.—JOSEPH TWEDDLE, Vine Valley Nurseries, Stoney Creek, Ont.; Grape Vines.

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The Utility of What Makes Life Interesting.

FOOD, clothing and shelter are the primal, universal wants; but when these are supplied, new needs arise, the wish for increasing comfort and security, and then the desire to make life interesting, so that it may be something more than mere existence. The means to this end are as varied as the special qualities and dispositions of individual men, but, however it may reveal itself, this hunger for something beyond the means of physical subsistence is an ideal element in our nature. It is the origin of poetry and romance, and of all art. It is the source of progress and civilization, and is, indeed, the distinguishing endowment and crown of humanity. It is not enough for men to have food, clothing and shelter in amplest supply. The physical life itself is not prosperous or secure when the mind is starved and dwarfed. Pleasant thought is a vital force. Interesting mental employment promotes health and longevity, and is a necessity for all.

The means, conditions and occupations which make life interesting for some persons have no such value or result for others. The sustaining pleasures of one man would be a burden and weariness to another. Growth carries the same individual beyond the earlier ideal satisfactions, and he discerns more truly what is normal, sane and healthful. A cultivated and developed taste rejects what was once highly esteemed. In an advanced state of society every person would be free to employ his means and opportunities for the satisfaction of his own ideal needs—to pursue the objects which would make life most interesting to him, if he did not trespass upon the rights of others. At the same time every individual would be influenced and aided by the general taste, judgment and culture of the community about him.

The growing interest in out-of-door life, and in means of recreation that can be enjoyed in the open air, is one of the most encouraging tendencies of the time. Gardening and the care of flowers and trees are becoming more and more attractive to thoughtful and cultivated people everywhere. These are sane and wholesome occupations, and they are coming to be depended upon for relief from weariness and "nervous prostration," as it is found that pleasant

activity in the open air is often a more potent restorative than medicine. The primary benefit comes, of course, from our breathing purer air, and more of it, when out-of-doors; but every one needs a more inspiring reason for going out than the bare and depressing thought of the need of improvement to health. It is much better to think about our flowers or shrubbery, or to be interested in plans for the care of a garden or door-yard, than to think of ourselves in any more direct way. In all such activities immediate utility is associated with the more ideal aims.

The best garden or farm is partly a work of art. Its order and beauty add to the interest of life for its possessor, especially if he cultivates it with his own hands and brain. A day laborer with a garden, or a few square yards of ground about his door, has an artist's opportunities in the application of his taste to the capabilities of the area which he plants and shapes. He may have the delight of creating something beautiful and interesting which did not exist before. It is a serene happiness to think out plans for doing the best that can be done with even the smallest piece of ground on which anything can be made to grow. He who has room for trees has it in his power to make enduring changes in the landscape, and the care of even a few trees will supply much of interest from the time they are planted till their protector can walk or rest at will under their shade. One becomes attached to them as to children and friends, and they respond in their way. The watch against their many foes often involves unpoetical activities; but struggle is the condition of all animate being, and life without it, if it were possible, would not be interesting.

The defense of trees against their insect enemies introduces us to one of the most interesting provinces of the out-of-door world, the life of birds and their services to man. In the order of animal existence on our planet they are the natural instrument for keeping insect life down to its normal level and proportion. But we have repressed the bird population in this country to such an extent that we have produced an enormous over-development of insect life, so that the dominion is given over to them, and they have become an all-pervading curse, like that of the frogs in Egypt when they covered the land, entered the houses and climbed into the very bread-bowls. Learned men write books and governments make large appropriations to help farmers, orchard-growers and vine-growers to defend their crops against injurious insects, but if we were civilized enough to protect our friends and allies instead of cherishing our enemies, the birds would soon dispose of most of these pests.

It is often observed that birds are more particular about their food than formerly, and that many of the worst insects are not eaten by them. But that is because their supply of food is so abundant that they can afford to be dainty and to eat only what they like best. It is much the same as if a banquet for a thousand men were served every day for half a dozen. They could taste here and there, and would make little impression on the whole supply. It is so with the birds because they are so few, but if they were protected till the bird population began to press upon their means of subsistence, they would not be so fastidious, and would be glad to get any kind of bug or worm, and would snap up every one that showed his head.

Besides their utility as insect destroyers, birds are among the most interesting and companionable of all living creatures. Few people in this country have any intimate acquaintance with birds and their ways, but those who have studied them in close and pleasant relations know that they have a great deal of individual character and a wonderful and most interesting kind of intelligence. Their music, too, often peculiarly sweet and fascinating, with a mysterious and indefinable quality—a kind of divine suggestiveness—appeals strongly to the higher and gentler elements of our nature. But few persons now hear this music, because the birds that remain are so hunted, terrified and tormented that they rarely feel like singing. If the children and young people of the country were instructed in their homes,

schools and churches regarding man's relation to the earth on which he lives, and his responsibility for the care and ordering of it and its products, not only would there be a saving every year of millions of dollars in the crops of our farms, gardens, orchards and vineyards, which are now destroyed by insects, but life would soon be much more interesting to the wiser race of men and women.

An Associated Press dispatch, dated at Silver City, New Mexico, October 27th, serves to emphasize what was said in these columns last week with regard to the difficulties which will attend any effort to secure from Government consideration even of a comprehensive scheme for preserving the forests on the public domain of the United States. It appears from this dispatch that an attempt made by the agents of the Treasury Department to protect the forests in southern New Mexico from promiscuous thieving has met with violent opposition and protest. The effort of the Government to preserve its valuable timber from being stolen bodily is characterized as "a summary step to paralyze the chief industries of the territory." The owners of saw-mills, who have been carrying on their business for years with timber openly stolen from the Government, receive the sympathy of the community because they have been "made miserable by Government agents," who have attempted to perform the duties of their office. Congress is to be asked to modify the laws so that plunder can be made legal, that the mine-owners and timber-men of New Mexico and of the other territories can carry on their operations without fear of molestation.

The forests of southern New Mexico, covering a mass of high and almost inaccessible mountains, are the most valuable in all the region immediately adjacent to the southern boundary of the United States. The timber which they contain is often large and of good quality, considering that it has grown in a comparatively dry region. These forests, could they be managed with a little care and forethought, are capable of supplying, indefinitely, the people and the mines of New Mexico with timber, and of furnishing a large amount for shipment to the treeless regions east, north and west. The time, indeed, is not far distant when the great body of timber occupying the mountain ranges of southern New Mexico and south-eastern Arizona will, if it can be preserved from needless destruction, become a considerable factor in the timber-supply of North America. These forests, too, assure the integrity of a number of small streams absolutely essential to the existence of the inhabitants of the valleys at the base of the mountains. Were these forests under proper control, and systematically worked, the people of New Mexico would be able to purchase regular and abundant supplies of timber and firewood, and there would be no question of "one-third of the population being driven out of the territory, and of all business being paralyzed" by Government action. The truth of the matter is, however, that the people of New Mexico want their timber for nothing, and that a not inconsiderable part of the population are now in the territory because good timber can be had there for the taking. Settlements have been made and industries have sprung up on this basis, and every effort of the Government to protect its property will be met with determined and well organized opposition.

In this active local opposition lies the great obstacle to forest-conservancy in the United States. The task of preserving the forests of western America is in itself sufficiently difficult to tax the energy and the administrative ability of any nation. No forest region, not even that of India, which has been brought under control, presents anything like the physical and climatic difficulties which a forest-administration would be called on to encounter in dealing with the forests in the central and western parts of this continent. When to these natural difficulties are added national indifference and active local opposition, the prospect of serious reform is not encouraging. And yet if this destruction cannot be stayed, that portion of this continent

beyond the 100th meridian must, with the exception of a few favored localities, be uninhabited before another century has passed; and the people of the United States, whatever their numbers may be, will then be crowded into the eastern side of the continent. The forests mean existence to the people living in more than one-half of the present territory of the United States, and in their future lies one of the great social and economic problems of the twentieth century.

Landscape-Gardening in Persia.

PERSIA has long been famed for the artistic genius of her people. It is less generally known, however, that the art of landscape-gardening has been for thousands of years one of the most characteristic of the æsthetic expressions of Iran. This ignorance is doubtless caused by the fact that examples of the other arts of Persia can be exported or reproduced in color, whereas a garden cannot very well be exported, and few travelers have visited Persia or had the artistic training that would lead them to write intelligently about her arts.

I speak of the landscape-gardening of that country as reaching the rank of an art, because, in the first place, it is an original expression of a national taste for the beautiful, and in the second place, because, like all true art, it is an outgrowth from natural conditions and adapts itself to those conditions.

The climate of Persia makes out-of-door life essential. For nine months no rain falls, and even the wet season, which lasts less than three months, is attended with only moderate rain or snow on the elevated plateaus, which constitute the larger part of the country. The remainder of the year the skies are cloudless, the dews are imperceptible, and the dry air quivers with mirage. The heat is steady, but the nights are cool, owing to the elevation of the country. Exception may be made to these observations in regard to the climate of the narrow strip between the Caspian and the Elbarz Range, forming the northern watershed of those mountains. The vapors of the Caspian striking these slopes deposit a vast amount of moisture, which descends in numerous streams. The northern slope is covered with dense, jungle-like forests, the alluvial lands at the base are devoted to rice fields, and the steaming atmosphere reeks with malaria.

But, on passing the ridge, one enters a dry atmosphere and beholds before him plains extending six hundred miles, often mere waterless, verdureless sand, and always destitute of trees, except where irrigation has been employed. This is the region where the landscape-gardening of Persia has been developed and brought to exquisite perfection.

It is evident that an arid soil and a cloudless sky at once suggest the need of water and shade, and that those must be the prominent objects to be brought together in agreeable combinations, while the scarcity of the population and the engineering difficulties to be encountered must regulate to a large degree the characteristic features of a place. Add to these a third element—the last one would imagine as giving a direction to landscape-gardening—polygamy. This institution shapes almost every phase of Persian life. In the present case the seclusion of the women imperatively controls the arrangement of the grounds as well as of the dwelling apartments, and hence is one of the causes for the constant surprises and variety we find in the country-seats of Persian gentlemen.

In spite of these limitations, artists in landscape do not slavishly follow a fashion or some dominant conventional system of decoration, but allow the *genius loci* to stand at their elbow and direct them how to evoke beauty in accordance with the particular spot that, from an arid rocky slope or a barren plain, is to be transformed into a dream of voluptuous delight.

Having purchased his land, the proprietor does not say to the designer: "What is the latest style in landscape-gardening or in the construction of villas?" But, "What can you make out of this piece of land?" The land is not to be twisted into conventional designs, but the design is to be brought into harmony with the land. The variety possible on this principle in Persia is evident when we consider that the first object of a country-seat is, wherever possible, to locate it on some elevated point, in order to lower the temperature, and approach the sources fed by the mountain snows, the latter in order to have abundant water for irrigation, without which it is useless to attempt culture in that country, either of woodland or tilth.

I cannot better illustrate these statements than by a brief description of a characteristic place in the neighborhood of Teheran. These country-seats, by the way, all have specific names, by which they are known, rather than by the name of the proprietor. Jeferabad includes some sixty acres on the

steep slope of one of the spurs of the Shimran Range. The vegetation is divided between fruit trees, shade trees and flowers, arranged to make an agreeable summer residence and a profitable farm, the latter feature being so distributed as not to be too prominent in a pleasure seat.

The grounds are so steep and broken that a proper site for the residence could be obtained only by terracing. This added to the expense but also to the impressive beauty and majesty of the design, which has everywhere been carried out with an admirable combination of breadth and detail, and a general harmony of effect, which produces an impression on the memory more vivid and lasting than that of many far more elaborate and costly places I have seen in Europe. Herein is exhibited the consummate art of the Persian designer.

The shape of the estate is exceedingly irregular, roughly representing a pear pinched at the smaller end, which is, at the same time, the nearest the base of the hill. It is near this end that the gardens and residence are placed. These might have been more easily reached by having the main entrance to the grounds just at a bend in the road before it descends to follow the roaring brook that comes from the mountains and dashes through a romantic ravine. But to have done this would have been to sacrifice one of the finest effects of the place. This feature of Jeferabad is one of the most effective I have seen produced by the art of landscape-gardening.

Descending into a little hollow, the steep winding road inclosed on either hand with high walls, one comes unexpectedly to a lofty gateway on a widening of the street, the latter intended to afford space for the groups of horses attending the cavalcade of a Persian gentleman. Entering the gate, we look up an avenue of lofty, trimmed Sycamores and Poplars, forming on either hand a stately wall of green, through which glimpses of fruit-trees are seen. This avenue turns a sudden angle and continues up a gentle slope for a hundred yards, leading, apparently, to nothing; so dense is the vegetation, one can form no idea of the character of the place.

Still wondering what he is coming to, the visitor reaches another sharp angle in the avenue, and, without warning, faces a flight of broad stone steps, flanked by a carved balustrade at the end of the third stage of this impressive walk. At the head of the steps is a vast terrace, and, framed as it were between the walls of greenery beyond this terrace, appears a most graceful pillared pavilion surmounting a second terrace, the effect being not less beautiful than some of the restored temples of classic times, lifted toward the blue ether by gradual elevations.

It is not until one actually places foot on the pavement of the first terrace that he has any conception of the delightful surprise that awaits him. He beholds a platform one hundred and twenty yards in length and forty in width, from whence he gazes over the capital of Persia in the distance, an oasis of green on the plains, quivering with mirage fading away to the south. This view is seen through a break, permitted for this purpose, in the wall of foliage that surrounds the terrace.

The terrace is entirely paved, but yet we say this with reserve, as through the centre is a channel for a stream, and parterres abounding with flowers fill a large portion. The northern end is raised a foot and contains a circular tank some fifty feet in diameter. The east side of the terrace is protected by the wall of the second terrace rising fifteen feet. This terrace is of less width, and is, in turn, protected on the east side by a dense grove of Poplars swaying over it, like plumes in the regular trade wind.

The buildings are constructed on these two terraces in a manner to combine effect with the peculiar domestic arrangements of the country, and, at the same time, in a way that could not be admitted in a less mild and even climate. Extending entirely across the northern end of the first terrace are the apartments of the ladies, and these have a separate court, invisible until one enters it. This is paved, and beautified with roses grown in the form and almost the size of Lemon-trees. In the centre of this court is a tank, where the water plays at will; and from this court one reaches a stately apartment, serving as a common room where all can meet and sleep, gossip, embroider or touch the guitar as they choose, listening to the plashing of water from every quarter. For the water, led from the hill above, where it has fed the orchards, passes into the tank of the small court; thence it passes under the women's apartments to toss its spray again in a tank on the southern front of those apartments; thence it bursts forth again with a lofty jet in the large basin, then dashes along the terrace to break down a mimic cascade, and then passes under the dining-apartment at the southern extremity of this terrace, dashing forth down to the brook with the chatter of a mill stream.

In the meantime another branch of this stream is diverted to the second terrace, where it feeds two other basins between the three pavilions, for the master's quarters, which, at regular intervals, crown the centre and each end of that terrace. Thus at will five jets can play at once in this part of the grounds, in addition to two mimic cascades, and the roar of a brook which courses through the orchards. In warm weather the charm of this cooling music can be easily appreciated.

The large grounds which rise in the rear of these artificial works are densely covered with fruit and forest trees, judiciously broken by delightful winding walks, and intervals provided with seats. Here and there a terrace of rough masonry is bolstered against the hill-side, and a deep, rude tank, overgrown with moss and turf, offers, at the highest part, a delicious spot for a fête champêtre, for which purpose it is often employed. Altogether, this portion of the estate forms a romantic wild wood, slightly aided by art and taste.

S. G. W. Benjamin.

Viburnum lantanoides.

IT is a singular fact that with the exception of the poor figure in Audubon's "Birds" no portrait has been published before of this shrub, which is by far the handsomest of the North American *Viburnums*, and one of the most beautiful plants of our flora. The fact that it is impatient of cultivation—for the Hobblebush, or Moosewood, as this *Viburnum* is often called at the north, is the most difficult of all our native shrubs to cultivate—probably accounts for this lack of figures, as American plants have been figured generally in European publications from specimens obtained in European gardens. *Viburnum lantanoides* was not included in either edition of the "Hortus Kewensis," and it is doubtful if it has flowered in a garden very often (a small plant flowered in the Arnold Arboretum this year) or that many persons who are not familiar with our woods in early spring have ever seen it in all its beauty.

It is a tall, stout shrub, with naked winter buds, reaching occasionally to a height of twelve or fifteen feet, with short tortuous stems, rather bare of branchlets, and covered with smooth, dark brown bark, that of the square or angled shoots being red and marked during the second year by numerous white dots. The leaves are confined to the ends of the branches; they are round-ovate, abruptly acuminate, sharply and doubly serrate, pinnately straight veined, the prominent veins connected by conspicuous transverse veinlets; six inches long when fully grown, by nearly as much broad. They are densely scurfy-pubescent when they first appear, as are the broad, stout petioles, the inflorescence, buds and shoots of the year. The flowers are produced in radial cymes, the marginal being neutral, with enlarged, flat Hydrangea-like corollas, an inch or more across. The inflorescence begins to unfold late in April or early in May, the neutral flowers opening first. The leaves are then an inch or an inch and a half long, and conspicuous from the broad prominent veins covered with dense brown tomentum. The flowers are fully open a month later, and the fruit ripens in September. It is coral red as it reaches maturity, turning dark crimson or purple when fully ripe, ovoid, rather flattened, and half an inch long. The stone is flattened, three-grooved on one face, deeply and broadly grooved on the other.

Viburnum lantanoides is found in the forests of New Brunswick and Canada, extending southward through the Appalachian Mountains as far as the high peaks of North Carolina and Tennessee, where it attains on the high western slopes of the Big Smoky Mountains its greatest development, and where specimens fully fifteen feet high of almost arborescent habit are not uncommon.

It approaches the coast at a few points in eastern Massachusetts, but its true home is far north, or on the high mountains. The Hobblebush delights in rather moist soil and in the deep shade of deciduous trees, where it often quite covers the ground, and enlivens in early spring the forests of Sugar Maple, Beech and Birch of northern New England, New York and of the shores of the Great Lakes, with its showy white flowers, and again with the deep, rich claret coloring of its unsurpassed autumn foliage.

Mr. Dawson has tried various experiments in his attempts to cultivate this plant. He finds that when it is grafted upon *Viburnum dentatum* it grows much more vigorously than it does upon its own roots, but that it will not unite with *V. Lantana*. Grafted plants two years old are already larger than wild plants taken from the woods five or six years ago.

C. S. S.

Holiday Notes in Southern France and Northern Italy.—IV.

MILAN, the principal city of Lombardy, and one of the wealthiest manufacturing towns of Italy, stands near the centre of a plain which owes its unusual fertility to a system of irrigation more thorough than exists in any similar area in Europe. Indeed, but for its artificial supply of water the region would be scarcely capable of cultivation, for the summer there is hot and almost rainless. As it is, an unusually cold summer is the only thing which affects the crops to any extent.

Close to the central railway station passes a broad avenue of Horse-chestnuts, a fashionable drive, which follows the line of the old ramparts. The public gardens lie on the south side of this boulevard, and they are, as a whole, well laid out and contain a number of very fine trees. In the neighborhood of the Municipal Museum, however, the ground is too much cut up, and a number of flower beds, arranged carpet fashion and otherwise, look paltry and mean. The bedding generally seemed poor, the only combinations noted as good being four large beds bordered with Ivy and filled with *Musa Ensete*, *Canna Ehemanni*, flowering freely, *Colocasia antiquorum*, the Papyrus (*Cyperus Papyrus*), *Panicum plicatum* and *Eulalia Japonica zebrina*. Perhaps the most striking feature of which the gardens can boast—certainly the best from a purely ornamental point of view—were the groups of *Erythrina crista-galli* growing in the grass. The plants were evidently very old, eight to ten feet or more in height, with thick, branched stems and fine heads, the long, erect racemes of richly colored flowers contrasting well with the deep glossy green of the leaves.

Noble groups of *Magnolia grandiflora*, some of the trees laden with fruit, and here and there one bearing a second crop of flowers, filling the air with fragrance, challenged attention. This splendid evergreen never attains such size or luxuriance in England, even under the most favorable circumstances. A rather unlikely companion to the Magnolia, but one, moreover, thriving under the same conditions at Milan, is the Norway Spruce (*Picea excelsa*). A few Deodars (*Cedrus Deodara*) were also noted as being better than any hitherto seen by us in our journeyings. An interesting feature was a group of *Albizia Julibrissin*, a handsome low tree with flat head and horizontally spreading branches, their loose habit and light green feathery leaves forming a striking contrast to the formal growth and dark green needles of the Spruces and Pines near them. Here and throughout southern France *Albizia* (or, as it is frequently called, *Acacia*) *Julibrissin*, with its erect, brush-like racemes of pink flushed, long stamened flowers, is one of the most graceful and ornamental of flowering trees. Planted at the tongue of one of several sheets of water, a fine group of the deciduous Cypress (*Taxodium distichum*) forms a striking effect in this part of the park. Some of the stems were actually surrounded by water, and they had all attained a considerable height. At one end of the group Bamboos offered excellent cover for the water fowl. Here and there on the broad expanse of well kept turf were groups or single specimens of trees. A number of Sweet Gums (*Liquidambar styraciflua*), bearing a crop of their curious fruits, had stems from two to three feet in diameter and about seventy feet in height; these beautiful trees afforded a grateful shade by one of the main thoroughfares. The Kentucky Coffee-tree and American Beech also appeared to thrive well; neither my companion nor myself had ever seen examples in England to compare with them in any way. A group of the fern-leaved variety of the European Beech—clothed to the ground with foliage, with the sunlight playing on the leaves—was most picturesque. Fine Maidenhair trees (*Ginkgo biloba*) were observed, and large bushes of Yulan (*Magnolia conspicua*). Here, too, were huge Chimonanthus bushes and trees of *Cercis Siliquastrum*, conspicuous by reason of the innumerable red-brown pods which covered the stem and large branches. Among the best of the ornamental shrubs were *Abelia rupestris*, a very handsome plant with small glossy leaves, and a profusion of trumpet-shaped flowers, white, faintly tinged with purplish red; *Lagerstræmia Indica* of tree-like proportions in

full flower; *Hibiscus Syriacus* (a long sloping bank facing the Via Palestro, planted thickly with this shrub and kept cut in to one level, produced a novel effect); and *Spiræa Thunbergi* of surprising size and vigor. Except near the Municipal Museum, the lawns were not defaced by meaningless flower-beds, though in a sort of angle we noticed a fine mass of a deep red-leaved *Amaranthus* about four feet high. *Desmodium penduliflorum* was remarkably attractive, both planted singly and in groups, on the turf, the long, slender flowering stems being allowed to droop naturally. The correct name of this plant is *Lespedeza bicolor*, but a plant widely different (of erect habit, with much shorter racemes and greatly inferior from a garden standpoint) is grown in nurseries under this name.

A broad flight of steps at one end, and a steep gravel path at the other, ascend from the grounds just described to the older portion of the gardens, in the centre of which is situated the Art Museum. The difference in level is skillfully utilized for rough, natural looking rockery and climbing plants. Here and there the slope is clothed with Savin (*Juniperus Sabina*), with the edges of the mass irregularly broken; a few plants scattered singly away from the general mass give a pleasing, because natural, effect. Other shrubs are used in a similar manner, but the Juniper mentioned made the most pleasing impression.

Behind the Brera, formerly a Jesuit college, now used as a picture gallery, museum, library and observatory, is a small botanic garden of about two acres in extent. It is well kept, and worthy of a visit from those who love trees. Here are to be seen the first Maidenhair tree introduced into Italy, said to be about 200 years old and thirty-eight metres high. A fine White Oak was about seventy feet in height. The Brera Botanic Garden, too, claims to have the first Black Walnut (*Juglans nigra*) planted in Italian soil. It is now a very fine, perfectly healthy tree. A good specimen of *Celtis australis*, and another of a peculiar form of *Magnolia grandiflora*, with narrow, wavy edged leaves, almost complete the list of remarkable trees. The Magnolia was named *M. Hartwicus*, but it is practically identical with forms grown in Continental nurseries under the name of *M. angustifolia* and *M. salicifolia*.

The central portion of the gardens—the trees were principally crowded round ends and sides—was laid out in six-foot beds, divided into squares of a yard in size by bricks set on edge and half buried in the soil. In these beds herbaceous plants were systematically arranged. A small basin for aquatic plants contained the best mass of *Scirpus Tabernaemontani zebrinus* I have yet seen. To most gardeners this plant, which, when thriving properly, is as handsome as it is curious, is perhaps better known as *Juncus zebrinus*, the name under which it was first exhibited and distributed. A fine Pomegranate, laden with beautiful fruit, occupied a good position close to the Brera. After seeing what is done by the Botanic Garden authorities in so restricted an area, one could not but wish that a larger piece of ground, better situated with regard to soil, exposure and other conditions, could be placed at their disposal.

Kew.

George Nicholson.

New or Little Known Plants.

Gymnogramme schizophylla.

OUR illustration upon page 533 of this issue is made from a specimen plant of the robust form (var. *gloriosa*) of this fine ornamental Fern, which was exhibited by Mr. John L. Gardner, of Brookline, at the Rose and Strawberry Show of the Massachusetts Horticultural Society last June and received the first prize in its class.

This variety, which is of garden origin, differs from the type plant in its more vigorous habit of growth, and in its somewhat larger and stouter fronds, which are from one and a half to two feet long, gracefully arching from above the middle. They are finely cut with very minute, ultimate divisions, bright light green on the upper, and pale or nearly white on the lower surface.

Gymnogramme schizophylla is a native of Jamaica, whence it was introduced into European gardens as late as 1880. It should be grown in a warm, moist house in order to develop all its beauty. The plants are found to do well when the pots in which they are grown are suspended from the rafters or raised on the benches out of the way of neighboring plants. The ends of the long, drooping fronds are preserved in this way from contact with the benches;

and the plants are more easily protected from careless overhead watering, which is apt to destroy or diminish the scurvy powder which covers the under surface of the fronds, and is one of the chief attractions of many species of *Gymnogramme*.

This plant, in common with nearly all Ferns, needs a copious supply of water during the summer or growing months, and should not be allowed to become dry during any season of the year. Thorough and sufficient drainage is essential to its well-being, with sufficient shade during the middle of the day to protect the fronds from too direct influence of sunlight.

would be as effective in autumn as the old garden Crocuses are in early spring. *Gerbera Jamesoni*, a new Composite from the Cape, has all the characters of a first-rate garden plant. It is good for pot culture, and it is also a beautiful border plant. Such, at all events, it has proved to be this year at Kew, where it has made its debut, and where it is flowering in the open border now. It has the aspect of a Dandelion, leathery leaves and scapes a foot long bearing flower-heads four inches across, Mutisia-like and colored rich salmon-scarlet, most bright and beautiful. Each head lasts at least a fortnight. Another pretty Cape Composite which is in full beauty outside now is *Agathaea celestis*, the "Blue Marguerite." Several circular beds of it are now thickly studded with its erect blue-purple flowers. This plant is well worth planting outside



Fig. 140.—*Gymnogramme schizophylla*.—See page 532.

Foreign Correspondence.

London Letter.

OCTOBER is not generally favorable to flowers in the open air, but we seem to look much gayer this month than is usual, this year. Bedding plants are healthy and full of bloom, that king of summer plants, the Scarlet Geranium, being still all aglow. No nipping frosts have come to blacken the face of summer, and the Belladonna is in full glory on the sunny border under the shelter of the Orchid-house, where also the beautiful *Schizostylis* flourishes with its spikes of crimson cups, and the *Zephyranthes* with its large, white, Lily-like flowers. Autumn Crocuses are in their best array. They have been in flower since the middle of last month, and they will last until next month ends, unless a severe frost occurs. There is material in these autumn flowering species of *Crocus* out of which might be developed a race of plants which

for autumn effect alone. It is scarcely a foot high, and is of spreading, branching habit, with elegant spatulate leaves.

Chrysanthemums have begun in real earnest. Of course we have had flowers of these plants since July, and there is the prospect of our soon having them all the year round. But October and November are the richest season, and will continue to be so whatever the breeder may accomplish. The last meeting of the Royal Horticultural Society brought Mr. Cannell and others with some new kinds of Chrysanthemums of much promise. A handsome, reflexed Japanese variety named Doric was selected for a certificate. The flowers are rich yellow, full, of good form and medium in size. *Etoile de Lyon*, also Japanese, with flowers of immense size, the broad, flat florets of light rose color; *Avalanche*, a very fine flower, and one of the best of the Japanese varieties, being white, good in form and of large size; the habit of the plant is dwarf and compact. The famous yellow flowered kind, *Mrs. Hawkins*, a sport from that good old Chrysanthemum, *Wormig*,

was shown in splendid condition by Messrs. Hawkins & Bennett.

Orchids were represented by *Lælia autumnalis alba*, the flowers pure white with a yellow blotch in the throat; *L. præstans alba*, a beautiful novelty, the flowers being pure ivory white, save a crimson tip on the labellum; *Cattleya Hardyana*, the king of all Cattleyas and one of the most attractive of all Orchids; a hybrid *Cypripedium* and a curiously colored variety of *Lycaste plana*.

Hybrid Anthuriums are favorites with the President (Sir Trevor Lawrence, Bart.), who has a very fine collection of them, mostly in large specimens. They are chiefly the progeny of *A. Andreanum*, *A. Ræzlii* and *A. Veitchii*. Flowers of several hybrids were shown at the meeting. For large stoves these plants are most useful, as they flower freely and continuously, their flowers being large and brilliant in color. They are also suitable for mixing with large tropical Orchids, such as Vandas.

Exceptional activity is being displayed just now by those who believe that the position of the English farmer will be immensely improved if he can only be persuaded to grow fruit for the supply of the English market. I refer to this subject because it must be of special interest to your fruit growers and exporters, seeing that from the United States alone close upon six million bushels of apples are annually sent to the English market. It is supposed that we can do without this and grow better fruit at home sufficient to supply every demand. Mr. Gladstone thinks so. He has lately made an important speech on the subject, being himself convinced that we are altogether wrong in not devoting considerably more land to fruit culture than has been done hitherto. The present Lord Mayor of London also takes a keen interest in this question. He has had the Fruiterers' Company to a Mansion House feast, and now he makes an appeal to the public generally for pecuniary aid to the cause of this company. I quote from his letter: "The Fruiterers' Company are making a very laudable effort to bring about the restoration of fruit gardens and orchards in connection with our homesteads and cottages throughout the country." He then points to the "very large sum annually paid to foreigners for apples, pears and plums which might be grown equally well in our own land." Five thousand pounds are needed, he says, to rouse the country to the importance of this question. Prizes are to be offered for the best farm and cottage orchards.

Men who have had long experience in the culture of fruit in England do not believe that the foreign competitors can be easily ousted from the English fruit market. The very same circumstances which enable the foreign corn growers to flood the English market assist the foreign growers and exporters of fruit. Last February I purchased, at a shilling a dozen, Tasmanian apples, which I was assured by a fruit farmer were almost equal to English apples which a few years ago were worth about sixpence each at that time of year. English growers cannot compete against such odds. All we can hope to do is to enable small cultivators to grow a good supply of fruit for their own consumption. It is in this direction that the efforts of the Royal Horticultural Society are likely to do much good. By its splendid exhibitions of fruit, such as were made at the Apple and Pear Conferences held a year or two ago, by the valuable information bearing on the whole question of fruit culture which was the outcome of the conference, and by the publication of this and similar information in its journal, this society has already re-established itself in the favor of horticulturists generally. We are proud of what has been done in the short time since the revival of the society. Three years have scarcely elapsed since the present effort began, and yet the record of work accomplished is probably as good as anything done by the best of your societies. As an instance one might take the last number of the journal, which is devoted entirely to Apples and Pears. It contains 376 pages. The first part is full of valuable information from the masters of fruit culture in England. Mr. Bunyard and Mr. William Paul write on Apples for profit, discussing soil, aspect, methods of culture and the best sorts to grow; Mr. Shirley Hibberd follows on Pruning, and then come three thoughtful papers on the subject of canker in fruit trees. Few men have perfect knowledge of this terrible disease, except that it comes mysteriously and appears to be incurable. Other diseases are discussed in a paper by Mr. John Fraser. Mr. Dunn, Mr. Cheal, Mr. Coleman and Mr. Saunders treat respectively on the best kinds of fruit for Scotland, Sussex, the Midlands and Jersey. Compensation for fruit planting—a subject of vast importance here, but of which you probably know nothing—the cost of railway carriage for fruit, are subjects which receive practical attention. The second part of the journal contains statistical and other

information relating to the cultivation of Apples in this country. Amongst other matters of interest, we find here proof that the following are the best and most generally cultivated Apples in England.

Six best dessert kinds: King of the Pippins, Cox's Orange Pippin, Ribston Pippin, Kerry Pippin, Blenheim Orange, Irish Pearmain. Six best culinary Apples: Lord Suffield, Dume-low's Seedling, Keswick Codlin, Warner's King, Blenheim Orange, New Hawthornden.

The discussion of grafting still continues in *The Garden*. It is condemned by some because it has not succeeded in a few cases, and it is defended by others, generally on the ground of its facilitating the work of the nurseryman. The real heart of the question is missed. Theoretically, grafting as a means of propagation ought to be just as successful as slips or cuttings, and practically we know that it is so. Certain simple rules must be observed by the operator, the first of which is what we may term consanguinity of stock and cion. The condition of both at the time of grafting, the manner of its performance, and the treatment of the grafted plants until the union is perfect, are necessarily important to the success of the operation. If clumsy workmen are employed, or if haphazard grafting is practiced, then failure will come sooner or later. But we cannot abandon grafting on this account. There is scarcely one in a thousand of our fruit trees that was not originally grafted; and many *Coniferae* and other ornamental trees are invariably propagated in that way, because it answers better than cuttings. One might point to numbers of exceptional specimens of rare trees and shrubs which have been grafted, and which, at the least, have not suffered on that account. No one condemns cuttings as "a delusion, a snare and a swindle," because some plants are a failure when propagated by their means. Many of the Pine tribe are useless when obtained from cuttings, as every experienced propagator knows; but there are those who, through ignorance or something worse, sell these plants obtained from cuttings. If we want timber trees we do not get them from cuttings, but from seeds. I am trying to show that if the failure of grafted plants here and there is to be urged as a reason for discarding grafting altogether, then the same argument has equal force in the case of cuttings. I am told that physiologically the union between stock and cion can be made perfect, and that the success or failure of a grafted plant depends solely on what we have called consanguinity. If stock and cion work together and the supply of nutrition is kept up, there is no reason whatever why a grafted plant should fail. On the other hand, a great many plants for which grafting is not suited are increased by its means. Rhododendrons, many Roses, Azaleas, and plants which sucker freely, ought not to be grafted. I helped, some years ago, to graft many thousands of Tea Roses on the Briar and Manetti, but I know now that they are better on their own roots and that they are just as easily propagated from cuttings. I touch upon this subject in the hope that some of your readers will think it worth commenting upon. You do things on such a gigantic scale in America that grafting is sure to be well tested with you.

Kew.

W. Watson.

Cultural Department.

Notes in a Northern Garden.

THE BEET, after the potato, is the favorite garden vegetable, and has a very wide sale in all markets. The long rooted kinds have mostly passed out of favor, though the old long blood beet has never been surpassed in quality. Well shaped beets of the turnip rooted class, round, smooth and with small tops, enjoy the greatest favor. All of these are early, but some are earlier than others, and, of late, the Egyptian has taken the lead, though good only when young. An "improved Egyptian" has lately appeared in the Boston market, which is a decided advance. The Eclipse has not seemed to me to be sufficiently fixed; at least it appears to me to vary too much in color and habit of growth. But the various forms of the dark red Blood Turnip Beet constitute the bulk of this crop as sent to market. In quality, the Bassano has never been surpassed among the early Beets.

Lately, Beets have, in many gardens, been affected with a disease which appears to be identical with the "scab" of the Potato, and, as with the Potato, the use of stable manure seems favorable to its appearance. Where badly affected, the crop is ruined for market.

Most amateur growers fail to thin out their Beets sufficiently, and the result is a small crop of small and inferior roots. In order to get a large crop of really good beets, the ground should be well enriched, and the crop carefully thinned to four inches

apart. Beets three to four inches in diameter are better than smaller ones, and many families understand that these large beets, especially if baked, are far superior for the table to smaller ones.

Beet seed is easily grown, and every gardener who is desirous of fine beets should raise his own seed, carefully selecting medium sized roots, having the characteristics most desired. These should be preserved in sand, carefully set out as early in spring as possible, and the seed stems supported as they grow by small stakes and string. A dozen beets will produce a pound or more of ripe seed.

Is the wild original of our garden Beet an annual, like the

A new Rhubarb bed, which I set out last spring, has surprised me by its remarkable growth. The ground was heavily manured on the surface, and plowed about eight inches deep. Roots with from one to three buds were set rather deeply four feet each way, and did not seem to grow remarkably fast at first. But about midsummer they started ahead with tremendous vigor, and by the middle of September plenty of stalks could be found that would weigh a pound each. What seemed remarkable was, that at that time these stalks were in nice tender eating order, while those from old beds were hard and stringy.

Parsnips, as well as Beets, need careful thinning to produce



Fig. 141.—*Viburnum lantanoides*.—See page 531.

Carrot? It will sometimes send up a seed stem the first year; but also it will occasionally not send one up the second season when set for seed, but will increase in size and be as good for the table the second fall as the first. I have heard of beets in California growing on in this way for several seasons and attaining very great weights, exceeding 100 pounds.

Onions, especially onions grown from sets, have shown a disposition to rot this year. The decay begins in the spot from which the roots issue, and is of a dry character. I have noticed the same thing in "multipliers," or "potato-onions," years ago, but never before in the crops grown from black seed. If this disease extends, it will make onion growing for market an even more precarious business than it now is.

good merchantable roots. I find five inches asunder not too much. The land for Parsnips, unless very light, needs deep tillage to get well shaped roots. If one is growing this vegetable for market the care necessary to get long and evenly sized parsnips is well expended. A load of this character will find a speedy sale where crooked, "sprangly" roots would fail of a buyer.

There is a considerable improvement in Carrots lately. The new Chantenay is quite astonishing in its uniformity and smoothness. Planting an experimental plot among my other Carrots, I am so pleased with it that I shall hardly care for any other sort for market sales.

Newport, Vt.

T. H. Hoskins.

The Grape-fruit in Florida.

FLORIDA is notably the land of flowers, but it is quite as truly a land of fruits. Her Citrus fruits are now known the world over, and her large grape-fruit and shaddock, hitherto little appreciated by northern people, are beginning to appear regularly on our market-stands along with her oranges, limes, lemons, bananas, pineapples and dates. Many persons use the words shaddock and grape-fruit interchangeably, and the shaddock is, in fact, a near relative of the grape-fruit, but is much larger, often weighing from three to five pounds. It is also coarser than the grape-fruit, and has not yet proved very useful, but the tree and fruit as they adorn the lawns of many southern homes are strikingly beautiful. The fruits grow singly on the trees, and look like veritable pumpkins suspended from twigs. The tree comes from China and Japan, and was first brought to the West Indies by one Captain Shaddock, from whom the name was taken. There are said to be upward of forty distinct varieties of the fruit in Florida, some of which are very large and of use for canning or preserving in the same way that citron is put up. The shaddock is also known as pomelmouse or pummellow. This fruit has probably never been exhibited in our northern markets for sale. It is not of sufficient value to warrant shipping it north, for even the natives in Florida seldom take the trouble to gather it. It will doubtless be found of use in time, however, and until then it will ripen and die upon the trees in southern groves.

The cultivation of the pomelo, or grape-fruit, is extending rapidly in the south, and it is becoming a first-class marketable fruit, very valuable in the spring and early summer, after oranges are about gone, and by many people esteemed equal to the orange. When it becomes better known it will be a popular fruit during the spring months. It is prepared for the table by removing the bitter, white membranes and sprinkling the pulp with sugar. In warm weather, after it has been iced, the melting pulp and juice from between the membranes are deliciously refreshing. The pomelo can be grown more easily than the orange, and it yields more to the tree than any other member of the Citrus family. The fruit grows in clusters, two, three or four hanging together from one stem, from which peculiarity the name of grape-fruit was given to it. The trees are beautiful objects covered over with rank, glossy, dark green foliage, and loaded with thousands of bright, pendent, yellow globes. I have seen a twig no larger than my little finger with five or six big pomelos hanging from it. A comparatively small tree will often bear as many as two thousand at a time.

California also produces these fruits, but most of them come from Florida. They are sold on fruit stands according to size at from five cents apiece to fifteen cents apiece for very large ones. They vary in quality as much as oranges do, and while the good ones are very good, the bad ones, if green, are very bad. Those with smooth white skins are the best, and a little rust on them will not hurt their flavor or juiciness. The fruit is always cut from the tree, as the orange is, wrapped in tissue paper, and packed carefully in barrels rather than in boxes. They are not sized as oranges are, but are sent north with the number of fruits in each barrel marked on the outside.

It has been said by more than one southern fruit-grower that a fortune was waiting the man who had the courage to plant a grove of grape-fruit trees, and depend on them for a living. Heretofore there has been no systematic cultivation of the trees. Two or three trees are planted around the yards or orchards for ornaments as much as for anything else, and allowed to take care of themselves. If properly treated, however, their yield would be much larger than it is to-day, and a good profit could be made from them. The trees should be set out about fifty feet apart each way in soil that has been prepared for them beforehand. If possible the young trees should be taken from soil like that on which they are to grow in the future; that is, if they have come from Pine-land they should not be grown on hummock-soil, otherwise the trees will become stunted while adapting themselves to the change of soil, and never perhaps attain the vigorous growth that they should. The holes should be made large and shallow, and the dirt worked among the roots with the hand, until it is packed firmly and settled by shaking the tree up and down. If planted too deep the trees will be smothered, and not do half so well as when given shallow planting. If the soil is at all dry, a pail of water can be given to each tree in planting, so that the earth is washed among the roots, and the surface should then be covered with dry soil. Trees planted in this way, and then mulched, will send out new roots and shoots almost immediately. For young trees with tender, sappy buds, a slight protection of coarse, long grass, found growing spontaneously in every old-field,

if stood up and tied about the trees as gardeners protect Roses from the cold, has been found to repay cost. Muck or commercial fertilizers applied around the roots of the trees, or plowed into the soil generally, will greatly help them in their growth. Weeds should be kept down, and a good way to do this successfully is to plant Cow Peas between the rows, and plow them under. They make a good fertilizer for Florida land. Cultivation should cease late in the season, to allow the young growth to ripen and be in condition to resist frost.

New York.

George E. Walsh.

Orchid Notes.

Dendrobium Brymerianum.—This is a very handsome and interesting Orchid, and should be in every collection. The terete bulbs are about fifteen inches long, very much swollen in the middle and tapering at each end, with four or five persistent lanceolate leaves at the apex. The flowers, which are produced in short racemes from near the top of the bulbs, are about three inches in diameter and of a rich golden yellow. The lip is very much fringed, the front lobe terminating in a long branched fimbriation, which renders this species very striking, and distinct from any of its congeners. *D. Brymerianum* was introduced from Burmah in 1874, but it has never been very plentiful. A few years ago plants from another locality were sent out for this species, but they proved to be a worthless variety, since named *D. histrionicum*. This variety may easily be distinguished from the true species by its short and more swollen stems. The flowers in this variety are small. The peculiar beard-like appendage of the lip being rarely developed, the flowers are often self-fertilized in bud, and do not open at all. *D. Brymerianum* grows freely in the warmest house, is strong rooting, and requires abundance of water during growth. It should not be kept very dry in winter, providing the house is warm.

Cælogyne (Pleione) lagenaria.—This is one of a small genus now included in *Cælogyne*, popularly known as Indian Crocus. It is a charming little Orchid, and its flowers are particularly welcome at this season. The bulbs should be planted pretty thickly in small shallow pans, so that when the flowers appear (which they do as soon as the leaves have ripened and fallen off) they will completely cover the surface of the pan, the flower scape being only about an inch long. This Orchid requires rich soil and liberal treatment during growth, but the bulbs need thorough ripening in a cool house to ensure a good crop of bloom.

Cattleya labiata vera.—This grand old species is now in perfection with us. It is of very distinct habit, and may easily be distinguished from its congeners. The clavate bulbs are about one foot long, proceeding from an unusually thick rhizome, and bearing a very thick coriaceous leaf about ten inches long, both bulb and leaf being suffused with reddish purple. The flowers, usually three on a peduncle, are about six inches in diameter, with narrow sepals, and broad, wavy petals of pale rose. The lip is very handsome, the anterior lobe, which is deeply emarginate, is very crisp and of a deep magenta-purple, with deeper colored veins extending into the throat. The side lobes are convolute and pale rose. A characteristic of this species is the purplish double flower-sheath.

The true *C. labiata* is a very rare plant, though among the first known of the genus, having been introduced from Rio Janeiro about eighty years ago; but as no plants have been found (though diligently sought for) for nearly forty years, the species is believed to have become extinct in its native country. In order to develop its massive bulbs this plant requires very liberal treatment in respect to heat and water, also plenty of air and light, and though it may be kept moderately dry during the winter months, the warmest corner of the house should always be given to it.

The finest specimens and freest grown plants I have ever seen were grown in an old-fashioned flue-heated stove pit, with the pots plunged in tan bark, and this same pit has contributed very largely toward preserving this noble species to our collections.

Kenwood, N. Y.

F. Goldring.

Corydalis lutea.—This pretty *Corydalis* flowers more continuously than any hardy plant I know. Its bright yellow flowers appear in May, and the plant is still bright with them (October 30th), in spite of the severe freezing it has been subjected to; and from May until November there is not a day on which it is not in flower. *Corydalis lutea* is a native of southern Europe, where it grows in waste and rocky places. It has become naturalized through long cultivation in many countries where it did not grow originally, like England and some parts of northern France and Germany, but in this country it is not

seen very often. It is described as an annual or as a perennial, forming a tufted stock of many years' duration. Here it is a true perennial, and has been growing for years in the same place in my garden, where it has become a compact cushion, a foot high and more than two feet across. The leaves are pale green, twice divided, with obovate, cuneate segments, an inch or more broad and cut into three divisions at the extremity. The bright yellow, cheerful flowers, which are rather more than an inch long, are borne in short racemes well above the foliage on slender stems. This plant is easily increased by division or it may be raised from seed. It requires no care or cultivation, and it will thrive in rocky soil and exposed situations, as well as in the best garden loam. It is an excellent rock-garden subject, and a good plant to tuck into some out-of-the-way or neglected corner of a garden, where it will go on flowering and giving pleasure indefinitely.

Boston.

C.

Dicentra eximia.—Last spring we took occasion to call attention to this plant as one of the best of recent additions to the list of native plants, suitable and desirable for cultivation. After the second season's trial of it we cannot forbear to mention the fact that from the first week in May to the last week in October *Dicentra eximia* has been constantly in flower. Moreover, the odor so apparent in *D. spectabilis* and other varieties of the *Fumariaceæ*, is totally absent in the plant under note. The figure of *D. eximia*, given in the "Dictionary of Gardening," is not a good representation of the plant, as it is with us. This may be accounted for on the supposition that the difference in climate affects the appearance of the plant, or that our plant is a geographical form of the plant commonly grown elsewhere under the name of *D. eximia*. Our original plant came from Tennessee, where it is by no means common in a wild state. There, however, it seeds freely, whereas here it rarely produces a seed vessel, owing probably to the absence of the necessary insect agency. The flowers are closed at the apex, and the bees here, when forcing an entrance, injure the organs of reproduction to such an extent as to preclude the possibility of successful fertilization. *D. eximia* must therefore be propagated mainly by division, and this is easily accomplished early in spring before the growth is far advanced. It may also be added that when seed is produced it must be sown at once, and then germination will take place the following spring. Seeds of plants included in the order *Fumariaceæ* are notoriously long in germinating.

Passaic, N. J.

E. O. Orpet.

The Forest.

Some Japanese Trees in New England.

DR. GEORGE R. HALL is the first American who sent Japanese plants to the United States, in any considerable numbers, at least. His first visit to Japan occurred in 1860; and his first shipment of plants was made not very long afterwards. They were sent principally to Mr. Parsons, of Flushing, who propagated and distributed them, as well as a number of other Japanese plants sent home by Mr. Thomas Hogg, who a little later lived several years in Japan and devoted much attention to collecting seeds and plants for the Flushing Nurseries. A number of Dr. Hall's Japanese plants were planted early on his farm near Warren, R. I. (about 1870), and have grown into what, I believe, are the finest specimens of certain species which can be found in the eastern states. Some of them I have not seen equaled in Europe. A few notes, therefore, upon these trees which I have recently had an opportunity of visiting will, perhaps, be interesting.

The plantations are confined, in the main, to the northern and eastern sides of an open field, on the top of the ridge which extends continuously from the town of Warren to Bristol. It is open to the south-west and fully exposed to the south-west winds which sweep up Narragansett Bay. The situation, I should think, was a very trying one, especially for conifers. The soil of the field, however, is a good strong loam, and close planting has been of assistance to the trees, which are principally conifers.

Two or three specimens of deciduous trees may be mentioned. The first of these is *Zelkova Keaki*, with a short trunk fourteen inches in diameter, dividing into a number of stout, upright branches. This tree has a total height of fully thirty-five feet. It is the only specimen of this plant I remember to have seen growing in the United States, and I have never seen one a quarter of the size in Europe, although larger ones exist, perhaps, in the Mediterranean countries. In habit, Dr. Hall's plant resembles a common form of the American Beech of the same size, and the bark is not unlike the bark of

that tree. The following account of the *Zelkova*, which is one of the largest and most valuable of the Japanese trees, is extracted from Rein's "Industries of Japan" (see GARDEN AND FOREST, page 321 of the present volume), in which will be found the most satisfactory account of the economic properties and uses of many Japanese plants which has been published:

"The *Keyaki* (pronounced *Kéaki*) of the Japanese is a stately, and, because of its wood, a useful tree, found in forests and temple groves, as well as along the sidewalks of village streets, particularly in the neighborhood of Tokio. It sometimes reaches prodigious size, from ninety to 120 feet in height and thirty feet in circumference. In appearance it has a strong resemblance to *Celtis australis*, of the Mediterranean regions, as for instance the fine specimens of this kind in the Botanical Garden at Madrid. But it is also similar to our *Beeches*.

"*Keaki* is the favorite joiner's wood, and plays in Japan the part of oak wood with us, and is somewhat like it. Its most notable recommendations are, that it does not split or warp easily, so that cross sections may be used, that is, for trays and bowls, as is done in the Hakone mountains. It is also noted for its great toughness, elasticity and durability, as much in water as in dry air, if not felled when full of sap. The smooth, gray-white bark resembles in color and thickness that of our *Beeches*; the soft, light-colored sap-wood is quickly transformed into grained wood, whose color varies according to the situation and age of the tree, from light to dark brown. To make it more valuable, the color is often deepened by a long submersion in water before working. *Keaki* is lighter than oak, having a specific gravity of only 0.682. When cut crosswise its small pith-rays are easily distinguished, as is the case with all elms, and the girdles of numberless larger pores on the inside of the year-rings is plainly marked. These pores and their walls show very distinctly even when cut lengthwise. This reveals also the parallel and straight-fibred character of the ordinary wood. It serves the Japanese for many purposes: in ship and house building, in furniture making, turnery ware, and for manufacturing many small articles. It takes different names according to its coloring, the highest estimate being placed on *Tama-moku*, or speckled wood, also called *Tama-no-keaki*.

"In all the qualities which have been mentioned, it excels the other *Ulmaceæ*. On the other hand, its branches are so fine and its foliage, like the *Celtis*, is so light that it cannot be used like the Elm as an ornamental or shade-giving tree. Its draft upon the soil is about the same as with its kindred. It is found in its best condition on light clay soil, in which it can spread and develop its roots symmetrically. It belongs to the lower region of the mountain deciduous forests, and in Hondo seldom grows beyond an elevation of 800 to 1,000 m. It is not widely distributed or frequent, and only attains on the plains, in temple groves and along the roads, those large dimensions which distinguish it beyond all other deciduous trees, except the *Camphor Laurel*."

There is in the garden near the house the finest specimen of *Quercus dentata* which I have seen. It is about twenty-two feet high and well furnished with branches nearly to the ground. It is always a striking plant on account of its conspicuous buds and large, deeply lobed and brightly shining leaves, which are often more than two feet long. They turn, later in the season, to deep orange, but at the time of my visit (October 24th) were quite fresh and green, although the leaves on all the native Oaks in the neighborhood, both White and Black, had changed color some time before, and were falling. This Oak is often grown in Japan, according to Rein, as a small ornamental tree for gardens, on account of its handsome foliage. He found it very common on the island of Yezo, and as a shrub on the borders of volcanic forests in northern Hondo. The wood is said to be coarse grained and to possess little value. *Quercus dentata* is often known in gardens as *Q. Dai-myō*, and it was first distributed from Flushing as *Q. Halliana*.

Near the Oak is a plant of *Magnolia hypoleuca* (GARDEN AND FOREST, vol. i., f. 49). It is much smaller than Mr. Hogg's tree in New York; but the fact that this fine species is hardy in New England is interesting. It is the *Ho-ko-ni* of the Japanese, and Rein gives this description of it:

"This fine, highly interesting tree appears in all the mountain foliaceous forests of Japan from Kiushiu to Yezo, not, however, collected together, but scattered about among other deciduous woods. Toward the north its frequency increases; it attains here, also, its largest dimensions, with trunks of more than six feet in circumference and sixty to seventy-five feet in height. It is found, also, in the high foliaceous forests of middle and northern Hondo, on the island of Yezo, and

even in southern Saghalin. It rivals in height and thickness the other deciduous forest trees in its company, and all the other varieties of its own race, even the North American *M. grandiflora*. Few of its kindred endure the rigors of winter so well.

"Ho-no-ki loves a good soil, and grows best in the shade of high trees, especially the Beech forests. Oaks, Maples, Ashes, and especially *Esculus turbinata* and *Acanthopanax ricinifolia*, are frequently its companions.

"The smooth, grayish-white bark of the straight trunk, which in thick, high forests is branchless to a considerable height, reminds one of the Beech. The crown is formed of thick, widely spreading, but not so numerous nor so ramified branches, and its leaves and flowers give the tree a peculiar beauty."

"Every branch develops about ten leaves, which are crowded together in verticillate form near the end. In the midst of this beautiful wreath of leaves there unfolds, about the middle of May or beginning of June, a splendid large white flower, with a pineapple-like perfume. Even later in midsummer the Ho-no-ki tree presents a surprisingly beautiful appearance. When the wind sways the foliage of the Magnolia-lined mountain side, and the lower side of the leaf is turned upward, the tree looks to one at a little distance as if it were for a second time covered with blossoms.

"By October the trees are bare. The long, ellipsoidal, reddish brown fruit capsules, with their pink seeds, soon follow the leaves. The seeds, like all of this species, soon lose their germinating power, which is probably the main reason why the Ho-no-ki is still a stranger to our European gardens. The Ho-no-ki in Japan surprises and delights every lover of plants, and it is easy to agree with Dupont when he calls it more ornamental than *Magnolia grandiflora*.

"The light, grayish-white wood changes gradually to a deeper shade. It is soft, easily bent, and elastic, and has a fine, even grain, which makes it applicable to many uses. The wood engraver uses it in patterns for cloth printing, and the lacquerer finds it adapted to various small articles. The sides of the pretty, light and durable oval bread baskets are generally made out of Ho-no-ki. Two thin strips of the wood are bent around the elliptical pine wood bottom, their sharpened ends bent over each other and glued, and tacked to the bottom board. Sword sheaths (Katana-no-saya) were also formerly made out of Ho-no-ki. In Niigata and Yonezawa it is used as the groundwork of nearly half of all the lacquer ware, and from it is prepared the soft, fine grained charcoal which is used throughout the whole of Japan for rubbing the lacquer and for polishing the enamel of cloisonné ware."

Taxus cuspidata is represented by a broad pyramidal specimen twelve feet high, the branches covering a space on the ground forty feet round, and producing fruit sparingly. This is by far the finest specimen I have ever seen. *Taxus cuspidata*, according to Rein, is "a bush or low tree eighteen feet high, found mostly in Hida and in Yezo, and used often as a decorative plant. Its highly valued wood is marked by a beautiful red color, fine grain and great toughness. On account of this last quality it is used by the Ainos for their bows." The Japanese Yew is now considered by Maximowicz a form of the widely distributed *Taxus baccata*, the so-called English Yew. As seen in cultivation here it differs from the common forms of that species by its longer leaves and by its more strictly pyramidal habit. There seems no question of the hardness of the Japanese plant, even in the most exposed positions; and as it is the only Yew which grows to any size, which is hardy in the extreme northern and eastern states, it is destined, probably, to play a considerable part in the decoration of northern gardens. This plant is still exceedingly rare in cultivation, and little known in this country and in Europe.

Abies firma appears in Dr. Hall's plantations in half a dozen specimens twenty-five to thirty feet high, with stout, clean trunks, bare of branches to a height of five or six feet from the ground. The specimens are beautifully colored with dark green leaves, and are growing with the greatest vigor, especially the main stems, the leading shoots of the year being all two to three feet long and remarkably stout. *Abies firma* is one of those trees which grows at the top at the expense of the lower branches, which are generally weak, become shaded by those above them, and so die early. This habit takes away from its beauty as an ornamental tree, but makes it more valuable for forest-planting, where the production of long, straight timber, free of knots, is desired. This species, the Momi of the Japanese, is, according to Rein, "spread over the whole of Japan; more general, however, in middle and northern Hondo, and on the southern Islands. It is found chiefly, and

in the highest development, in mixed forests, among the beautiful deciduous woods, at an elevation of between 3,000 and 4,500 feet, seldom isolated. It develops the most magnificent trunk of all the Japanese Firs, and grows in parks and temple groves to a height of ninety to 120 feet, with a circumference of twelve to fifteen feet. In its entire bearing, as well as in the character of its wood, this tree resembles our *Abies pectinata*, but has a much slower growth. Its wood is lighter, rougher and less tough than that of the Pine, hence cheaper and less valued. It is seldom used in house building."

The best specimens of *Picea polita* I have seen are in this plantation, the largest being about twenty feet high. They are all well furnished to the ground, and have stout, vigorous leaders. These specimens, of which there are half a dozen, appear, on the whole, promising, although I noticed on one or two of the trees that the leaves on the lower branches had turned yellow and were falling, a not unusual thing with this tree, which I believe, however, will prove to be one of the most valuable of the Japanese *Abietina* for this climate. It makes, Rein tells us, "a fine stately tree, with the bearing of *Picea excelsa*, belongs to the high mountain districts and northern parts of Japan, and is little used. In modern times, on the island of Yezo, however, it has been much employed in building." This species is the latest of all the Firs to begin its growth here, and would, therefore, be valuable in countries where late spring frosts are common.

Chamaecyparis (Retinospora) obtusa has been used successfully by Dr. Hall in forming wind-breaks, which are now fully twenty feet high; and there are a number of fine single specimens twenty to thirty feet high scattered through the plantation. These represent one of the most graceful and desirable forms of this exceedingly variable species, which, as it is seen here, is very ornamental, although generally unsatisfactory in this country. This tree, in Japan, occurs most generally on mountain-sides, where it grows to a height of ninety or 100 feet, with a trunk three or four feet in diameter. It is the Hi-no-ki of the Japanese, and "is particularly sacred to ancestor cultus (Shinto worship), and is cultivated on this account more than any other. The wood is white or pink, smooth, light and very tough, fine grained, poor in resin and free from knots. It is preferred for lacquer ware, and used exclusively for building Shinto temples. The palaces of the Mikado and his family at Kiôto were always built of Hi-no-ki wood, and roofed with the bark of the tree, which, when very old, can be easily cut into long stripes. Criminals condemned to harikari (disemboweling) were formerly presented with a dagger upon a small white unlacquered table of Hi-no-ki wood, and on a similar one is offered the food and drink to the gods at festivals."

There is a perfect specimen of *Thuopsis dolabrata*, twelve to fourteen feet high, a large size for this country, where this tree is, unfortunately, less hardy than many of the Japanese conifers, but by no means an unusual one in Europe, where it thrives admirably. According to Rein "the wood is yellow, is marked by its durability in water, and is therefore much used for stakes, as well as in ship and bridge building. It is also employed for lacquer wares and window sashes."

There are several specimens of *Pinus densiflora*, thirty-five to thirty-eight feet high, with spreading branches resting on the ground and covered with cones. The trunk of the largest specimen girds forty-two inches three feet from the ground. This is a picturesque, but hardly a handsome, tree. It has the advantage, however, of growing rapidly on poor soil and of being perfectly hardy. It is the *P. Massoniana* of many gardens, but not the true *P. Massoniana* of Lambert, which is a south China species, not hardy here. Rein says that "*Pinus densiflora* (Kuro-matsu) makes the least requirements as to soil of any tree in Japan. If the sand dunes, thrown up by the waves of the sea, have attained some firmness through the settlement of deeply rooted strand plants, among which generally the creeping Juniper (*Juniperus littoralis*) is often found, the Japanese turn them to good use by plantations of Kuro-matsu. This Pine is, therefore, of very much the same importance here as *Pinus Pinaster* in the French Département Des Landes, which has been previously mentioned. From the coast to 300 metres above the sea we find the Kuro-matsu on land that would afford no support to other conifers. It comes to its best as a shade tree on the country roads and in temple court-yards. Trunks from 150 to 200 years old, with a circumference of twelve to eighteen feet, and ninety to 100 feet high, are here not infrequently found."

Two plants in Dr. Hall's plantations, which I take to be *Abies Cilicica*, surpass in beauty the Japanese plants; and if my determination of the species is correct, this is certainly one of the most ornamental Silver Firs which will thrive in the

northern states. These specimens are slender, narrow pyramids, fully thirty-five feet high, and perfectly furnished with branches. These have a tendency to turn up at the ends, and so expose the white under surface of the leaves, thus giving to the whole tree a decidedly silvery appearance, which is striking and beautiful. This species is too rarely seen in collections. It suffers in England from spring frosts, and is, therefore, rarely propagated in English nurseries; and I have never seen a good specimen in Europe. This will sufficiently explain why the Cilician Fir has not been planted more often in this country, in spite of the fact that Dr. Hall's plants and several fine specimens in Mr. Hunnewell's Pinetum show that it is able to adapt itself to the climate of New England.

C. S. S.

Correspondence.

Variegated Wild Plants.

To the Editor of GARDEN AND FOREST:

Sir.—In 1888, at Nonquitt, Massachusetts, I noted the following variegated plants:

Spartina cynosuroides.—Finely striped with gold. It did not blossom either in that or in the succeeding year, although the green variety adjoining bloomed as usual.

Kalmia angustifolia.—Finely gold-blotched. I distributed a number of herbarium specimens. * On visiting the locality, which was along the road-side, in 1889, I found the whole patch had been cleared off and burnt over.

Rumex acetosella.—In 1889 I found a single specimen beautifully variegated with yellow. It had a more compact growth than usual, and with a little increase of size might have been deemed attractive.

Barbarea vulgaris.—While at the New York Agricultural Experiment Station at Geneva, a specimen very prettily variegated with white blotches was removed to the greenhouse and grown for two years, retaining its variegation during the whole time.

Will some of the readers of GARDEN AND FOREST add to this list?

South Framingham, Mass.

E. Lewis Sturtevant.

Data Concerning the Growth of Native Trees.

To the Editor of GARDEN AND FOREST:

Sir.—In the spring of 1835, a considerable number of White Pines (*Pinus Strobus*) were planted about my residence. Of these fifteen are still standing and are apparently in full vigor. My uncle, who planted these Pines, states that they were of very uniform size, their trunks measuring about two and a half inches in diameter. At present, the smallest of the series measures forty-three inches in circumference, four feet from the ground, and the largest seventy-nine inches. Nine of them vary from sixty-two to sixty-eight inches. The average circumference of the fifteen trees is sixty-two and a half inches.

These trees were not placed at uniform distances from each other, and some show the certain ill effect of overcrowding. This is conspicuously the case with three of the Pines, and these have suffered. Had the planting been done with greater reference to the future, and an equal chance given each tree, the average circumference would have been greater by at least three inches; the girth of the twelve largest being sixty-five inches. As it is, including the three somewhat stunted trees, the growth (circumferential measurement) has been sixty inches in fifty-four years; an annual increase of one and one-ninth inches.*

These Pines stand upon a bluff, composed of compact, ferruginous sand of great depth, and are exposed to the full sweep of the western and northern winds. In the matter of soil and exposure they have had equal chances. It is not readily seen, if at all determinable, why more of these trees should not have reached the maximum size, and become stately trees, which, in a sadly deforested landscape, are commanding objects.

A year later two Wild Cherries (*Prunus serotina*) were planted near the Pines, by the same person. "These trees were very small," he writes me, "as I pulled them up with my hand and carried them to the yard, as one would a walking stick. Probably neither were more than an inch in diameter." These trees are in full vigor to-day, one measuring seventy-

*Since the above was written, one of these Pines has been felled and the rings of annual growth carefully counted. They are sixty in number, which accords with the history given above of the planting, now nearly fifty-five years ago. It may be well to add that, while each ring is distinctly defined, there are several much larger than the others, and a general increase of the width of the rings upon the south-eastern side of the trunk.

three inches and the other sixty-eight in circumference. The former is fully fifty feet in height; and the crop of fruit it bears annually is enormous.

In 1836 my grandfather found among a lot of Peach-trees that he had purchased an Elm (*Ulmus Americana*) which "was a mere switch." It was planted in an out-of-the-way corner, and is now a splendid tree, with a spread of branches measuring seventy feet. The circumferential measurement, at a height of four feet from the ground, is 103 inches.

Of the Oaks, Cedar and Beech, of which I have many fine specimens upon the farm, I have not been able to gather any definite data, but it would appear that the growth is exceedingly slow after a certain term of years. My uncle is very positive that a Black Oak in the lane and a Red Cedar near by have not increased materially in growth in the past half century. He believes the Cedar to have "quite stood still," and this may not be so strange, for it is known to be considerably over 100 years old. It was a conspicuous road-side tree in 1802. It measures but eighteen inches in diameter.

Trenton, N. J.

Charles C. Abbott.

Chrysanthemums at the United States Nurseries.

To the Editor of GARDEN AND FOREST:

Sir.—No horticultural event last year aroused more interest than the exhibition in the fall of a few blooms of the Mrs. Alpheus Hardy, a white Chrysanthemum of unique beauty. On the last day of October I visited the establishment of Messrs. Pitcher & Manda, who signalized the opening of their business career by the courageous purchase of this variety for a much greater price than had ever been paid for a Chrysanthemum. The visitors who will throng these nurseries this week, at the invitation of the proprietors, will find the flowers in more advanced condition than when I saw them, but, even then, the Chrysanthemums were already massed and tastefully arranged in one of the larger houses.

The general effect, as one passes from the Orchid houses and stands on the steps by which entrance is had to the larger and lower house, is one of striking beauty, a great mass of the Mrs. Hardy filling the entire centre, and the fine blooms of the general collection lining the entire outer circuit. Standing here to enjoy the general effect, one notes the strong and weak points of this favorite flower. Certainly no other species gives us the wealth and diversity of bloom, such grand flowers here and delicate ones there, with innumerable shades of color—here the soft white of Mrs. Hardy, there whites of all tones; yellows, from palest primrose to deepest orange; reds and bronzes of seemingly every possible combination. The true blue Chrysanthemum has not appeared, but, unfortunately, there is blue mixed with the reds, and this is the most discordant color in the family. Noting the vigor of the plants and the bold and massive effect of the blooms of a well grown collection, one is impressed with the masculine beauty of this flower, and it seems a pity that it has not been dubbed the "King of Autumn" instead of "the Queen." In the centre bed were planted some 2,000 late struck plants of the Mrs. Hardy, which were blooming freely, although not yet in perfect form. Judging from some grand flowers on the larger plants at the end of the house, this variety is fulfilling all its promises.

Messrs. Pitcher & Manda have also been fortunate in securing the newest seedlings of Dr. H. P. Walcott, who is well known as the first raiser of American seedlings and an enthusiastic amateur. Noticeable among these were Shasta, clear white, globular heads, tubular florets; Semiramis and Tecumseh, both in the way of Mrs. Wheeler; Adirondack, a fine Chinese incurved sort, very pure white; Ramona, an incurved Japanese, light amber; Monadnock, a yellow Gloire Rayonnante, and Manitou. Here are also some promising Short Hills seedlings, the best of which is said to be Number 26, a full globular flower, pink and rather early. Among a consignment of Japanese varieties received this year the most promising are provisionally named 4xxx (white), 18 (bronze), 9 (yellow), 4x (deep yellow). All the well known best varieties are grown, as well as the latest productions of the Continental florists. Some of the most promising of the new kinds under trial are "C. Souchet" (Del.), coppery, reflexed; Suzon (Rey); La Tosca (Del.); M. Louise Leroy (Del.), one of the best of the new whites; M. Constant Varin (Del.), yellow, fragrant; La Fortune (L. Lac.), yellow (extra); Belle Pointevine (Brt.), very fine white, incurved. Those who do not succeed with Empress should try this and Walcott's Adirondack. Of Fewkes' set L. B. Bird and Kioto seem to be the choice.

As is well known this nursery has a grand collection of Orchids, and though comparatively few are in blossom at this

season several charming banks are arranged on the benches, with here and there a gem. Such a plant is *Lælia Eyermannii* alba, the only individual known. *Vanda Sanderiana* and *V. cærulea*, in fine form, are, however, plants which would better satisfy the ordinary eye. Cypripediums are to be seen in apparently countless profusion, they being a great specialty here. Nepenthes, too, are abundant, while great masses of Palms and decorative plants fill every spare space, and all seem in robust health and carefully grown.

A new Cuphea, whose varietal name I did not learn, was shown in a great mass—an almost startling combination of scarlet and purple with white stamens. It is said to be an excellent bedder.

Aside from the flowers one could not but notice the remarkable order, neatness and care everywhere evident, and the vigorous health of all growing things.

Short Hills, N. J.

G.

Notes.

A meeting of influential citizens in the upper San Joaquin Valley has been held to take steps toward securing a large reservation in the Pine and Sequoia forests of the Sierra in the Fresno and Tulare region. The subject will be pressed at the approaching convention of fruit growers in Fresno.

An agricultural and forestry exhibition, under the auspices of the Imperial Agricultural Society of Vienna, will be held in that city next summer, from the 15th of May to the 15th of October. Forest products of Austria and Hungary only will be admitted, but foreigners are invited to exhibit machinery and tools used in cutting timber and manufacturing lumber, and to contribute memoirs on scientific subjects relating to the forest.

The autumn exhibition of the Hampden County Horticultural Society will be held at Springfield, Massachusetts, on November 12th–15th, when it is expected that one of the best collections of Chrysanthemums ever seen in New England will be displayed. The Connecticut Valley Florists' Club offers a year's subscription to GARDEN AND FOREST for the best new seedling Chrysanthemum, shown this year for the first time by the grower and having real merit.

Berberis Thunbergii was, last week, the most beautiful shrub in the Arnold Arboretum to many persons. The plants still retained their foliage, which had turned to the most brilliant scarlet, and were loaded with the bright red fruit, which hangs on the branches until the appearance of the new leaves in the spring. There is certainly no shrub more attractive in the fall of the year than this Japanese Barberry, and none which retains its autumn brilliancy for a longer period. It has proved an introduction of first rate merit.

One of the most beautiful of all shrubs in the color of its autumn foliage is the Japanese *Euonymus alata*, which just now is at its very best. The leaves of this plant turn bright rose colored, something unknown in other plants, or certainly very unusual. The broad, corky wings which grow on the branches give interest to this species, but the flowers and fruit are small and inconspicuous. The beauty of its autumn foliage, however, compensates for this; and this *Euonymus* should find a place in every garden in which shrubs are grown.

Zanthorhiza apiifolia, the Yellow-root of the Alleghany Mountains, a low under-shrub with spreading root-stocks and handsome pinnate foliage, is one of the last plants in the garden to take on its autumn colors, which are brilliant orange and scarlet. This alone would make the cultivation of the Yellow-root desirable. The habit of the plant, moreover, is good; the foliage is always attractive, and, as it grows well under trees and spreads rapidly, it is a desirable subject for covering shaded banks and slopes, in spite of the fact that neither the flower nor the fruit is at all conspicuous.

A combination of autumn colored foliage, which has come under our notice this season, is worth recording. A European Beech and a Scarlet Oak are growing next to each other in a large circular group of trees on the lawn of a suburban villa near Boston. Three or four of the large branches of the Oak have grown through those of the Beech and protrude several feet beyond them. The leaves of the Beech are still as bright and green as they were in midsummer, while those of the Oak have turned brilliant scarlet. The effect of color produced by the contrast of these two trees standing side by side is splendid, and it is greatly heightened by the scarlet branches of the Oak growing as it appears directly out of the green Beech.

The New Hampshire Forestry Commission met at Concord, October 4th, and organized by electing Joseph B. Walker, of Concord, President, G. Byron Chandler, of Manchester, Treasurer, and J. B. Harrison, of Franklin Falls, Secretary. The commission will endeavor to stimulate popular interest in the preservation of the characteristic scenery of the state and to make a thorough examination of the present condition and methods of treatment of the mountain-forests. As New Hampshire has no state lands, nothing can be accomplished for the preservation of the forests except by the intelligent co-operation of private land-owners and lumbermen.

Two years ago a Mr. Barber tried the experiment of planting Pampas Grass on five acres of land in San Bernardino County, California. A few weeks ago he cut from the five acres 70,000 plumes, which he sold for three and a half cents each, or \$2,450 for the crop. The expense of caring for the five acres has not been in excess of \$450, and the crop has netted him \$400 an acre. Next season he expects to net \$500 an acre, as the plants will then be three years old and in full bearing. The demand for the plume of the Pampas Grass is constantly increasing and it has been demonstrated that it can be profitably grown on high-priced land.

The number of Orchids of good varieties, and the quality of the specimens which are now seen in the florists' windows in this city, shows, more clearly than anything else, the great advance which has been made in the general cultivation of these plants in this country and the appreciation in which they are held for decorative purposes. High-class plants like *Vanda cærulea* and other Orchids occasionally seen in the windows of New York flower-sellers will not now be found, it is safe to say, in similar establishments in any other country in the world; while in matters of taste, as shown in the arrangement of the plants and flowers offered for sale in these establishments, the American florist has no equal. The most expensive plants, especially Orchids, are found in New York; greater variety of material, however, better Roses and the best taste in arrangement are now seen in the florists' windows in Boston.

The prizes awarded to exhibitors at the Paris Exhibition were distributed on the 29th of September. The ancient and distinguished house of Vilmorin, Andrieux & Co. received two Grand Prizes—one for flowering plants and one for vegetables. The Forest Department of France received a Grand Prize for its exhibition already described in these columns. Grand Prizes were awarded, among others, to Croux & Fils, and to Honoré Defresne, for their collections of hardy trees and shrubs. A gold medal, the highest award in its class, was given to the *Revue Horticole*, which, in the sixty-seven years of its existence, has exerted an immense influence in shaping and developing French horticulture, and has contained, in the long list of its editors and contributors, the names of the most distinguished botanists and horticulturists France has produced during the last half century. The small assistance France received from foreign nations appears in the fact that only forty-eight awards were made to foreigners for horticultural exhibits; of these only four were English. The United States apparently was not represented in the horticultural exhibition; at least, no award comes to this country.

M. Lemoine, the successful and distinguished hybridizer of Nancy, has produced in his new Gladioli the most striking novelty of recent years among garden plants, and one which, if the early promise of his seedlings is sustained, will give to our gardens a decorative plant of the very first order. As the readers of GARDEN AND FOREST already know, the new hybrid is to be known as *Gladiolus Nancianus*. It was obtained by crossing the hybrid *G. Lemoinei*, one of Lemoine's earlier triumphs, with the scarlet flowered *G. Sandersii*. Too much, certainly, has not been said of the vigor of the plants, or of the beauty of the flowers of this new hybrid. Plants in Lemoine's garden during the past summer were fully five and a half feet high, with long, compact spikes of broad flowers with spreading segments. They vary in color from the deepest scarlet to pale, clear rose, and all are marked with the conspicuous spot, which is the prominent characteristic in the coloring of the flowers in *G. Lemoinei*. The new race flowers in July or early in August; that is, rather earlier than most garden Gladioli. A few varieties have been so far tried and propagated as to permit their being put upon the market this autumn; but among the newer seedlings there are several which now appear more promising than any which have already received names. M. Lemoine received a gold medal at the Paris Exhibition for a collection of cut spikes of his new hybrid.

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Work Among the Trees.

IT is now rather late to plant trees, at least in this latitude and further northward. This does not mean that all trees planted later than this will certainly die, for it is possible to remove them at any time during the winter. Nevertheless, trees set out in late autumn are exposed to unusual dangers. The ground will not have time to settle firmly about the roots, which will be loosened as the top sways in the wind. The tree will be more easily lifted by frost and its hold upon the soft earth will be more insecure in time of a thaw. Even if these dangers are warded off by careful staking, there is the more serious one which threatens the tree from its lack of feeding roots to supply the moisture which the drying winds of winter absorb from trunk and limbs, leaving them shriveled and lifeless. A tree planted in early autumn, in ground thoroughly settled, will throw out roots enough before winter sets in to supply this drain.

Now is the time, however, to prepare for planting next spring. Where trees are to be set, ample pits should be dug, the more ample, the better for the health and beauty of the future trees. A hole three feet deep and twenty feet across is none too spacious for a long-lived tree. Into these excavations the loam taken out should be returned, together with enough peat or good soil added and thoroughly mixed with it to supply the place of the poor subsoil, hard-pan and stones which should be rejected. This will settle into a firm bed for the roots of the young trees next spring, when they are placed in the shallow hole, which can then be quickly dug in the centre of the large one. If the young trees have not already been secured and heeled in for the winter, they should be bought now and placed in a cold pit or cellar. It is bad practice to wait until spring to select nursery stock, for at that time the nurserymen are overwhelmed with orders, and they cannot give proper attention to the lifting and packing of their stock.

Planting in spring is half done when it is well begun in autumn. This is an important point gained in tree planting, for time at that season is precious here in the cold north, when the great volume of vegetable life, liberated

by a few days of sunshine, rushes all at once into full activity. To take advantage of this sudden change from winter into summer, everything must be in readiness at the first moment when the ground is dry enough to work and the weather will permit it. No matter how thoroughly we prepare for this season, the working days of spring will be found too few and too short for all the operations which must be crowded into them, and the prudent planter will leave nothing undone which will lessen or facilitate his labors then.

But care for growing trees is quite as essential as the planting of new ones; indeed, as has been often repeated, time and labor are worse than wasted in planting unless the after care is intelligent, determined, ceaseless. Now is the best time for pruning trees, before work among them is rendered unpleasant and unsafe by extreme weather, and perhaps a coating of ice upon the limbs. Many deciduous trees, which seem to be going into decline, can be started into new life by a judicious cutting away of dead or dying branches; but the limbs should invariably be cut back even with the surface of the trunk and the wound should be covered with coal-tar.

This is the season, too, for studying plantations and marking for removal trees which are injuring their more valuable neighbors. No tree can attain its full stature or its noblest expression or have a reasonable hope of longevity unless it is fully exposed to the influence of air and sunshine. Most of our parks and gardens are disfigured by trees which have been dwarfed or starved or forced out of shape by aggressive neighbors. Planting for immediate effect means overcrowding usually, and when the saplings begin to struggle with each other for the mastery, delay is fatal, for they will begin at once to spindle up or bend away toward the light, and soon all will be deformed past remedy.

These autumn days can be used to no better purpose by one who has trees, or hopes to have them, than by a thorough study of his grounds before the snow covers them, a thorough preparation for getting through the spring work without hurry, and a resolute use of the axe wherever thinning out or tree-surgery is needed.

We have spoken of autumn as a season of preparation for work among the trees, and we might have added that no time is more suitable for making plans for next year's operations in every part of the garden and grounds. Now that the summer vegetation is cleared away, the entire place can be studied, and any desirable changes in the general design can be mapped out. But just at this point a word of caution should be spoken. Do not attempt too much. Do not undertake to cultivate too much ground. Do not try to grow too great a variety of plants. There is more pleasure and more profit in cultivating a small garden thoroughly well and in getting the most out of it than can be had from a large piece of ground half cultivated. It is a common mistake to undertake more than can be thoroughly well done. Every man who cultivates a garden, whether he is rich or poor, suffers from this national tendency. We want to grow everything, and a great deal of it, and the result is that nothing is well done and men rarely get the satisfaction from their gardens which their expenditure of labor and energy and money entitles them to. No one man, whatever his resources may be, can grow all sorts of plants well, or get from them all they are capable of. The men who derive the greatest pleasure from gardening are those who grow a few plants, and study thoroughly their needs and habits and learn all about them. And it is such men, specialists, perhaps, they should be called, who advance horticulture, and who, in getting the most for themselves out of their gardens, do the most to increase knowledge and so to advance the interests of the community. It is due to the specialists from Dean Herbert to the intelligent men of the present day who are satisfied with growing and studying one class of plants, wringing from them all their

secrets, that modern horticulture has reached its present state of development.

Do not attempt too much in the garden or on the farm. Do not undertake more than can be done thoroughly well. There will be pleasure and profit in following this piece of advice.

The Art of Gardening—An Historical Sketch. XIII.—Roman Country-Seats.

(Continued.)

WHEN we read Pliny the younger's account of his Tuscan country-seat, the strongest impression we receive is of formality—a semi-architectural symmetry. Yet, a little consideration of his words shows that natural beauties—or those which seemed natural—must have played a considerable part in the effect of his domain as a whole. He does not describe them as he does the artificial features, perhaps because he thought it less needful, perhaps because he would have found it more difficult; but his keen appreciation of them is evident, and the same feeling shows in many other passages of his letters. Nor were his formal arrangements inappropriate in the immediate neighborhood of a house so splendid. Nothing, indeed, could be more thoroughly in keeping with the demands of a refined taste than the garden immediately in front of his house, as described in the first passages, which I quoted, were it not for the omnipresence of fantastically clipped trees and shrubs. The presence of such topiary work was, of course, more offensive here, where a beautiful natural landscape appeared beyond it, than in the smaller enclosures of the *villa urbana*, whence little was visible, very often, except the neighboring gardens. But we may feel sure that in any place a Greek would have protested against it, and so, too, did many Latin poets. Nevertheless, it was greatly loved in ancient Italy, and was, doubtless, the offspring of local taste. The records of Egypt tell, indeed, of clipped trees and of shorn hedges along the borders of the roads;* but the severity of Egyptian taste would hardly tolerate anything beyond spherical, columnar or other simple shapes, harmonious with the architectural forms about them, while the Romans had hunting scenes, ships, climbing serpents, and a whole gallery of like fantastic forms.

Villas, still more splendid than Pliny's, were scattered throughout the length and breadth of Italy, thickly bordering the sea-coast north and south of Rome, dotting the slopes of the Apennines, and nestling by the shores of Como and Garda. So numerous did they become, and so vast were the spaces occupied by their ornamental grounds, even in the time of Cicero, that he complained that no fields would be left for the husbandman to till, and Seneca cried: "There is not a hill which is not covered with your gardens, that is not encircled by your parks, nor far and near a lake where the roofs of Roman grandees do not rise." Nor does Pliny's description give us a complete idea of the extravagance displayed in these pleasure-grounds, and severely satirized by many moralists. He does not speak of their great *vivaria* and aviaries, their costly green-houses, and parterres of colored flowers, nor of the magnificence often attained in the water-works which formed all kinds of fountains and cascades, and even turned clocks and ran organs that yielded sweet music. The chief gardener was called the *topiarius*, so great was the love for clipped trees and shrubs; but an *aquarius* had special charge of the water-works, and innumerable lesser officials attended to the utilitarian parts of the domain. The *topiarius* is the only one whom Pliny the Elder dignifies by the name of "artist." The fact that the actual designer of the grounds is not specialized leads us to believe that the architect laid them out when he built the house, and their character well supports the assumption.

Sometimes we can understand an almost wholly formal arrangement of the pleasure-gardens; but the larger they were, the more features of a natural sort, of course, they were likely to contain, and after a while there seems to have been at least a partial reaction against symmetry and stiffness. One is inclined to fancy that it may have been brought about by the protests of the poets, as was the similar reaction in northern Europe in the eighteenth century. Here, as in the urban pleasure-ground, Nero again appears as the exponent of a taste for natural loveliness. A villa which he possessed in the Apennines, and which was excavated not long ago by Professor Lanciani, lay in a wild gorge, cut by the Anio, which fell

in three cascades into the valley below. Dams retained the water in three large lakes, but their artificiality was not apparent, and from the domain as a whole "art had been thoroughly banished," says the explorer, "and everything left to the free play of nature." Hunting-ledges stood on either side of the gorge, connected together by a daring bridge, and the lakes were overshadowed by great rocks and enormous Oaks. Indeed, as time went on, a truly romantic feeling for wild mountain scenery seems to have developed in these Romans, satiated with symmetrical splendors. Trajan built himself a hunting-lodge high above Nero's, at the very source of the Anio, 3,200 feet above the sea-level, where the prospect was of alpine grandeur and variety; and the ruins on the top of Mount Etna are believed to be those of a villa built by Hadrian, 3,631 feet higher than the summit of the Rigi, 3,277 feet higher than the summit of Mount Washington.*

No place was more famous for its multitude of splendid country-seats than Tibur, the modern Tivoli. Here lay Cicero's estate, with winter and summer dwellings, great baths, now with hot water and again with cold, two gymnasiums after the Grecian pattern, numerous basins and grottoes, and water-works so well supplied that he jestingly called the place his "Nile." Pompey and Hortensius, Crassus and Brutus and Lucullus were his neighbors, each with a stately domain; and the mother of Augustus, like Tiberius himself, was attracted by the natural beauty and the fashion of the place. In later years came the Emperor, Hadrian, too, creating, a few miles from the modern hamlet, the villa which history still ranks among the wonders of the world. It is now a mass of almost undecipherable ruins, but its circuit can be traced for about half a dozen miles; and though some modern pleasure-grounds have been even larger than this, none of them can give us a true idea of the splendor of Hadrian's home. No accurate description has come down to us, but we know that everything that had been attempted elsewhere was here achieved in a more magnificent way. A whole army of artists traveled in the Emperor's service, buying Greek and Egyptian works, or copying originals that could not be purchased, or studying how to imitate them at home. Everything was reproduced, including seven great temples typical of seven different foreign countries, and, to take a striking contrast, the abode of the dead, as poets had pictured it. But the most interesting fact to note is that, amid this multitude of buildings, statues, paintings and formal pleasure-grounds, at least one spot was transformed into the likeness of a romantic natural glen. The famous Vale of Tempe, in Greece, was copied as accurately as human skill could compass. When we remember that this was but the chief among many villas which Hadrian owned, that Tiberius had twelve in various places, and that even private citizens seldom contented themselves with one or two, we gain a faint idea of what the aspect of Italy must have been in the golden days of the imperial power.

The Romans, like the Greeks, learned the lavish use of cut-flowers only in the later years of their national life. The extent to which the cultivation of flowers, and especially of Roses, must, however, then have been carried on, is implied in many familiar anecdotes. Nero's dining-room, for instance, had an ivory ceiling, artfully contrived to shower Roses upon his guests; Heliogabalus caused the floors of his apartments, and even his porticoes, to be thickly strewn with Roses, over which a golden net was stretched to keep the mass in place; and in water-festivals, the surface of the lake was sometimes so closely covered with floating flowers that it wholly disappeared from view. Many large areas in Italy were devoted to the growing of Roses for Rome, and, in winter, whole cargoes were imported from Egypt. It would be interesting to know what methods were used to keep them fresh on the long journey.†

The Violet, Narcissus, Gladiolus, Lily, Hyacinth, Iris, Crocus, Amaranth and Poppy were especially common in Roman gardens—the Lily, by Pliny's witness, being esteemed next to the Rose. But their list of flowers was very short, indeed, compared with ours, and the gardener must have been chiefly occupied in arranging his materials well, not, as too often to-day, in increasing their variety.‡

New York.

M. G. Van Rensselaer.

* Lanciani: "Ancient Rome in the Light of Modern Discoveries."

† Pliny speaks of garlands being brought from India, and even from countries further to the eastward, but it must be thought that these were of artificial flowers, and the idea is borne out by his statement, that no Rose-garlands were at all esteemed in his day unless entirely composed of petals sewn together with the needle, while the "most refined" custom of all was to "present garlands composed of nard leaves or of silk of divers colors steeped in unguents."

‡ Wuestemann is the best authority on the horticulture of the ancients. I have been unable to obtain his books, but Becker quotes freely from them in the notes to his "Gallus." See, also, De Candolle's "Origin of Cultivated Plants."

* Ebers: "An Egyptian Princess." This book, like those of Becker, is a romance, but its author is prominent among the Egyptologists of our day.

Autumn Colors of Foliage.

THE brilliant autumn coloring of many of the trees and shrubs in New England and the northern states and Canada is very widely known and appreciated; and most Europeans, who are so fortunate as to travel in this country at that season, are filled with the desire to reproduce the same effects at home. But the trees which are so gorgeous when the first frost appears here are said to lose much of their native bright autumn effect when transplanted to the gardens of Europe. Various reasons have been advanced to account for this peculiarity, the most generally accepted being the fact that the climate of eastern North America is much less humid than that of Europe. This certainly appears to be an important point, because the brightness of the coloring in a cool, wet season like the present, when growth has continued until frost, is not at all comparable with that of those years when the autumn is dry and there is an abundance of sunshine.

The early autumn frosts are usually considered an important factor in the production of these crimson and scarlet effects, but much more depends upon whether the season is cool or warm, wet or dry; and soil, situation, exposure, etc., also play a part.

Autumn changes in the color of the leaves are said to be due to the disintegration of the chlorophyll or green coloring matter, and the presence of xanthophyll (yellow), and erythrophyll (red) and other coloring matter within the cells.

Frequent studies and notices of the subject are to be found in foreign works and journals.

Among those most accessible and published in this country may be mentioned the notice by Professor Goodale (Physiological Botany, p. 297), and a study of "The Autumnal Changes in Maple Leaves," by W. K. Martin and S. B. Thomas, in the *Botanical Gazette* for April, 1887. The following statement from the latter (pp. 80, 81) is interesting and comprehensive:

"Chlorophyll, manufactured constantly under the influence of light, is as constantly undergoing decomposition by the metabolism of the cell. Under ordinary conditions, the manufacture of chlorophyll is sufficient to cover up its decomposition, and the leaf retains its green color. Under certain changed conditions, however, such as intense light or diminished vitality, the decomposition of chlorophyll exceeds its manufacture, and xanthophyll (probably one of the products of decomposition) appears. In other words, xanthophyll is being formed all the time, but only becomes apparent when the manufacture of chlorophyll is checked. The condition of intense sunlight gives us the occasional summer yellowness, while to lowered vitality must be attributed the failure of chlorophyll manufacture in the autumn. This lower vitality is brought about by diminution of light, lowering of temperature, and probably causes in the plant itself. The common notion that frost is the cause of autumnal coloration is true only so far as it is one of the causes which tend to diminish the vitality of the plant, and so the manufacture of chlorophyll. Autumnal coloration may take place before any frost. Xanthophyll then stains the chlorophyll masses yellow, which were before stained green by chlorophyll. The red coloration is brought about in a very different way, as erythrophyll is manufactured in the leaf, and stains the cell-sap, leaving the chlorophyll masses untouched. This red coloring matter cannot be discovered in any of the crude materials brought into the plant, or in any other part of the leaves, except sometimes in the phloem regions of the petioles. When the leaf falls and the cell sap evaporates, and the chlorophyll bodies die, the erythrophyll lays hold of the cell wall and solid contents and stains them. In this way dried leaves retain their red color. As erythrophyll is soluble in water, however, contact with moisture will soon cause the most of it to disappear."

An experiment, showing the effect of checking the growth of a plant or a part of it, may be made by girdling young branches of some of our trees or shrubs, which will cause the foliage of the part above the girdle to change color while the remainder of the plant is still green. It is interesting to note the peculiarities of the autumn coloring of different individuals of the same species, which often occur in Maples, Oaks, etc. These individual characteristics usually remain constant year after year; and, as some of them are much more desirable than others, it would be an interesting point to prove that such could be perpetuated by grafting as suggested in a former number of GARDEN AND FOREST (vol. i., p. 410). It seems very possible that varying results would be produced, according to the kind of stocks used. Stocks of some of the foreign species might produce quite a different effect in regard to autumn coloring than would be the case if the desired form was grafted upon stocks of the same species.

This is a field for some valuable experiments. If American trees do not produce all their native splendor of autumn coloring when transplanted to Europe, it is also true that, as a rule, few European trees develop much brilliancy when planted here. But it is a well known fact that Japan can furnish many trees and shrubs which, when planted in this country, are quite as conspicuous in the autumn as some of our native species.

There is no class of woody plants in this latitude which contributes such rich autumnal effects in shrubberies or by roadsides as those of the genus *Rhus*, better known as Sumachs. The most striking one of them all (*R. venenata*) is also the most poisonous to nearly everybody, and but very few handle it without some visible evil effects.

The so-called Poison Ivy (*R. Toxicodendron*) also assumes pleasing colors, and is valuable as a covering for stone walls, etc. Its poisonous properties will always prevent it, as well as the preceding species, from becoming a welcome plant in much frequented gardens.

But there are three native non-poisonous species, the Stag-horn Sumach (*R. typhina*), the Smooth Sumach (*R. glabra*) and *R. copallina*, which meet all desires for the bright colors, red, crimson, orange and yellow. The shining, polished looking foliage of the last named species usually becomes of a uniform rich purple.

The Smooth Sumach is also frequently purplish at first, but among the novelties at the Arnold Arboretum there is a form of this species with foliage of an unvarying yellow color in autumn.

Japan also furnishes bright autumn foliaged species, the best non-poisonous species yet introduced being *Rhus semialata*, var. *Osbeckii*, which in favorable seasons assumes beautiful orange and crimson tints. Another Japanese plant, *Cercidiphyllum japonicum*, belonging to the Magnolia family, gives promise of rivaling all other trees in the beautiful tinting of its leaves in favorable seasons or when planted on dry ground. It is as yet, however, too rare and too little known to be fairly judged.

As the Sumachs lead the larger shrubs in regard to autumn colors, so the Maples may be said to be at the head of the list of trees. The Scarlet or Swamp Maple (*Acer rubrum*) assumes rich hues earlier in the season than any other tree; and this is followed, often before any frost, by the orange or gold, crimson or scarlet colors of the Rock or Sugar Maple. The small Mountain Maple (*A. spicatum*) often assumes various rich shades of red. The varieties of some Japanese species, notably those of *A. polymorphum*, which hardly become more than shrubs here, are well known for their beautiful summer foliage, which becomes intensified as autumn advances.

There are few plants of the Pea family which become beautiful on account of these rich colors as the life of the leaves is withdrawn, but, among the exceptions, the Yellow-Wood (*Cladrastis lutea*) is very striking on account of the clear, bright yellow color which it sometimes assumes in October. The leaves of our Ash trees fall early, but before they drop to the ground those of the White Ash (*Fraxinus Americana*) turn a rich brown or olive purple, or occasionally yellow. In its best condition *Sassafras officinale* changes to a delicate buff or orange color.

The bright scarlets and crimsons of the Tupelo (*Nyssa sylvatica*) in autumn always call forth admiration, and, considering the graceful habit of the tree and its bright green leaves in summer, it ought to be more frequently planted for ornament.

The Scarlet Oak (*Q. coccinea*) is well known for the rich scarlet which its leaves assume in late autumn; and the browns, reds, yellows and dark purples of individuals of other species of Oak only make the Scarlet the more conspicuous.

Although the Liquidambar is not considered very hardy in the latitude of Boston, it is much valued further south and west, and is cultivated in Europe for the deep crimson effects of its autumn foliage.

Many of the shrubs which assume rich autumn effects become purplish, often a deep, dull purple, before the red and orange colors show conspicuously. This is especially noticeable in wet seasons and among plants of the Cornel and Heath families. *Cornus florida* is an instance in which the early effect is purplish, changing later to scarlet or crimson above and russet beneath the leaves. Some of the other species of *Cornus* undergo the same changes. Many of the *Vacciniums*, *Andromedas* and *Azaleas* first become purplish, then crimson and orange; and the foliage of a small, southern tree (*Oxydendrum arboreum*) is at first intensely dark and at a distance much resembles that of the Flowering Dogwood. The Yellow-root (*Zanthorhiza apiifolia*) is prized for its bright orange colors of late autumn.

That brilliant autumn foliage is not common to all the species of any genus or habitat is well shown among the Spiræas, in which the Asiatic species, *S. Thunbergii* and *S. prunifolia*, become orange and scarlet, and almost no other species, not even our native ones, are of any autumnal value. *S. Thunbergii* is especially attractive and beautiful at this season.

The common Barberry (*B. vulgaris*) does not often develop very rich colors of foliage, in this country at least, while nearly all the introduced Asiatic varieties and species are conspicuous by their bright orange and scarlet, a Japanese species (*B. Sieboldii*) leading them all in this respect.

But no other Japanese plant can compare in autumnal value with *Ampelopsis tricuspidata* (also called *Ampelopsis Veitchii*, *Vitis inconstans*, Japanese Ivy, Boston Ivy, etc.), and altogether it should be considered one of the most valuable introductions from that country of beautiful plants. In its purples, reds and crimsons and pale yellows, where the direct rays of the sun do not strike, it rivals the beauty of the Virginian Creeper (*Ampelopsis quinquefolia*), which, about Boston, loses its bright crimson leaves before its Japanese relative has attained its greatest glory.

To give details of the changes of all the species of hardy woody plants which possess any value for their autumnal foliage would occupy many pages of GARDEN AND FOREST. Nearly all the genera have some species which have a claim to notice, and often nearly every species belonging to a genus has its own time of changing and peculiarities of tints. Many of the conifers, too, undergo distinct changes in color when the frosts appear, and the leaves of some of the Larches and of *Pseudolarix Kämpferi* sometimes assume a pretty yellow or orange hue before they fall.

Arnold Arboretum.

J. G. Jack.

The India Rubber Tree.

THE "India Rubber" or "Rubber plant" is a familiar and cherished object in many houses. There is not, probably, a plant among those which, during the last twenty-five years, have become really popular for the embellishment of living rooms and conservatories, which is better suited for the purpose; and there are few persons now who know anything about plants at all who are not familiar with the straight stem and splendid great, dark green, lustrous, leathery leaves of the "Rubber plant," which seems able to resist, with impunity, darkness, neglect and drought, and even an atmosphere vitiated by the gases from burning coals. Plants more than ten or twelve feet high are not very often found in our northern cities, and few people, perhaps, who see one of the plants flourishing year after year in the narrow quarters of an ordinary sized flower-pot realize that it belongs to a race of veritable giants, or that the *Ficus elastica*, as our common "Rubber" plant is called by botanists, is, in its native countries, a marvel among trees. Some idea, perhaps, of the manner of growth and of the size which this plant attains in the tropics can be obtained from the illustration upon page 547. It represents a tree of ordinary size and only fifty years old in the Botanical Garden of Peradenya, in Ceylon, one of an avenue of some length. It is difficult to realize that the aerial roots, grown into supplementary trunks, common to many species of Fig (for the Rubber plant is a Fig, and produces miniature figs precisely similar in structure to the figs of commerce), and the great roots twisting like huge serpents in all directions over the surface of the ground, belong to the little pot-plant we are familiar with.

Ficus elastica is a native of the foot-hills of the Sikkim Himalaya of Assam, of Burmah, Perak and of the islands of the Malayan Archipelago. It is a large tree, towering high above the forest, with a broad, leafy crown and immense trunk. Griffith describes, in the *Journal of the Asiatic Society* (vii. i., 132), a tree one hundred feet high, covering with its branches an area of 610 feet, the main trunk seventy-four feet in girth, while the trunk with its supplementary stems was 120 feet in circumference. This species of Fig, like many others found in the tropics, is an epiphyte—that is, the seed from which it springs germinates upon the trunk or branch of another tree. The young plant sends down roots to the ground, and as

these grow they gradually smother the host-plant, and form an upright stem which in time becomes the support of the Fig-tree. The fruit of this species, which is probably never seen outside of the tropics, is ovoid, about the size of an olive, and greenish yellow in color.

Ficus elastica is a favorite ornamental tree throughout the tropics, and is largely used in the East Indies for shading avenues, for which purpose its wide-spreading head admirably fits it. It is cultivated in Assam, where large plantations of this tree have been made in recent years, for the caoutchouc, which it yields in large quantities, although it is now generally believed that Para rubber, the product of several species of Hevea, especially of *H. Braziliensis*, a large evergreen tree found on the banks of the Orinoco, retains its firmness longer and possesses greater strength and elasticity.

Ficus elastica was cultivated in England as early as 1815, and whoever first thought of using it for house decoration made a happy hit. It was probably first used in this way, to any great extent at least, in Berlin.

New or Little Known Plants.

Staphylea Bolanderi.

THE number of genera of woody plants with representatives in each of the great botanical regions of the North Temperate Zone, the coniferous and the ament bearing genera excepted, is not large. The discovery a few years ago in northern California of the Staphylea, which is figured upon page 545 of this issue, added this genus to the number. The flora of eastern North America contains, *S. trifolia*; *S. pinnata* inhabits central Europe; *S. Colchica*, which is by far the handsomest of the genus, is found in the Orient; *S. Emodi* in the Himalayas, and *S. Bumalda* in Japan.

*Staphylea Bolanderi** was discovered by the excellent collector whose name it bears on McCloud's Fork of the Sacramento River, in the neighborhood of Mt. Shasta, in April, 1874; and afterwards it was found again in the same region by Mr. J. G. Lemmon in fruit. It is a shrub with stout branches, covered with reddish brown bark, that of the year pale green or straw colored. The leaves are three-foliate, with broadly oval or orbiculate, glabrous, serrulate, abruptly acuminate leaflets. The flowers are greenish white, with exserted stamens and style, the sepals rather shorter than the petals. The fruit, which is rather narrow for the length, is two and a half inches long, with slightly flattened seeds one-fourth of an inch long.

Staphylea Bolanderi is apparently one of the rarest shrubs of the Pacific forests, and has not been introduced into cultivation.

C. S. S.

Plant Notes.

The Cloudberry. (*Rubus Chamæmoris*.)

THE Cloudberry, which is found in few localities south of the Canadian boundary, and even then not in great abundance, is quite common and greatly prized in Newfoundland, Labrador, Nova Scotia and northern Quebec. It is known under various names, and is very abundant through northern Canada, extending from the Atlantic to the Pacific, and north to the Arctic Sea. Growing always in peat bogs at the south, and further north in open boggy places in woods, it is found in the greatest profusion on the barrens beyond the northern limit of tree growth, occasionally ripening its fruit even within the Arctic Circle. In spite of the fact that it is very susceptible to frost, and that frequently the fruit does not mature at all, it seems to improve in quality, like a few other berries, toward the northern limits of its distribution.

Rubus arcticus and *R. Chamæmoris* are frequently found together; the broad, rose colored flowers of the one contrasting beautifully with the large, white Anemone blossoms of the other. The Cloudberry resembles none of its congeners in color or in flavor. The rich amber or golden berries are only slightly tinged with deep red on the side toward the sun;

* *Staphylea Bolanderi*, Gray in *Proc. Am. Acad.*, x. 69.—Brewer & Watson, *Bot. California*, i. 108.

and they never have more than the slightest trace of acidity. Indeed, so tasteless is the berry that it can hardly be eaten at all until almost ripe. The berries when apparently mature are often dry and insipid, tasting not unlike a very young apple; indeed, the name "Bake Apple Berry," by which it is known

White Raspberry of cultivation; and then if eaten in small quantities it is perhaps the most delicious of our northern berries. The *habitants* of Quebec and the Indians prefer it just as it approaches ripeness and before it has lost its acid taste; but to southerners it is at that time hardly palatable.



Fig. 142.—*Staphylea Bolanderi*.—See page 544.

in the maritime provinces, may have been given to it on account of the real or supposed resemblance of its flavor to that of a baked apple.

When quite ripe, however, the Cloudberry has an intensely sweet, honey-like flavor, slightly recalling that of the large

It is known in northern Quebec and about Hudson's Bay as the Yellow Berry, and in that part of the country there is no fruit more sought after for cooking. A small amount of sugar is needed in preparing it for the table, and jam made from this berry has such a rich and delicate flavor, so unlike

that made from any other fruit, that at several of the Hudson Bay Company's posts large quantities are preserved and sent to friends at home. The Chipewyan Indians of the Mackenzie River Valley make a sugar from the juice of the birch in which the Cloudberry are cooked, and, prepared in this manner, they are considered a great delicacy. Few birds eat the Cloudberry, so that when they are not picked by man they decay slowly on the vines and finally drop to the ground.

Ottawa.

J. M. Macoun.

Foreign Correspondence.

London Letter.

SOME of your readers may be glad to know what plants are the most attractive in our warm houses at this time of year. The following are exceptionally good at Kew just now. They are not new, indeed some are of the oldest of garden plants, still they do not appear to find much favor nowadays:

ÆSCHYNANTHUS SPECIOSUS.—This plant has been gorgeous with flowers since June and there are still several specimens in full bloom. There are few plants more charming than this, whether it be in flower in summer or in November. It has numerous erect stems, eighteen inches high, bearing opposite, ovate-lanceolate, dark green leaves, three inches long. The flowers are in terminal fascicles, strong stems bearing as many as twenty flowers, which all open together. They are erect, and each one is composed of a five-lobed subulate calyx and a tubular corolla three to four inches long, curved at the top where the mouth is divided into four rounded lobes. The color is bright orange, with scarlet lobes and a line of black dividing the orange from the scarlet. The flowers remain fresh more than a fortnight. The plants should be grown in pots in a compost of turfy peat, leaf-mould and plenty of sand. They like abundance of moisture and a stove temperature all the year round. This species was introduced in 1847 by Messrs. Veitch through their collector, Lobbs, who found it growing freely, attached to the trunks of large trees in Java.

COSTUS IGNEUS.—This species was introduced from Bahia by Messrs. Linden in 1882. As a flowering plant it is much the best of the several species of Costus that are in cultivation, being of dwarf, compact habit, easy to cultivate, a free bloomer, with large and bright colored flowers. Here it has been in flower all summer—not a succession of plants, but the same plants from June until now. Its stems are herbaceous, about a foot high, with elliptical-lanceolate dark green leaves, the points slender and acuminate; their length is about six inches. The flowers are in terminal clusters or heads, and each head is composed of a great number of scales and buds. One or two flowers are expanded at a time and remain fresh about a day. Each flower is composed of a large, circular, wavy lip which measures two inches across, the other lobes small, whilst in the middle there is a tongue-like appendage to the sessile anther. The color is bright, glistening orange red. The color and form of the flowers are exceptional among stove-plants. Besides this we have *C. Malorteanus*, which has short stems, large, orbicular, fleshy, hairy, gray-green leaves and heads of crimson flowers. For tropical aquaria this species is of value, as it likes water and becomes attractive with liberal treatment. *C. speciosus* has stems four feet long and crimson flowers. *C. spiralis* is similar, but smaller in leaf and habit. The genus is a large one and it occurs in all the tropics. In some species, as, for instance, *C. spiralis*, the flowers are sometimes terminal on the leafy stems and sometimes on short stems which spring direct from the rhizome, as in the Gingers.

BEGONIA HAAGEANA.—The merits of this new Begonia were mentioned incidentally by me in a letter last year. A year's further trial has proved the plant to be of first-rate merit as a garden Begonia. Among the many species of evergreen Begonias grown at Kew, this one stands out prominently on account of its bold habit, handsome foliage, floriferousness, and the size and beauty of its flowers. These are colored a soft rosy white, with conspicuous crimson hairs on the outside of the sepals; the male flowers are one and one-half inches across, and they are in very large branching racemes, strong stems producing racemes nine inches across. The female flowers are smaller and in looser racemes. The plants at Kew are now in full flower. In the hands of a clever hybridizer, such as Monsieur Lemoine, this species might be made much of. It was introduced from Brazil by Messrs. Haage & Schmidt, of Erfurt, and it flowered for the first time, at Kew, in 1887. A figure of it is given in the *Botanical Magazine*, t. 7028, under the name of *B. Scharffii*. This is, however, a different species, which was introduced at the same time as *B. Haageana* and belongs to the same section.

DISSOTIS INCANA.—This is one of a genus of Melastomads

found in Africa, mostly in the tropics. Until this species was introduced, none of those tried had proved of any value for the garden, but this one is handsome enough to find favor with many. It has numerous, erect, four-angled stems which spring freely from the root-stock and grow to a length of about two and one-half feet. The leaves are three inches long, opposite, ovate-lanceolate, with prominent nerves on the surface covered with scabrid hairs. The flowers are borne in large, terminal, spike-like racemes, the length of which is sometimes eight inches, and thickly crowded with deep purplish crimson flowers. These are one and one-half inches across, and composed of five ovate, overlapping petals, and urn-shaped, green calyx with five small sepals, purple anthers and yellow filaments. They are not unlike the flowers of a *Monochætum*; but the plant is more vigorous and the flowers more abundant than in any of that genus. The Kew plants were introduced from Natal in 1886, under the name of *Osbeckia Umlasiana*. They have been grown in pots plunged in a border out-of-doors all summer and removed into a green-house to flower.

IXORA MACROTHYRSA.—I have already described this to your readers, and only refer to it now because in addition to its display in August it is now again beautiful with flowers. This time the plants are younger, having a single stem, erect, two feet high and crowned with a magnificent head of rich scarlet flowers. Nothing would be finer in the stove than this.

The meeting of the Royal Horticultural Society, on Tuesday, October 22d, was well attended, in spite of one of our famous London fogs. The exhibits were more than usually interesting, some of the groups being extremely fine. There were a few good Orchids, amongst which was a very fine specimen of Tantz's variety of *Odontoglossum grande*, the flowers remarkably large and well marked. *O. Insleayi splendens aurea*, not nearly as good as the type, has a bright yellow lip, with brown markings, the sepals pale coffee colored. The golden variety of *O. grande* was also very fine. *Dendrobium formosum*, var. *giganteum*, from Mr. Gladstone, received a cultural commendation; the specimen, a very fine one, was well flowered. *Cattleya aurea*, var. *Blenheimensis*, from the Duke of Marlborough, appears to differ very little from the old Dowiana, and *D. Statterianum*, from St. Albans, with fine rosy purple sepals and deep purple lip, does not seem to differ much from *D. superbiens*.

Epidendrum sceptrum, a novelty from Sir T. Lawrence, received a botanical certificate. The racemes are large, crowded with bright yellow, purple marked flowers—a very interesting species. *Cælogyne speciosa*, from the same garden, was very fine. The Messrs. Veitch, of Chelsea, as usual, had a very handsome group of mixed plants, amongst which were many rare and a few new plants. Amongst the rarer plants were *Dracæna Doucettii*, a nice habited and remarkably distinct form, the leaves variegated white and green, promising to be a useful adjunct to table decoration and for like purposes. The Crotons were very nicely colored, as were the Palms, *Sarracenia Chelsoni* and the new *S. Wrigleyana*, the latter very fine and distinct. *Gynierium argenteum variegatum* looks like a hardy plant, and if so will certainly be one of the plants of the future. The leaves are very handsome, the variegation yellow and bright green, being very striking. A new *Carex*, called *C. species variegata*, received a first class certificate. The leaves are very narrow, grass-like, green on the edges, with an ivory white centre. The habit resembles that of an *Isolepis*, with broader foliage, and altogether a more attractive appearance. A remarkable and very interesting new hybrid Rhododendron was shown in flower, and received a first-class certificate. It is called *R. Indico-Javanicum*, and is a cross between *R. Javanicum* Lord Wolseley and *Azalea indica*, Stella. The flowers are darker than those of the Rhododendron, the substance much better, and the shape altered to a narrow, and, for their size, longer tube, the limb spreading very little. The leaves of the specimen in flower were nearly or quite those of the Rhododendron, while another specimen, not in flower, from the same seed-pod, had leaves decidedly those of an Azalea. This is the first cross of its kind, and, besides being full of interest botanically, will prove very useful to horticulture. The Messrs. Veitch also sent a very handsome collection of autumn foliage. To you in America this will appear trifling perhaps, but as the product of a climate like that of England, wonderful, to say the least, were Japanese Maples of all shades, from blood red to golden yellow, exquisite in shape and cutting; *Populus fastigiata*, clear lemon yellow; *Rhus* of various species; Liquidambar, and the handsome red leaved Guelder Rose. The collection was very large, the leaves being simply laid on the table in bunches, and were very effective. There were also close by a very fine group of cut blooms of hybrid Rhododendrons and a charming

mixed bunch of *Pernettyas*. A group of dried grasses from South Africa attracted a good deal of attention, the chocolate brown *Cyperus* or *Carex* being highly ornamental. The *Chrysanthemums*, though few, were choice, Stanstead Surprise, a seedling from a Japanese variety, from J. Laing & Son, being of fine form, and a warm rosy crimson color. It received a first class certificate. Stanstead White, an incurved Japanese, pure white, of large, fine form, is very distinct and desirable. M. Benard, a reflexed Japanese, with purple amaranth, very large flowers, attracted much attention. From Kent, the home of flowers, M. Pankoncke, madder brown, received an award of merit. William Neville also received an award of merit. It is reflexed, orange buff and of very fine form. Eynsford White was perhaps the finest in the show. It is far superior to Avalanche, the florets broad, strap-

These autumn *Crocuses* are very ornamental, filling up a large gap at a time when flowers of this nature are rather scarce, and especially in the rock-garden, where the groups of alpines have long since begun to show the sere and yellow leaf. The majority of them are very easily cultivated, and a few of them, notably *C. speciosus*, *C. medius* and *C. nudiflorus*, multiply with surprising rapidity. Their only fault, if such it may be termed, is that most of them flower before the leaves have attained any material size; but even this is easily remedied by planting them, as is now almost universally practiced, among Pinks, and other loose, tufty plants. In this matter, however, they are free from one great objection we have always felt to the autumn *Colchicums*, which are also erroneously called autumn *Crocuses*—that is, the large and very ugly leaves produced by the *Colchicums* in spring, if planted in borders



Fig. 143.—*Ficus elastica* in the Botanic Garden at Peradenya, Ceylon.—See page 514.

shaped, reflexed and pure white. It looks like a huge snow-ball. M. Charles Lebrsq, a single variety, with citron or Indian yellow flowers, small, but abundant, also received an award of merit. Octavie is an extremely pretty *Begonia*, and very useful for autumn cutting, the flowers double, white, and remarkably like those of the *Camellia*. *Gymnogramme schizophylla*, var. *gloriosa*, from Mr. May, received a bronze Banksian medal. It is a most lovely form. The *Adiantums* in this group, as usual, were finely colored. W. Watson.
London.

Cultural Department.

Autumn *Crocuses*.

THE autumn *Crocuses*, of which there are now twenty distinct species, exclusive of well marked or garden varieties, have flowered remarkably well in English gardens this season, notwithstanding the unusually large rainfalls of last year,

or beds which at this time are expected to look their very neatest. It would be a pity to discard them on this account, however, and we have compromised the matter by planting them in the grass in the pleasure garden or park, where they do very well and make a pretty feature. The spring *Crocuses* are abundant enough, including all the different forms and bright colors of *C. aureus*, *C. chrysanthus*, *C. biflorus*, and the handsome various-colored *C. Imperati*; but the autumn ones, amongst which we have also a pure yellow, several purples of different shades and many whites, come, as already stated, at a time when such flowers are scarce, and, therefore, they are doubly welcome. It is rare to see these *Crocuses* destroyed by frosts; the earlier ones, beginning with the middle of August, are over before the frosts are severe enough. Heavy rains do most damage, and this is more apparent in the absence of a ground-work which serves as a support to the long and usually weak flower-tubes. *C. Sharojani* is the first to make an appearance, about the middle of August, and in very hot

seasons as early as the end of July. It is the only species in which the previous year's leaves live until the autumn flowering-time. The flowers are of good size, deep orange and very attractive. It is a native of the north-west Caucasus; its scarcity being somewhat remarkable, seeing that it grows intermixed with the more common *C. vallicola*. It increases very slowly. *C. vallicola* follows closely, and is usually in flower about the beginning of September. Balansa says that in its native home, the Alps of Trebizond and Lazistan, it flowers as early as July. The flowers are usually of a pale cream color, and it is the only species in which the segments have fine, thread-like appendages at their summit.

C. nudiflorus follows next, being rarely later than the beginning of September. It is a very hardy species, naturalized in several counties in England, notably Nottingham, where we believe it is plentiful still. It is the old *C. Pyrena* of Parkinson, with large, unstriped, bluish purple flowers, the tubes unusually long, and, unless supported, very liable to be destroyed with heavy rains. The corms throw out long stolons, and where not confined sometimes become troublesome. The pure white variety is very desirable, common about Biarritz, Astureas and in the Pyrenees.

C. zonatus, which we also find in gardens as *C. Kotschyanus*, is one of the newer species, discovered in 1855 in the mountainous districts of Cilicia, to the north of Taurus. It is one of the early ones, but not so regular as some of the others. It is one of the freest flowering and most useful of the autumn species, increasing with rapidity and very hardy. The flowers are lilac or rosy lilac, veined on the inside with five to seven purple lines, and with a bright orange base and yellow fringed stigmata.

C. iridiflorus (*Byzantinus* of Parkinson) is a very remarkable species, intermediate almost between a Crocus and an Iris, and on this account Schur proposed the generic name of *Crociris iridiflorus*. It is the tallest, and, with the exception of *C. medius*, the largest of the genus. The outer segments, of a clear, rich purple, are almost twice the size of the pale lilac inner ones, forming a very odd and remarkable flower. A native of Transylvania, flowering late in September.

C. speciosus is perhaps the commonest and most serviceable of all the autumn species. Its geographical distribution ranges from northern Persia to the Caucasus and Transylvania, and there is a record of its occurrence in central Asia Minor, where it was gathered by Kotschy in November, 1859. It produces, in great abundance, large, rich, bright lilac flowers, the inner surface feathered with numerous, dark purple, much branched lines from base to summit of segments. It multiplies rapidly by cormlets formed at the base of the old corms, as many as a dozen to each.

C. pulchellus follows the last very closely, and may be readily mistaken for *C. zonatus*, the color of their flowers being very similar. It usually begins to flower about the middle of September, and in mild autumns continues to flower until near Christmas; outer segments self-colored, on outside pale lilac, the inner surface faintly marked with purple lines, the anthers white, stigmata orange. There is also a rare white variety. Native of the Bosphorus, where it is found in heathy thickets.

C. Asturicus and *C. Clusii* are very nearly allied, both having purple flowers and leaves appearing at flowering-time.

C. ochroleucus, a charming little white flowered species, flowering from about the middle of October to December; creamy white with bright yellow throat; from northern Palestine and Syria.

C. medius is one of the most delightful of the autumn Crocus, producing abundantly large, bright purple flowers, with huge spreading masses of bright scarlet stigmata, very hardy and increasing rapidly. It is found on the Riviera, at Mentone, etc.

C. longiflorus is a very neat species; the flowers are lilac veined purple, the stigmata nearly entire and of a bright scarlet. It increases very rapidly. A native of southern Europe.

C. Salzmanni has varied purple flowers, and *C. lævigatus* creamy color striped purple flowers. *C. Cambessedesii*, the flowering season of which varies under cultivation from October to April, has pale buff flowers with purple featherings on the outside. *C. serotinus*, *C. Hadriaticus*, *C. cancellatus* and lastly *C. sativus* and its numerous very fine varieties, Cartwrightianus, white, with scarlet stigmata, are all effective. These are all in cultivation in English gardens, and are much appreciated. Could a home be found for them in America, where the summer is hotter and the chances of ripening more certain than it is with us, they would be worthy though humble companions to your Michaelmas Daisies and other late autumn-flowering plants.

Kew.

D. Dewar.

Notes on Forcing.

THIS is an important part of the winter work of gardeners, and preparation for it now demands attention so that the stock may be ready for an early start and a proper rotation. And although, in the forcing of Dutch bulbs, Lilies-of-the-Valley, etc., to which attention is now invited, the details are familiar to most plant-growers, yet it may be of benefit to some novices to have a few hints in regard to this interesting, though not specially intricate process. The first essential is to buy good stock—sound, solid bulbs, or large, plump pips, as the case may be—and to store them away in pots, pans or boxes as soon as received, so that a good foundation of roots may be grown by the time the bulbs are required to be brought into heat.

In regard to Lily-of-the-Valley there has been some slight difference of opinion as to where the best roots are produced for forcing, but in my experience those grown in the vicinity of Berlin have proved far superior to any Holland-grown pips, both in size and quality of bloom, and they can also be forced earlier than the latter. For late forcing the difference is not material, though even in that case the German pips usually produce the finest flowers. When grown in pots, the undivided roots or clumps may be used, and, as they generally throw up more leaves in proportion than the selected or separated pips, they are more effective, though the latter offer one advantage in allowing a more regular arrangement of the spikes of bloom, and particularly when the plan used by some of the London market-growers is adopted. This plan is to force the pips in a bench of sand or light soil, over a strong bottom heat to start them, keeping them there until the flowers are almost ready to open, when they are taken up and potted. After keeping them for a day or two, to enable them to overcome the shock, they are sent into market.

The ordinary method of forcing Lily-of-the-Valley for flowers is to pot the pips or box them as soon as received, taking care to keep the points of the shoots well above the surface of the soil. After this a good watering should be given to them, when they should be placed in a cold frame, where it will be found best to cover them at first with a thin layer of long litter, or straw from the manure-heap, and over this to spread from one to two inches of soil; the litter is put on first, so that the pots may be more readily cleaned off afterward when the soil becomes frozen, the straw preventing the soil from sticking to the pips.

On bringing them into the house in which they are to be forced, the boxes should be placed on a bench, to which a steady bottom-heat of from eighty-five to ninety degrees can be applied; and by covering the pips with a layer of sphagnum and enclosing the bench in a sort of box or cover made of sashes, shutters or oiled muslin, as may be most convenient, so as to exclude a portion of the light and at the same time to confine the heat, a more regular temperature can be preserved. By this system the flower-spikes may be sufficiently drawn to stand well above the foliage, though more light should be admitted before the flowers begin to open, else they become thin and flimsy in texture and consequently do not last long. In fact, at this stage they may be taken out of the forcing house and put in a cooler one to harden off and open their flowers. The time occupied in forcing Lily-of-the-Valley on this plan is from twenty-one to twenty-four days, according to the time of the year in which the operation takes place, and it is therefore easy to gauge the time of bringing in fresh instalments of the pips to insure a steady succession of flowers.

Tulips, Hyacinths, Narcissi, etc., for forcing, should be potted as early as possible, and for this purpose good, light, rather sandy loam is preferable, if it contains a fair mixture of manure. In potting the points of the bulbs should be kept well above the surface of the soil. They should then be placed in a frame and buried to a depth of three to four inches in coal ashes, sand or light soil, the ashes being preferable because they are somewhat repellent to earthworms.

After the bulbs are well rooted they may be brought into heat as required, and in the case of the Tulips it is well to shade them enough at first to draw the flower-stems up to a fair length, as otherwise some of the varieties are liable to grow too short in the stem to be effective either for cutting or for decorating.

Hyacinths and many of the Narcissi force easily and do not require much heat; in fact, they are frequently forced underneath the benches in green-houses, from whence they are brought into prominence as the flowers appear.

Holmesburg, Pa.

W. H. Taplin.

Spiræa Kamtschatika, recently described in the *Gardeners' Chronicle* as a new plant, has long been known in American gardens under the provisional name of *Spiræa species*, Japan, of which country it is a native. It has also been called *S. gigantea*, a name which is very appropriate, inasmuch as it is the largest herbaceous species with which we are acquainted. It attains a height of from eight to ten feet, the tall, erect stems being clothed with large palmate foliage, somewhat resembling that of a grape vine. The stem is terminated by a large branching panicle of creamy white flowers. It is stated in the *Gardeners' Chronicle* on the authority of Pallas, that the natives of Kamtschatka eat the young shoots in spring uncooked, also the roots during scarcity of food in winter, while the leaves are used in soup. Be this as it may, the plant is a desirable one to associate with other tall growing subjects, as a background to the flower border, where its distinct appearance arrests attention at once. There is one thing to be borne in mind when planting it, and that is that strong sunshine is liable to scorch the young growth, so that a position in which it can have shade and plenty of moisture at the roots is essential to the success of this gigantic *Spiræa*.

Sternbergia lutea.—This plant, often called *Amaryllis lutea*, has afforded for the past month one of the prettiest bits of color in the garden. The bright yellow flowers resemble the *Crocus* somewhat in general appearance, but they are much larger and of longer duration. The most important feature of the plant is its autumnal flowering. When the ground is covered with fallen leaves it is a particularly pleasing sight to see the bright green foliage and yellow flowers peeping up and braving the frosts that have laid low every other flower. The *Sternbergia* is perfectly hardy here with us when provision is made for throwing off the snow and water in winter. This we do with perfect success by placing a sash over the bed. The foliage dies down early in summer to rest the bulb until early autumn, when growth recommences. Indeed, having had occasion this summer to shift our stock of bulbs, we allowed them to remain for some time in an open box without soil or moisture, and yet flowers were produced and fully expanded before they were planted in the soil. The bulbs are usually the size of those of a *Narcissus* and they should be planted about four inches deep. A cold wet soil in winter should be avoided.

Catasetum Bungeorhizii.—I recently had the pleasure of seeing, in the establishment of Messrs. Siebrecht & Wadley, at New Rochelle, a fine specimen, in bloom, of this finest of recent introductions among Orchids. The plant under note was a particularly fine form, with large cup-shaped flowers of the purest white, broken only by a spot of bright orange in the centre of each. Much has been written and said of this beautiful Orchid, but judging from the specimen we saw it seems impossible to over-praise so fine a novelty. We noticed, also, a batch of *Cypripedium Spicerianum*, which, for size and rude health, left nothing to be desired. This variety and *C. insigne* are in great demand for cut-flower work. *Cattleya Warneri* was represented by several forms strikingly rich in color, and *Oncidium Varicosum* by a number of large branched sprays, which, when grouped with other Orchids and Maidenhair fern, had a charming effect. A number of *Chrysanthemums* from Japan were just unfolding their first flowers, and among them were some new varieties which will no doubt be heard of later on. O.

Passaic, N. J.

Storing Root Crops.—Many roots, like turnips and carrots, can be safely wintered in earth pits, and even apples, if properly treated, can be kept, with little loss, in the same way. The real danger is not from cold, for the frost can always be excluded by a sufficiently thick covering. The danger from heat is much more serious. On this account the roots should not be lifted until the weather is cool, and they should not be placed at once in the pit or root-cellar, but laid in small heaps of four or five bushels and covered lightly with straw. If they remain in this way for a week or so, covered with shutters to protect them when it rains, they can, after the so-called sweating process, be removed to the pit. Even then they should be lightly covered with straw at first and the earth should be applied gradually as the weather grows severe, so that they will remain uniformly cool and escape heating. It is well to place a drain-tile at the top of the cone for a ventilating chimney, and if the crop is large, so that it can be placed in a long windrow, the chimneys should be set about six feet apart. These long piles can be five or six feet wide and from three to four feet high. The trench, or bottom of the pit, need not be more than eight inches below the surface. Of course, no wet, soft or decayed roots should be placed in pit or cellar. Pars-

nips and salsify are better flavored if left in the ground; but it is troublesome to lift them in winter, and, therefore, part of the crop can be placed in a cellar and covered with sandy soil. The tap-roots should never be cut, nor should the tops, especially of beets or salsify, be cut close to the crown. If a root cellar is used, it should be dry, well ventilated, rather dark and kept at a uniform temperature not higher than forty degrees.

Long Island.

C. G.

Prolonging the Tomato Season.—All who are fond of the peculiar flavor of the tomato should know how easily the season of this vegetable may be prolonged. By simply covering the plants with old carpets, or any other convenient fabrics, during nights that threaten frost, the plants may often be kept in a growing condition for days, and even weeks, after unprotected plants have perished. When the nights become very cold, a hot bed frame may be placed over two or three vigorous plants, and covered with sash. The sun shining through the glass at midday will give sufficient heat to mature the fruit quite rapidly. As the last resort, the green fruits may be picked and spread out on a shelf in a chamber, or cellar, where they will ripen slowly for two or three weeks after herbage out-of-doors has been killed by frost. If they do not ripen as rapidly as is desired, the maturity may be hastened by transferring them to a shelf in a warm part of the kitchen.

Experiment Station, Madison, Wis.

E. S. Goff.

Correspondence.

The National Flower.

To the Editor of GARDEN AND FOREST:

Sir.—The interesting communication in GARDEN AND FOREST of the 10th of July, from the pen of Mrs. Van Rensselaer, on "The Choice of a National Flower," effectually disposes of all claims to that honor of the Trailing Arbutus, so sweet and shy; the aggressive Ox-eyed Daisy of the early summer; the too æsthetic Sunflower of the dog days, and the graceful Golden-rod of the fall-time. And the merits of the *Kalmia*, or Mountain Laurel, are so attractively set forth that one is almost convinced that it is in all respects the most suitable floral emblem to share with the great American eagle in decorating our flags and banners, shields and seals, and all other national and official ensigns.

Granting all that has been said in approval of the *Kalmia*, the fact remains that it is generally known, where known at all, by the common name of Laurel, which is also the botanical or scientific name of a large genus of plants not indigenous to our country, among them the *Laurus nobilis*, the Laurel of the ancients. This shrub is a native of the Mediterranean coast, and has been consecrated since time immemorial to priests and sacrifices, heroes and victors in wars and games of skill, and has been celebrated accordingly. To poet, painter and sculptor it still affords inspiration for realistic and conventional emblems and designs. Our Laurel is so called on account of a resemblance of its foliage in shape and evergreen color to this European Laurel, although very dissimilar in flower and quite destitute of odor or beauty in fruit, and very distinct in all its family relations.

Now if our Laurel is selected for the national flower, how are the two celebrated plants of the same name and similar in foliage ever to be distinguished? It would seem that confusion must arise. At this moment an instance is recalled in which a famous American poet mentions the two in the same poem as if they were identical. This is a most serious objection to our Laurel as a national flower. True, it is in some localities known by the undignified name of "Calico-bush," on account of its spotted flowers, and in others as the "Bush Ivy," on account of the similarity between the shining green of its foliage and that of the *Hedera*; again "Spoonwood," for what reason who can tell? But no one would wish to have any of these names substituted for Laurel, even if it could be successfully accomplished, much less the name of "Sheep-poison" or "Lamb-kill," as certain varieties are sometimes called on account of the poisonous qualities that lurk beneath the beauty of their foliage.

All that has been so charmingly said in its favor can, however, be as truly said of the *Magnolia grandiflora*, and added to this are a great majesty and dignity, unexcelled by any tree of the American forest. In the great Bald Eagle as a national emblem we have the king of birds. Why not in flowers choose the acknowledged queen? The blossom of the *Magnolia* is beautiful in color and form, and blessed, to a remarkable degree, with delicious fragrance. The tree is royal in size, almost too symmetrical in outline of foliage, has a handsome,

smooth bark, and dense, large, dark green, thick leaves. It is so distinctive in all its parts as never to lose its identity. Gray describes it as "a noble tree, remarkable for its delightfully fragrant flowers, its thick evergreen leaves, with a shiny, polished, deep green surface above and rusty below."

It is cultivated in all parts of the United States and of Europe where it is hardy, and indeed all over the world where there are parks and gardens, as one of the choicest and most desirable acquisitions. Its stateliness and individuality rival that of the Egyptian Lotus, and it is quite as graceful. It has, as a type or model for artistic variation, all the advantages possessed by the Laurel, in addition to its character and loftiness. No poison lurks beneath its charms, no ignominious common name vulgarizes and offends fastidious taste and feelings. It is seldom spoken of except by its name, *Magnolia*, and even its Indian name, Toola, is melodious. On the contrary, many sentimental associations are connected with it in its native home, and it has been more than once the inspiration of the artist's pencil and the poet's song. Its succession of flowers continues several months in favorable situations, and the flower lasts long after cutting.

Would not its sculptured form, either natural or conventionalized, adorn the triumphal arch or garden gate with equal appropriateness? Would not its pure creamy color against the shining green foliage, its stately grace of carriage, be a royal subject for the painter's canvas and equally embellish the frieze or dado of the columns in the new library, or the border of a one-cent postage stamp?

The inflorescence of the *Kalmia* is in showy umbels, gradually blooming from the centre outward, so that until late in its short season of blossoming a terminal edge of half developed flower-buds adds grace and charm to the cluster; but a solitary blossom is so rarely separated from its companions that it would hardly be recognized except by the close observer.

It is true, perhaps, that an individual flower of the Mountain Laurel, with its sea shell, pearly tints and delicate markings, its perfectly regular and symmetrical five-lobed corolla, with its unvarying flutings and deep dimples that so carefully imprison the ten anthers of the daintily arched filaments, and make it look, as a lady devotee to fancy work expresses it, "as if it had so much work on it," are more exquisitely beautiful and bewildering than the great creamy bowl-shaped blossom of the *Magnolia*, with its smooth, thick, velvety texture, simpler form and less intricate disposition of the numerous stamens and pistils; but it surely has less character, and is less imposing and architectural. Is not the larger flower, which always blooms in solitary grandeur, although less complicated in form, with its conical buds, trinity of sepals, large, broad, smooth petals, with imbricated under edges and narrow clawed bases arranged uniformly around the many quaint stamens and pistils on the long receptacle, each making a fairy cavern filled to overflowing with delicious odors, far better for the designer's use and much more easy to identify than the more intricate and wonderful *Kalmia*?

And if there is any lack of dignity and variety and adaptability for the designer's purposes in the bud and blossom, this is more than made up in the unique egg-shaped fruit, with its overlapping ruby red carpels, each of which, on bursting into perfect maturity, discloses two berry-like seeds attached by spiral threads, making it unusually attractive and offering endless possibilities to the artist.

No one ever saw a noble specimen of this stately tree—which often reaches a height of more than a hundred feet, with its broad spreading lower branches towering in a pyramidal form toward the sky, with tier on tier of its lovely, large, milky blossoms, each well poised against the background of dense dark green, glossy foliage—without pausing to exclaim upon its majesty and grandeur. The only objections that can be seriously brought against it are, perhaps, that the individual flower is too large and rare to be utilized as a badge or personal decoration, and that its distribution over the country is somewhat local. And yet it abounds in a larger section of the country than the Mountain Laurel, and its rarity is one of its charms. Its representation upon flags and banners, frescoes and tiles, shields and escutcheons, monuments and columns, tapestries and draperies of every material, would soon make it as familiar as the great Bald Eagle, of which a living specimen is now a very great novelty.

The bird of freedom was chosen, we are told, for our great seal and coat of arms as an emblem of self-reliance, liberty and strength; and what flower can be named that will so favorably compare with it in representing these same desirable qualities as the *Magnolia*? In making selections from our native flora and fauna, it would seem to strike the interested observer that a comparison would be somewhat like this—the

Trailing *Arbutus* to the pretty bobolink, the graceful Golden-rod to the much loved robin redbreast, the common Ox-eyed Daisy to the blackbird or blue jay, the Sunflower to the æsthetic owl, and the *Kalmia* to the beautiful oriole. But what could be found in the floral world so symbolical of the power and strength, liberty and freedom of the great American Eagle, as the majestic and imposing *Magnolia grandiflora*?

Magnolia grandiflora was among the favorite trees, if not the especial one, of Washington. An imposing specimen over seventy-five feet high, known to have been planted by his own hands, still flourishes at Mount Vernon; and every year since this modern Mecca has been accessible to the public, each fallen petal of its faded blossoms, every glossy leaf of its rich foliage and every seed that drops from its fruit-pods have been carried away as precious souvenirs by the visitors to that hallowed spot.

Would it not be graceful and fitting in these times, when greater fraternity of feeling in all sections of the country is desired, for the north to take conspicuous part in adopting for the national floral emblem this queen of our southern forests?

Washington, D. C.

Mary Fuller.

[*Magnolia grandiflora* is not only the most beautiful tree of our Atlantic forests, but it is one of the most beautiful known anywhere. Its comparatively restricted range—for it grows naturally only in a narrow belt of country on the south Atlantic and Gulf coasts—might be used as an argument against the adoption of this *Magnolia* as the national flower. *Magnolia*, moreover, is not American exclusively, and there are rather more species in eastern Asia than in America, where, with a single exception (*Magnolia glauca*), they are confined to the southern states and to Mexico. The range of *Kalmia*—an exclusively North American genus—is wider than that of all our *Magnolias*, being found from Canada to Texas; and it is certainly much better known to the great mass of the American people than any *Magnolia*. The objection which can be made to it as a national flower is that it is not found in the Rocky Mountains or in any part of the country west of them.—Ed.]

Correspondence.

Chrysanthemums at Orange, New Jersey.

To the Editor of GARDEN AND FOREST:

Sir.—Mr. T. H. Spaulding's Chrysanthemum-houses at Llewellyn Park, New Jersey, at present contain a very large and interesting collection of flowers, and are well worth inspection. Visiting this establishment a few days since, I found the early varieties already cut over and marketed, and the mid-season kinds in full bloom. Of the new American introductions for 1889, it was a pleasure to note an unusual number of valuable additions. Mrs. Hardy was in excellent form, though small, from late obtained stock. Mrs. Carnegie was the same bold, dark colored flower shown last year, but this variety evidently does not enjoy close air or confinement. Mrs. W. K. Harris was a disappointment, as seen here, and not equal to H. Cannell, which it resembles. Excellent (Waterer), a most charming soft pink; Sunnyside (Craig), reflexed flushed pink, a grand flower; T. C. Price (Waterer), cream pink; Mrs. Jessie Henszey (Harris), canary; Mrs. A. C. Burpee (Craig), reflexed yellow, and Mrs. S. Houston (Waterer), white, were the pick of the Philadelphia varieties of 1889.

Of Fewkes' set, Neesima, Lincoln and Kioto, yellow, Empress of Japan (Belle Hickey), fine white incurved, and L. B. Bird, are all acquisitions. Mrs. Fottler has not fulfilled its promise.

S. B. Dana, a "brunette," is a market variety, an early, free bloomer of distinct color. Henderson's Mrs. Humphreys, small white, and Harris' Snowball, are synonymous. Baronald is in the way of Moseman, but more full. Geo. Atkinson, fine white; Llewellyn, Indian red, thin but distinct; Mrs. William Barr, wide petals, deep red with blue-red reverse, comprise the best of Spaulding's set seen.

The English kinds, as usual, comprise some good novelties. Sunflower is one of the best of the new yellows, an immense flower of light appearance. Mrs. Walters, a sport from Edward Audiguer, and one of the darkest of Chrysanthemums, is a first-rate sort of largest size. Mrs. F. Jameson, a brunette, and Stanstead White, of peculiarly neat form, are all promising, though on weak plants they were not in first-rate form. Mrs. Haggas is the latest sport from Mrs. Heale, a charming, soft

yellow Chinese incurved. Violet Tomlin, a sport from Princess of Wales of the same section, has fine form, but is of that distressing color known by florists as violet-rose. C. Orchard, after the fashion of Mrs. Wheeler, is an exhibition flower of largest size. Mrs. J. Wright, a large, deep and graceful white, is a first-rate addition, and one of the best of the season.

The French still produce annually a great number of fancy kinds, many of which, if poorly grown, can scarcely be distinguished from each other, but every year adds a few very good ones. The most promising here are Madame Edouard Lefort (Del.), a very deep maroon, with gold reverse and ends of petals laciniated and laced with gold, in the way of Macaulay; M. Bourignon (Del.), a purple-red reflexed, silver centre; Compte de Mun (Del.), cream and white; F. Marrouch (Aud.), yellow; M. J. N. Pigmy (Aud.), a white Soliel Levant; Madame Lay (Aud.), carmine-rose; M. Bernard (Brt.), violet-amaranth.

Mr. Spaulding has a great number of seedlings, the most promising of which has been named Ada Spaulding, a very solid sphere of white, shading to pink on the lower petals. The effect of a well grown flower is that of a large Pæony, though it is well incurved and belongs to the Japanese section, not being so closely imbricated as the typical Chinese. As grown here, the second season, in all forms, it appears to be a variety of great merit. This flower was awarded the Harrison Cup at Indianapolis, November 5th, as the best American seedling not yet introduced.

E. G. Hill, a fine yellow, flamed with red on its lower petals, will be fine if it retains its character. I fancied, among a great number, Cyclone, a white R. Crawford; 770, a bronze copy of same, 789, a very full Mrs. Wheeler; and Zenobia, a large white with wide petals. It would be interesting to know if, among original species from which our hybrids have been obtained, there is a scented one. Otherwise it is difficult to account for the appearance of an occasional variety with a decided perfume. A little lemon colored Pompon seedling here has a most pronounced odor, in the heat of the sun quite overpowering. Mr. Spaulding has fixed a white sport of Mrs. Gerard, which he has named Marie Ward, a most exquisite flower of distinct form. I noticed here one feature of very great interest to growers—the culture of the main crop in wooden boxes six feet long, a foot wide and a foot deep, such as are used by Rose-growers. Six plants were grown in each box, and were in excellent condition. Of course, such boxes require much less care and are less expensive than pots, more rapidly shifted into the houses, and in every way more convenient when the plants are grown for cut flowers for market in large quantities.

Orange, N. J.

G.

Recent Publications.

The Genus *Masdevallia*.

A Manual of Orchidaceous Plants Cultivated Under Glass in Great Britain, by Messrs. James Veitch & Sons, Chelsea.

A fifth part of this very useful work has just been issued, and is devoted to those charming little plants, the *Masdevallias*, and a few closely allied genera. Few other groups have increased so rapidly during recent years, and the available information is so widely scattered that the work will be welcomed by cultivators and others. And it is not too much to say that the same high standard of excellence which has characterized the early parts of this work is here fully maintained.

Masdevallia was established by Ruiz & Pavon, toward the end of the eighteenth century, for a single Peruvian species, which, strangely enough, is unknown to modern science. In 1832 Lindley enumerated three species in his "Genera and Species of Orchidaceous Plants," and thirty years later the number had only increased to thirty-six. At the present time, through the discoveries of travelers on the upper slopes of the Andes, 125 species is said not to be an exaggerated estimate of the numbers. Some of these are not in cultivation, and others have but little claim to be cultivated for ornament; but we notice that the selection given by Messrs. Veitch numbers some sixty species, exclusive of hybrids.

A large amount of useful and interesting information is given as to the homes of these plants and the conditions under which they grow, and from it the following is condensed: *Masdevallias* are alpine plants, having their homes on the mountains of tropical America. They grow in a variety of situations—on the ground, in the crevices of rocks, on the trunks and branches of trees, and even on the roofs of buildings, but always where there is but little soil, or where there is but a small accumulation of vegetable matter. They first appear on the Peruvian Andes, about the fifteenth parallel of latitude, and extend as far as the mountains of south Mexico, being most numerous in New Granada; while a few outlying species are found in

the mountains of Brazil and Guiana. Some of them occur within the *Odontoglossum* zone, but usually they are found at a higher elevation and above the limits of the forests. In round numbers, they may be said to occur between the elevations of 6,000 and 13,000 feet, a few of them ascending to near the snow line. In these elevated regions the *Masdevallias* live under very different climatic conditions from those under which they are cultivated in Great Britain, owing to the greater rarity of the air, its diminished capacity for absorbing aqueous vapor, and other local causes; nevertheless, their culture is not attended with any special difficulties.

Several features of interest present themselves on glancing through the work. Take *Masdevallia Chimara*, for example, where we note that no less than six Reichenbachian species are reduced as varieties of one polymorphic species. Seven varieties are admitted, but we read that "there are other *Chimæra* forms in cultivation, named and unnamed, so intermediate in character that they may with equal right be referred to either of the two between which they stand."

"The habitat of *Masdevallia Chimara* is restricted to a comparatively small area on the western Cordillera of New Granada, extending from Frontino, near Antioquia, to a few miles southward of that town. Its vertical range is from 4,500 to 6,500 feet; it grows chiefly on trees and shrubs, preferring the forks of the branches, where there is a small accumulation of decaying vegetable matter, and where there is shade and moisture. In those localities in which *M. Chimara* is most abundant the atmosphere is always at or near the saturation point, and fogs and mists are almost of daily occurrence for more than nine months of the year; but at the higher limits of its range, where these hygrometric conditions are less pronounced, the plants are much less vigorous, but flower more freely; the leaves are swollen and more leathery, the flower-scapes shorter and erect, and the flowers are smaller in all their parts."

Masdevallia coccinea, "a charming thing, with flowers as red as a soldier's coat," is a name which has been floating through the books like a ghost, without any one knowing what it really stood for, and consequently we read with interest that the plant has been identified, and is none other than *M. Lindenii*; of which *M. Harryana* is supposed to be only a variety. The confusion seems to have arisen through the true plant being first confounded with *Masdevallia militaris*, and then with *M. ignea*, and those who would read the history of this confusion should refer to the pages of the *Gardeners' Chronicle* for August 31st last, where the matter was sifted by Mr. Rolfe, of Kew. And so it appears we must write *M. coccinea* for this showy species, whose flowers vary from a deep, rich crimson-purple, through magenta-crimson, crimson-scarlet, scarlet, orange and yellow to cream white.

"Its principal locality," we are told, "is on the eastern Cordillera, between Sogamosa and Concepcion, where its vertical range is 7,000 to 10,000 feet; it is particularly abundant on that part of the Cordillera called the Sierra Nevada de Chita, where it spreads in uninterrupted masses for miles, covering acres upon acres of the upland slopes, growing in the partial shade afforded by the low shrubs that abound in the place. When in bloom these masses of *Masdevallia* present one of the most striking floral sights it is possible to behold, even in tropical lands."

These extracts will afford a glimpse of the valuable information to be found in the pages of the work. One of the illustrations calls for a remark—and, by the way, the same or a very similar one has appeared in the pages of the *Gardeners' Chronicle*. It is *M. racemosa*, with fourteen flowers, all expanded at the same time, and as three is the highest number seen in cultivation, we cannot but think some mistake has been made. The raceme certainly goes on lengthening and producing new flowers, but these are borne in succession, not synchronously. We recently saw a dried specimen which had been carefully glued to a sheet of paper, and which exhibited all the flowers of the raceme expanded at once; but the most cursory examination showed that the flowers had all been carefully attached to an old raceme. The moral is self-evident.

Notes.

Mr. C. L. Allen sends to this office a fruit of the Chinese Quince weighing considerably more than a pound. The flesh is dry, bitter and puckery, but the odor of the fruit is delightful.

A new Veitchian hybrid *Cypripedium*, not yet in commerce, to be called T. B. Haywood, is now flowering for the first time in America, in Mr. Ames' garden at North Easton. It hardly seems very distinct, or superior to many of its predecessors.

Lydia W. Shattuck, who recently died at an advanced age, had been teacher of botany in Mount Holyoke Seminary for no less than forty-one years. To the interest attracted by her teaching was largely due the founding of Williston Hall and its scientific collections.

In the article entitled "A Destructive Cornel Saw-fly," on page 521 of this volume, at the fourth line of the second column, the phrase "in the imperfect and mature stages" should be transposed so as to read "which, in the imperfect and mature stages, attacked and destroyed many larvæ."

A new variegated form of the east Asian Hercules' Club (*Aralia Chinensis*), the leaves broadly blotched with yellow, in the exhibit of the Associated Nurserymen of Boskopp, will be prized by people who are interested in plants with abnormally colored foliage—a class with which our gardens seem already sufficiently supplied.

A correspondent in California sends us a specimen of cork two inches thick, taken from a Cork Oak planted at San Gabriel twenty-eight years ago. The specimen is a part of the third crop produced by this tree. The prospect that the cultivation of the Cork Oak will become a large and profitable industry in some parts of California is excellent.

Abies subalpina, a native of the forests of the Rocky Mountains, where it is found growing only at high elevations, still remains one of the rarest of the American conifers in cultivation. It may interest the cultivators of such plants to know that a considerable stock of well grown young specimens of this species can be found in Mr. John Waterer's Nursery, Bagshot, England.

A personal letter from the Director of the gardens of the Villa Thuret calls attention to the value of *Lippia canescens* as a permanent lawn plant for California and similar dry regions. This plant spreads by means of prostrate stems, and is not affected by the hot, dry summers of Provence. M. Naudin will distribute a few seeds to Californians who may desire to experiment with it.

Mr. S. B. Parsons writes that no shrub on his grounds excels our native *Itea Virginica* in the splendor of its autumn colors. Even now, after the leaves have fallen from nearly every other shrub, they are still abundant on the *Itea*, and of a solid crimson color. This shrub also has the merit of blooming in late June and July after the mass of shrubs have passed their season of flowers.

Secretary Rusk, in his report just issued, urges upon the government the duty of assuming a more definite supervision over the forests of the country, or, at least, over such forest-areas as are owned by the government, and occupy positions of importance in the regulation of the water-flow and other climatic conditions. At present, he adds, we are without definite knowledge of the extent, location, condition and value, direct or indirect, of the forest property now in the hands of the general government; much less do we know of the forest condition of the country.

Plants of the European Spindle-tree (*Euonymus Europæa*) are remarkably fine this year in the neighborhood of Boston. This species, of which a number of varieties are in cultivation, attains the size of a small tree. It is perfectly hardy, the habit is good, the fruit is abundant and conspicuous, and the leaves late in autumn assume a brilliant scarlet color, which contrasts agreeably with the red and rose-colored fruit. The European tree far excels its American relatives in the brilliancy of its autumn coloring, which, perhaps, is not surpassed by that of any other European plant.

It is not, perhaps, generally known that *Parrotia Persica*, a tall shrub from the Orient, related to our Witch Hazel, is perfectly hardy in the northern states. This plant has long been valued in European gardens for the brilliant yellow tints the foliage assumes in winter, and in this country, even where bright-colored autumn foliage is the rule rather than the exception, *Parrotia* is well worth cultivating for the display of color it makes during the first week of November. There is a second species, *P. Jacquemontiana*, a native of Cashmere, which has probably not been introduced into the United States.

Lincoln Park, in Chicago, contains St. Gaudens' admirable "Lincoln," and not far away from it stands Mr. Boyle's group of Indian figures called "The Alarm," an interesting if somewhat immature work, far above the average of the figures which people our eastern parks. To these has recently been added a third statue, said to possess unusual artistic merit. It

was given by the Honorable Lambert Tree, formerly our minister to Belgium, and was executed by the Belgian sculptor, Jacques de Lalaine. It represents La Salle. The figure is bronze, of heroic size, and shows the explorer in travel-worn garments, standing with one foot on the prostrate trunk of a tree and gazing earnestly toward the south-west.

Gardeners rarely select herbaceous plants on account of the autumn colors of their foliage, and there are not many plants which belong to this class which are distinguished in this particular. A notable exception is the Japanese *Lysimachia clethroides*, the leaves of which are colored during the first ten days of November bright orange and scarlet. This is a handsome and a perfectly hardy plant, well worth a place, too, in the garden for its long, one-sided, curved spikes of white flowers, which are nearly half an inch across. It grows to a height of two to three feet, and its only drawback is that it grows too vigorously and spreads too rapidly by its underground stems. It is not easy to eradicate it from a garden when it is once fairly established.

All the monstrosities in the way of "floral decorations" with which our pleasure-grounds are deformed, we too commonly credit to the gardener in charge, forgetting that he is employed by others, and may possibly but execute their definite biddings. According to a letter in the *American Architect and Building News*, great injustice is done to one executive at least. Speaking of Jackson Park he says: "Here Garfield, made entirely of Cacti, reposed one year; here the lamented Jumbo, made of exactly the same material as the President, bristles each summer; and not far off, a gentleman on a bicycle, a loving couple in a boat, a sun-dial, a calendar, etc., bloom and flourish. The head gardener has very recently published a protest in an agricultural paper against these abominations; but how can he dispense with them when people enjoy them, children cry for them, and the Park Commissioners insist on having them?" Undoubtedly the same influences control many other parks all over the country, and it is time that the gardener should be relieved of a portion of the obloquy and that the public should be told where the responsibility rests.

Robert Douglas & Sons, of Waukegan, Illinois, have just signed a contract with Mr. George Vanderbilt to make a plantation of trees on his estate near Ashville, in North Carolina. About 1,000 acres are to be planted eventually, although the present contract is for not less than 300 acres, to be planted within twenty-four months. Twelve hundred trees are to be planted to the acre, the planters agreeing to cultivate them during two years, and to deliver at the end of that time not less than 1,100 trees to the acre. White Pines (*Pinus Strobus*) are to be planted principally, with four per cent. of Douglas Fir, as an experiment, and a few deciduous trees will be mixed through the conifers. Plants from twelve to eighteen inches high will be used. Mr. Douglas, who is on the ground giving his personal supervision to preparing the ground, proposes to plant fifty or a hundred acres this autumn for the purpose of testing the possibility of late autumn planting. Mr. Vanderbilt's experiment is an important one, and will be watched with interest. This is, without doubt, the first attempt at tree-planting on so large a scale which has been made in the southern states.

Monsieur André describes in a recent number of the *Revue Horticole* the new hybrid, *Hypericum Moserianum*, which attracted much attention this summer at the Paris Exposition, where it was one of the most interesting of the newer hardy plants shown. It was obtained by Monsieur Moser, of Versailles, by crossing *Hypericum patulum* with *H. calycinum*. The hybrid unites the qualities of the two parents and is considered superior to them both. It is a shrub three to four and a half feet high, with numerous upright branches gracefully arching above the middle. They are round, at first red, but eventually turn green, and are covered with opposite, entire, subsessile, oval, obtuse, opaque leaves, which are dark green above, paler and glaucous on the lower surface, and from one to two inches long by half an inch wide. The inflorescence is terminal, simple, or with three flowers which are an inch across, with a spreading, slightly cup-shaped corolla, of bright, clear yellow, concave petals, and purple stamens. The hybrid might be described as a tall growing, large flowered *Hypericum patulum*, resembling *H. calycinum* in the size of its flowers and in the texture and arrangement of the foliage. *Hypericum Moserianum*, if it proves hardy in this country, as there is every reason to believe that it may, will make an interesting and valuable addition to our list of hardy summer-blooming shrubs.

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The Chrysanthemum.

THE celebration in England, and in several countries on the continent, of the hundredth anniversary of the introduction of the Chrysanthemum into European gardens, is one of the most interesting horticultural events of the year. It can hardly be said that these festal ceremonies have done or will do much to kindle the enthusiasm of Chrysanthemum growers, for the simple reason that the ardor of their devotion is already a proverb, and it could hardly be more fervent. Thirty-five years ago an eminent horticultural authority declared that the passion for Chrysanthemums had become a mania in the British Islands; and certainly the zeal of English horticulturists in this direction has known no languor since. But this centennial commemoration has really done much to stimulate historical research. All the records of the century have been ransacked for facts and illustrations that will throw any light upon the origin and development of the flower, and, after the elaborate treatment of the subject by the horticultural press and the publication of the papers read at the Chiswick conference, little will be left untold of the history of the Chrysanthemum since its invasion of Europe a hundred years ago—or should we say two hundred years ago? The *Gardeners' Magazine*, which is the earliest of English horticultural journals to issue a centennial number—and an admirable number it is—repeats the quotation from Jacob Breynius in the “*Prodromus Plantarum Rariorum*,” a work published in 1689, in which six varieties of the Chrysanthemum are described as cultivated in Holland at that time; and who knows for how long a period before? There is little doubt, however, that these flowers were subsequently lost to Dutch gardens. At least when the large flowering Chinese Chrysanthemum was re-introduced a century later, the gardeners of Holland knew nothing of it.

But the Chrysanthemum has a long history as a cultivated flower in the gardens of Asia before it was introduced to European civilization, whatever may be the exact date of its advent there. In northern and central China it has been grown with rare skill from the earliest times of which that ancient race has any authentic record. The well-

known dish in the Franks' collection in the British Museum, decorated with this flower, is more than 450 years old, and in Japan it was wrought on the hilts of imperial swords forged seven centuries ago. But there is an earlier history still, of which no record exists in porcelain or bronze, and many a botanist would rather be able to identify the wild species from which the Chrysanthemum originated than to be familiar with all its garden history.

Glancing for a moment at the history of the Chrysanthemum in Europe, one is struck by the remarkable series of surprises which have occurred at intervals to revive or increase the popular interest in its cultivation. Of the three plants introduced a century ago, a purple one alone survived, and its value as an autumn flower was at once appreciated. Rose colored and buff flowers appeared a few years later, followed by the quilled yellow, the Spanish brown and the large lilac, and soon a white sport from the purple variety revealed the variable character of the plant and aroused the eagerness of collectors, so that during the first twenty years of this century it already ranked among the most popular of garden flowers. About the end of this period, striking novelties in form and color were imported, until fifty well-tested varieties were found in English gardens. None of these could win a first premium in an exhibition now, but many of them had wonderful beauty of form, and, judging from the illustrations then published, they were characterized by a wayward grace in the disposition of the long florets which in recent times would be attributed to a mixture of Japanese blood. Meantime the Chrysanthemum, under the sunny skies of France, had been ripening seed, and ardent admirers of the flower began to raise seedlings. Growers in Jersey soon followed, and even in England, where a sunless climate made the ripening of seeds a difficult matter, some seedlings were raised; and in 1835 appeared, among others, the variety known as Nonpareil, which is still grown and exhibited. The introduction of the Pompon class in 1846 was another distinct advance, and Chusan Daisies, as these flowers were called, at once became reigning favorites in France. The great exhibitions began in the middle of the century, and since then the evolution of the flower has been closely watched by enthusiasts in its culture in all the temperate climates of the globe. Varieties which did not bloom until late in spring were followed by precocious kinds, which flowered in August, until the year was almost girdled with Chrysanthemums. Then came Mr. Fortune's notable introduction of the Japanese varieties. These were contemptuously received by the old school of florists because they failed to conform to the rigorous standard of perfection. But of the seven original importations five are still common in gardens, while Golden Dragon and Grandiflorum retain their position in the foremost rank of exhibition flowers.

But the prime value of these introductions from Japanese gardens was not revealed until they proved their potency as parent plants in the hands of the hybridizer. Colors have been intensified until we can reasonably hope for a clear crimson, and cultural surprises in the matter of form and habit have signalized almost every exhibition season. The latest astonishment came two years ago, when the Mrs. Hardy bloomed in Boston, and this year a flower with the same downy pubescence, but a different color, has been found in a Japanese importation by Mr. Peter Henderson. What will be the next surprise? The blue flower, reputed as hiding somewhere among the temples of the East, is no doubt a myth. But was the painting of a climbing Chrysanthemum seen by Mr. Molyneux a product of the imagination only? Can anything be hoped from an infusion of the blood of any of the wild varieties, especially from that of some ancestral type? Such a return to original sources might restore the vigor of constitution which pampering for many generations has impaired. Time alone can answer these questions; but we may rest assured that whatever changes may come, the Chrysanthemum will retain its hold upon popular affection.

In American gardens the Chrysanthemum has long been

a reigning favorite, and American gardeners can claim a fair share of credit in developing its beauties. Our climate offers exceptional advantages for the production of seedlings, and the names of Dr. H. P. Walcott, W. K. Harris, John Thorpe and T. H. Spaulding will always be honorably associated with the history of the plant. Enthusiastic cultivators of *Chrysanthemums* were confined, a few years ago, to the more eastern states; but they are multiplying all over the country, and perhaps the finest collection of flowers ever seen in America was exhibited at the late show in Indianapolis. That popular appreciation of our flower is not on the wane is evident from the fact that the best *Chrysanthemum* blooms have been selling in the New York market at five and six dollars a dozen, and in one instance which has lately come to our knowledge, twenty-five flowers were sold by the grower for twenty-five dollars.

Among the Pines of Northern Michigan.—I.

THE southern peninsula of Michigan has no mountains nor very high hills nor any rocky surface worth speaking of within its borders. There are hills, plenty of lakes, and a fair proportion of swamps and marshes. The streams are usually slow in the north, and naturally clear, but the largest ones are often made muddy by the logs floating down to the mills.

White Pine once extended to a line running nearly west from the foot of Lake Huron. Probably nine-tenths of the merchantable Pine has now been removed. This has been taken nearly clean from the southern part of its former limits and in the vicinity of large streams. The lumberman has chased the Pines, Hemlocks and Cedars back from the streams and railroads over the hills, and when too remote for convenient transportation, he has constructed new railroads into the heart of the timber. It is a rare thing to see a good forest near a railroad.

Where the soil was of good quality much of the stump land has been cleared and converted into farms, but where the soil was poorest much of it still remains nearly as it was when the lumberman left for new conquests. It is no longer thought necessary to depend on a river to float logs to market. As proof of this, Mr. Potts has constructed a railroad along the Au Sable River to Lake Huron, on which he transports logs to his large mills. He avoids losses, saves time and money, by abandoning the old slow process of employing a boom company to take charge of his logs while passing down the river.

The attention of one riding for the first time along any of the railroads of northern Michigan is sure to be arrested by the dead standing or fallen Pines, mostly small and slender, or knotty and forked at the top; trees left because there was no money in them. If recently abandoned and killed by spreading fires, the bark still covers the trunks, and most of the limbs are there; if abandoned and killed some years before, the bark has fallen, leaving a smooth trunk, which reveals every unevenness in the surface, and the ends of many limbs have broken off and fallen. The period of lumbering is indicated by the signs above mentioned, as well as by the size of the young growth which is covering the ground. The small young trees and the shrubs still standing, though dead, often tell of the destructive sweep of one, two, three or more fires since the largest trees were cut and removed.

Three to six weeks in each summer of the past two years spent in traveling in the northern half of the lower peninsula has made me somewhat familiar with this portion of Michigan. The experiment station of the Agricultural College is testing a few acres of Jack Pine plains in five different counties of the state. In connection with this work, I take great interest in studying the native plants with reference to species, distribution, modes of growth and adaptability to cultivation. In new ground, roughly cultivated, and sown to Grasses or Clovers for two years, the increased vigor of some of the herbaceous perennials has been very noticeable.

A large Hemlock near the margins of a recently cleared forest does not give much indication of the genuine grace and beauty of a young tree well grown in an open space. The trunk is nearly cylindrical till we come to limbs near the top, which tapers rapidly to the apex. The limbs leave the trunk at a very wide angle. Dead Hemlocks present a peculiar picturesque and rugged appearance not easily forgotten. In the swamps, or near them, are many Balsam Firs, some of them with long, dense, conical tops. The Spruces are slender, with branches slanting downward quite rapidly and curving outward at the ends.

The Arbor-vitæ or White Cedar is everywhere in the swamps and varies much in appearance. In autumn we see the dead or dying fan-shaped branches and leaves among those of more recent growth, which are green. Every one has an idea of the shape of the trunk of a well grown White Cedar, as they are almost the only trees used here for telegraph poles. Very large trunks are sometimes seen, where trees have not been much crowded and where the soil and climate are suitable. We measured one at three feet from the ground, with a diameter of four feet and four inches. It tapered very rapidly, and was not much higher than some of the larger telegraph poles in large cities. The tree stands near Kingsley, in the south-eastern part of Grand Traverse County.

The Norway Pine, as it is always called by lumbermen in Michigan, is the Red Pine (*Pinus resinosa*, Ait.). It is abundant on the sandy lands above referred to, sometimes scattered here and there in open places among the Jack Pines, or occasionally found in large groves in which there are but few other trees, and so thick that underbrush is very scanty. A low tree, with a large top, as found in open places, makes a rapid growth, consequently has much sap-wood. They are called Black Norways by lumbermen, and are considered of little value. Tall trees, where they have been crowded, have small tops, and long, naked, straight trunks. These are called Yellow Norways, as most of the wood is heart-wood and yellow. The bark is not in vertical folds or ridges, as is familiar in the White Oak and Tulip tree, but comes off in irregular patches or scales from an inch to three inches in diameter. The bark is dull red in color. The top is more nearly like that of the Austrian Pine than that of any other tree in general cultivation. It has a healthy, sturdy look, and in every respect, so far as observed, is a much finer ornamental tree than the Austrian Pine. The seeds are not abundant, hence young trees are not often raised and put on the market. The trunks are extensively used for flooring, bridges, timbers for frames of houses and piles. In Kalkaska County I measured a sound stump three feet and three inches in diameter, though most of the logs cut at the mills would not exceed a foot and a half in diameter.

Across the Jack Pine plains, in many places, teams may be driven almost anywhere. A road soon becomes worn and cuts into the sand. A new road is easily made by cutting a few trees and bushes, or, perhaps, with no outlay of labor. Roads are cheap and abundant, running everywhere, often confusing the stranger, as he may not know whether this is a highway or a road leading to a camp or a small farm-house. These winding roads, in open places through the valleys and around or over the gentle hills among the Jack Pines and scarlet rocks, are often very pleasant, though in time they become monotonous to the traveler.

Agricultural College, Mich.

W. J. Beal.

Hardy Shrubs with Ornamental Fruit.

A FEW notes on the appearance of certain shrubs in this region may be of interest to eastern readers.

Rhamnus Caroliniana, as it grows in the grounds of the Agricultural College here, is a neat, tree-like shrub of five feet in height. The broadly lanceolate, recurved leaves are three to five inches long, shining dark green. The foliage alone would render it highly ornamental, but with the added attraction of its load of brightly colored fruit it becomes one of the most desirable specimen shrubs for the lawn. The fruit is a three-seeded, globose drupe, the size of a small cherry, borne in simple panicles of three to six in the axils of the leaves. About the 1st of August these take on a color too deep for scarlet and yet not crimson, the effect of which, in contrast with the dark polished leaves, is wholly pleasing. This color is maintained till the last of September, when they ripen to a waxy black.

The next botanical order affords two attractive plants which are abundant in the wooded ravines of eastern Kansas and as far west as the Solomon Valley. These are the Wahoo and the Bitter Sweet.

The Wahoo or Burning Bush, *Euonymus atropurpureus*, is found in thickets along the borders of timber, growing to the height of six or eight feet—a perfect miniature tree. The odd little velvety, dark brown blossoms will be noticed only by the real lover of trees and woods; but the brilliant coloring of the autumn fruit challenges the admiration of every passer. The outer coating of the fruit is pale crimson, showing, as it opens, the seeds encased in a deep scarlet aril. The European Wahoo, growing in our trial rows, has fruit a little smaller, with the seed enclosed in an orange aril.

The closely allied Bitter Sweet, *Celastrus scandens*, twines so closely with the branches of its supporter that the rambler

among the trees is constantly startled with the vision of sober, gray Elms and Oaks bearing drooping panicles of orange and scarlet fruit. These plants may be procured in abundance to adorn the humblest yard, while they would not be out of place on the most elaborate grounds.

The eastern Snowberry, *Symphoricarpos racemosus*, has not proved as thrifty a grower with us as in its native haunts; but some plants which I rooted under glass last winter have made a growth of two feet since they were planted out, and are bent to the ground with their weight of snowy white berries. Its more western cousin, the Coralberry, *S. vulgaris*, is so much of a nuisance along roadsides and in pasture lots that its long, slender stems, covered with the currant-like crimson berries, seldom get credit for the beauty they possess. This little shrub would be valuable for planting on embankments or other places where needed to hold the soil, as well as to hide an unsightly place.

The Wolfberry, *S. occidentalis*, is found abundantly on the head waters of the Solomon River and is equally as hardy as the last. It is more stiff and erect in habit, and the fruit, a trifle larger, is white. Neither of these should be planted where their propensity for sprouting from the roots can do harm.

Two Privets growing in our nursery-rows seem worthy of mention in this list.

Ligustrum buxifolium bears an abundance of berries in erect, close heads, several often branching from one stem, the terminal one being the larger. The other is represented by a single unnamed bush. This bears larger berries in a loose, raceme-like cluster, which becomes so heavy that it weighs down the slender stem, making it almost pendulous. These shiny black bunches are so numerous that the plant is a very pretty sight. Specimens of this I referred to Professor Sargent last year and he regarded it as a large fruited variety of *Ligustrum vulgare*.

The Black Alder of the Prinos division of Ilex, *I. verticillata*, thrives well in our trial rows, and those plants which fruit bear a heavy annual crop of the brilliant scarlet berries which make them so ornamental in autumn and early winter. The leaves are dull and without much beauty in our climate, but they fall early, thus better displaying the wealth of fruit.

A specimen or two of this, placed where their bright color is thrown into relief by some dark background, makes a pretty picture.

S. C. Mason.

Manhattan, Kan.

Holiday Notes in Southern France and Northern Italy.—V.

LAKE Como, in the opinion of many the most beautiful of the north Italian lakes, is enclosed by an amphitheatre of mountains, some of which rise to a height of 7,000 feet. Olive groves and terraced vineyards occupy a large portion of the lower slopes, and Chestnuts and Walnuts ascend to the very crests of the lower mountains wherever soil enough for them is to be found. Large Fig-trees are a feature near the villas by the edge of the lake; in vases along the walls of several villa gardens we noticed the scarlet flowered *Russelia juncea*, and in the shrubberies a number of ornamental woody plants which have already been mentioned in these papers. Como itself, the capital of the province, is a quaint town; it contains many large silk factories. It is interesting, too, as being the birthplace of both the elder and the younger Pliny, and of the electrician, Volta, whose statue occupies a prominent position near the quay.

From Menaggio a narrow gauge railway runs to Porlezza, at the north-eastern extremity of the Lake of Lugano. The highest point of the line is upward of 600 feet above the Lake of Como, beautiful views of which are obtained from the windows of the carriage. The journey by steamboat from Porlezza to Lugano—the largest and busiest town in the Swiss canton of Ticino—is a delightful one; in our opinion the scenery is more picturesque than on the Lake of Como, that of the eastern arm of the Lugano Lake being wild and deserted. On the lower slopes the vegetation seems nearly the same on both lakes.

In the pleasant garden of the Hotel du Parc, at Lugano, on the site of the suppressed monastery of San Maria degli Angioli, the following notes were made: *Buddleia Lindleyana*, with drooping inflorescences eighteen inches long, here attained a height of ten feet, and formed graceful, floriferous bushes; in most nurseries it is another species, *B. Japonica*, Hemsley, which passes under this name. The latter plant, too, has been a good deal confused in gardens, botanical and private, and numerous figures and descriptions of it have appeared in horticultural publica-

tions under the name of *B. curviflora*, W. & A., an appellation which rightly belongs to quite a different plant. Bushes of *Deutzia gracilis*, six feet high, surpassed in size and vigor any we had previously seen; the season's shoots measured about four feet in length. Even when cultivated with every care in Britain this charming shrub is a pigmy compared with the Swiss specimens just mentioned. Beds of Indian Azaleas well set with buds gave promise of a fine show of flowers; large bushes of Moutan Pæonies made us "covet and desire other men's goods." *Viburnum Awafuki* (according to Laval-lée's list identical with *V. odoratissimum*) excited our admiration. One bush formed a beautiful cone about fifteen feet high, and its large, leathery, glossy leaves of the darkest green made a fine foil for the cymes of coral-red fruits. The deliciously scented but inconspicuous blossoms of *Osmanthus fragrans* appealed strongly to the sense of smell and led to our discovering the plants. The Chinese are said to use the flowers for scenting tea. *Magnolia* (or rather *Michelia*) *fuscata* thrives well at Lugano—a mass of them in flower would be almost overpoweringly sweet. As an edging (and a capital one too) for shady walks and also as a sort of turf covering to the bare ground under the dense shade of trees, *Fluggea Japonica* was successfully employed. This pretty little plant, with its dark green, grassy leaves and blue berries, is frequently called *Convallaria Japonica* in English nursery-lists, and also *Herbe aux turquoises* in French ones; there being not many things which thrive under these conditions, it seems desirable to call special attention to the merits of this plant.

Beau-Séjour, a dependence of the Hotel du Parc, has a still finer garden. There we noticed fine *Arundinarias*, twenty feet high, *Osmanthus fragrans*, eight feet high and as much through, and *Abelia rupestris*, of still larger size, literally covered with flowers. Cherry Laurels, trained into an arch, made a delightfully cool and shady approach along one side of the front garden from the gateway to the hotel. The more spacious grounds behind the hotel rise rapidly and many beautiful plants were noted. On a sunny wall fruiting Citrons were very attractive, also Oranges laden with fruit. In the border at the foot of the same wall was a large bush of a white flowered Abutilon and another of *Eupatorium odoratum*, which by Christmas will be a mass of scented white flower-heads. A huge tree of the Yulan, *Magnolia conspicua*, a fine tree of *M. macrophylla*, about forty feet in height, and a large *M. grandiflora*, were the most remarkable of the flowering trees. *Edgeworthia chrysantha*, eight feet high by about ten feet through, profusely set with flowers, was conspicuous with its fine foliage; even under glass in England we cannot get this handsome Indian plant to thrive so well. *Benthamia fragifera* (the genus *Benthamia* is now merged by Bentham and Hooker into *Cornus*), another Himalayan shrub or small tree, of considerable beauty and interest, was as much at home here as in the warm, equable climate of Cornwall; the white-bracted flower-heads, like those of *Cornus florida* on a smaller scale, are showy, and the fruits, when ripe, are not unlike a strawberry. Camellias, Azaleas and Hydrangeas were represented by fine bushes, and *Chimonanthus fragrans* by the largest specimen we had ever seen. Photinias and the Loquat (*Eriobotrya Japonica*) were also good, as was also a very large plant of *Aesculus macrostachya*. *Elæagnus glabra*, a handsome Japanese evergreen, occurred as a climber; its long sarmentose shoots had wound themselves in among the branches of a cluster of Pines and had attained a height of about forty feet. In this part of the world this species makes one of the best of hedge plants.

American Vines made excellent arbors in the gardens of the cafés, hotels, etc., facing the lake, and the enormous crop of grapes borne by them could not fail to attract a good deal of attention among the cultivators in a district where Vines are everywhere grown. Here and there *Vitis vinifera* was used for shade, but for vigor and free-bearing qualities it compared most unfavorably with the American species; we learned, on inquiry, that these latter are now used extensively as stocks whereon to graft the more delicate Old World varieties, and that Phylloxera, the great curse of many European Vine-growing countries, is, by this means, to a considerable extent checked. In southern France we saw many establishments specially founded for the propagation and sale of American Vines.

At Ponte Tresa, where we leave the lake and take train to Luino, the railway is a narrow gauge adhesion line and commands magnificent views. For some distance the line follows the valley of the Tresa, a picturesque mountain torrent which here forms the boundary between Switzerland and Italy, and numbers of Italian custom-house officers, armed with carbines, patrolled the banks to prevent smuggling.

Kew.

George Nicholson.

New or Little Known Plants.

A New Winter-blooming Begonia.

(Begonia Triomphe de Lemoine.)

THIS hybrid Begonia, of which a portrait of the original plant appears on page 557, is a novelty which has received much attention in Europe during the past year. It is very free flowering; it remains in flower for months, and it can be grown and flowered, apparently, with very little trouble. The habit of the plant, as our illustration shows, is excellent. The foliage is good, and the flowers are brilliant, recalling in color those of *Impatiens Sullani*.

We are indebted to Monsieur Lemoine, to whose skill in hybridizing we owe this handsome plant, for the following note regarding it, and for the photograph from which our illustration has been prepared.

"The new Begonia was obtained by impregnating the flowers of *Begonia Socotrana* during the winter of 1887-88 with pollen from another species, probably *B. Razlii*. The flowers of *B. Socotrana* had been fertilized by a number of species, but only a single cross was successful. Whether the pollen-parent was *B. Razlii* or not, the seedling in less than a year formed a mass of foliage sixteen inches high by twenty-eight inches in diameter. The hybrid may be described as follows:

"The stems are herbaceous, spreading, then erect and branching into numerous flowering branches. The leaves are large, coriaceous, orbicular, rather oblique; the margins slightly cinereous; six inches in diameter; those at the base of the stem much the largest. The flowers are produced in dichotomous cymes from the axils of the leaves. The male flowers, with four petals, measure one and a half inches across, and are rose-carmine in color, the buds being rather brighter carmine before the flowers expand. The female flowers are exceedingly rare. More than 600 flowers have been open on the plant at the same time, and it has been so covered with bloom as to resemble an immense bouquet.

"This Begonia budded the 1st of December, 1888, and the first flowers opened toward the middle of January. It was still covered with flowers in the month of May, when it was exhibited at the Paris Exhibition, and excited the admiration of every one who saw it.

"The plants should be plunged out-of-doors during the summer, and grown in a cool house during the autumn and winter."

Nancy.

V. Lemoine.

Viburnum Sieboldii.

THIS handsome plant is a native of Japan, and was first described by Miquel from specimens gathered by Von Siebold in 1861.* Here, in cultivation, it is a stout shrub with spreading and finally with upright branches six or ten feet high and covered with smooth, ashy-gray bark. The leaves which appear early in May are, when fully grown, three and a half to five inches long by an inch and a half wide, and are borne on stout petioles, an inch and a half long; they are oval or obovate, sharply and remotely serrate towards the extremity only, with prominent midrib and primary veins. The lower surface, young shoots and buds are covered thickly with rusty-brown hairs, which are scattered also over the upper surface of the leaves. These at maturity are dark green and lustrous on the upper, and paler on the lower surface. The flowers with truncate calyx-limb and rotate corolla, are creamy white, and produced in flat, rather few-flowered cymes, terminating the branches. The fruit is black, half an inch long, with nearly triangular seeds conspicuously grooved on the back. The leaves when bruised and the wood possess, even more strongly, the peculiar disagreeable odor of our native *V. Lentago*. The flowers open here during the first week of June and the fruit ripens in September, at which time the plant is particularly ornamental, the stout branches of the abundant cymes having turned bright scarlet.

* *Viburnum Sieboldii*, Miquel *Prodr. Flor. Jap.*, 155.—Maximowicz, *Mel. Biol.* x., 660.

Viburnum Sieboldii, according to Maximowicz, is not a rare plant in its native country, being found along streams at the foot of the mountains in dense woods. It was introduced into cultivation through Mr. S. B. Parsons of the Flushing Nurseries, to whom American gardens are indebted for so many fine Japanese plants. He sent it to the Arboretum several years ago, and has propagated it largely. It is perfectly hardy, flowers freely every year, and requires no special soil or care.

C. S. S.

Plant Note.

Myrica rubra.

THIS is a comparatively newly discovered Japanese evergreen. It is a fruit tree, producing a highly flavored edible fruit, an inch in length by three-quarters of an inch in diameter, and in shape resembling a Blackberry. It is firm and contains a single seed of light weight. The fruit is dark red, almost black, but there is also a light rose colored variety the fruit of which is said to be sweeter than that of the one first mentioned, although it is not quite so large. The fruit ripens in Japan in the early part of July and can be used for many purposes. It is now used as a dessert, and is sometimes preserved. The extracted juice can be used as a beverage in its fresh state, and by slight fermentation produces a delicious wine. The foliage resembles that of a small leaved evergreen Magnolia, and is firm and leathery. The tree is ornamental, and its bark can be used to make a dye of a beautiful fawn color. It is not a very hardy tree, but will succeed well in a climate where the Fahrenheit thermometer does not fall below 20°, and where the summer is sufficiently hot.

I think it would thrive in the southern part of California, in all the southern states of the United States, in Central America, Mexico, Italy, Spain, and the southern part of France. It is questionable whether it would succeed in England, Germany, and in the northern states of America; certainly not without very adequate protection during the winter.

The propagation of *Myrica rubra* will be best accomplished through its seed, as the wood is too hard for cuttings.

The growth of the tree is rather slow, but if planted extensively it will pay well in time, as the trees not only will produce a delicious fruit in abundance, but will yield also a fine bark, which can be used for dyeing purposes, and a splendid timber showing a mottled grain better than the best Maple. The wood is light, tough and lasting, and is now used in Japan for fine cabinet work.

The seed should be sown in a light loamy soil, and placed on bottom heat if obtainable. The seed should be shaded with boards if possible, otherwise with a thick mulching of straw or other vegetable matter about a foot deep. Seeds must not be exposed to the sun's rays or to too much light.

Plants are at present very scarce, as the Japanese have not sufficiently appreciated the beauties of this tree to properly propagate it, but seeds can be collected.

Louis Boehmer, in *The Garden*.

Cultural Department.

Bromelias.

ANY one who is acquainted with the variety of form and beauty of colors which are characteristic of a large number of the *Bromeliaceæ* cannot easily comprehend the want of interest shown in these plants by horticulturists generally. Fashion reigns in horticulture as in many other things, and fashion having decided against Bromelias, they are scarcely known in gardens—always, of course, excepting that king of fruits, the Pine-apple. The late Professor Edward Morren, of Liege, who was not only the botanist of the order, but loved and cultivated the living plants as well, had the richest collection of species known. For their accommodation he had specially constructed houses, in which the requirements, real or supposed, of Bromelias were as carefully provided as is done for Orchids by their admirers now. I had the pleasure of seeing this collection when it was at its best, and it struck me then as being not only unique in character, but exceptional also in the interest and charm of the plants themselves. Huddled together, or, as is too often the case, placed in an out-of-the-way corner and neglected, Bromelias have a woeful aspect which is scarcely calculated to make people admire them. But when properly cultivated and arranged with taste and care, a collection of these plants forms a really fine feature.

In their vegetative characters, time of flowering, duration of the flowering season, as well as in the form, size and colors of their flowers, Bromelias are quite as varied as Orchids. There is, of course, a great difference between the two families, yet as plants of decorative value Bromelias are almost equal to Orchids. To persons who have learned to despise the former from having seen a few ill-grown examples, such as are often met with, this may sound like heresy. Unfortunately I cannot say, go to Liege and be converted, as when Professor Morren died the plants were sold, a large number of them having been purchased for Kew. But there are good collections of Bromelias in many continental gardens; Makoy & Co., of Liege, have an exceptionally large and rich nursery collection. In addition, they have also a private collection of these plants, kept solely for their own enjoyment, and not for trade purposes, a fact which speaks for itself. At Kew the collection of Bromelias is the richest by far ever seen in England. There are always a good many kinds in flower, and it is remarkable how many visitors take an interest

considerable, so many of the genera of this order being largely represented in gardens, and, as is usually the case, their history and nomenclature were all in confusion until Mr. Baker's book made all things plain. It is very agreeable news to bulb fanciers to hear that Mr. Baker will soon issue a similar handbook on *Irideæ*. The allied order, *Liliaceæ*, he dealt with some years ago in the *Journal of the Linnean Society*. In the interests of horticulture an appeal might be made to Mr. Baker to give us a handbook of *Liliaceæ*, uniform with that on the *Amaryllis* order. The *Linnean Journal* is not easily accessible to gardeners. At any rate some of the principal horticultural genera of *Liliaceæ* might be dealt with in this way. Gratitude displays itself by asking for more!

The Bromelia book contains descriptions of over 800 species, or more than double the number estimated by Bentham as recently as 1883, and this number will, Mr. Baker thinks, fall far short of what will ultimately be found.

The number of genera admitted is thirty-one. These are divided into three tribes. (1.) *Bromeliæ*; ovary inferior, fruit



Fig. 144.—*Begonia Triomphe de Lemoine*.—See page 556.

in and admire them. Still, fashion rules. No one has taken a fancy to Bromelias and horticulture loses in consequence. Fifty years ago hardly any one grew Orchids. It was not until the Duke of Devonshire, on seeing *Oncidium Papilio* in flower at Chiswick, was so struck with its beauty that he determined to build houses for and collect them, that the cultivation of Orchids received any attention from amateurs. The Duke set the fashion, which, once started, grew rapidly. Orchids deserve all their popularity; Bromelias deserve a great deal more than they enjoy.

Mr. John Gilbert Baker, of the Herbarium Kew, has been for many years identified with this family. Whilst Morren lived Mr. Baker was content to be thought second to him in a knowledge of Bromelias. Now, however, Baker is the only acknowledged authority, and his title to be considered so is unmistakably shown in the "Handbook of Bromeliaceæ" which he has just published.* The book is uniform with those already published by him on the "Fern-Allies" and the "Amaryllideæ." The value of the latter to horticulturists is

indehiscent. (2.) *Pitcairniæ*; fruit a three-valved capsule, seeds not funicled. (3.) *Tillandsiæ*; fruit a three-valved capsule, superior, seeds funicled. A considerable proportion of the genera are unrepresented in gardens, having apparently small claims to beauty. Of the genera cultivated or worth cultivating, the following are the largest in number of species and the most striking in floral characters:

KARATUS.—(Thirty-six species.) These are mostly robust plants with long ensiform, channeled, prickly edged leaves; flowers arranged in a large dense globose head and surrounded by bracts and leaves which are often very brilliant in color. In large tropical houses they are most effective. At Kew when in flower they attract great attention, and even when not in bloom they are ornamental.

CRYPTANTHUS.—(Twelve species.) These are usually remarkable for their prettily variegated leaves. *C. bivittatus*, *C. Makoyanus*, *C. Lubbersianus*, *C. zonatus* and *C. Bueckeri* are delightful little foliage plants, easily cultivated and always attractive. The flowers of this genus are white and not ornamental.

* George Bell & Sons, York Street, Covent Garden. Price, five shillings.

ÆCHMEA.—(One hundred and twenty-eight species.) Over thirty of these are grown at Kew, some being of large size, others small. The flowers are sometimes in a dense head, which nestles down in the middle of the rosette of leaves; in these the leaves are most attractive, the upper ones being almost wholly deep crimson or purple or spotted. Other species have a long panicle inflorescence, with red leaves and bracts scattered along it. They are, as a rule, very ornamental.

BILLBERGIA.—(Thirty-six species.) This genus is best of all in a garden sense. The leaves are usually folded, forming a sort of vase, and in some of the species they are prettily variegated. The inflorescence is in the form of a dense or lax spike, or sometimes a large branching panicle. It is clothed with large boat-shaped, brilliantly colored bracts, especially towards the top. The flowers are tubular, conspicuous, nearly always bright colored. Every one of the species deserves to rank with first-class flowering stove plants.

PITCAIRNEA.—(One hundred and thirty species.) This genus, also, is rich in good flowering plants. The leaves and habit are variable, but as a rule they are grassy, graceful, bright green, and in a large tuft. The flowers are on erect or arching panicles; they are numerous, tubular, large enough to make a display, and nearly always very bright in color, namely, scarlet, crimson, yellow or blue. Several species previously known as Puyas are included here, such as *P. carulea*, a truly beautiful plant, with flowers on a large, stout, erect panicle, each flower almost as large as a *Lapageria* and colored a rich peacock blue. This and several others Mr. Baker has seen fit to call Pitcairneas.

PUYA.—(Fourteen species.) The giants of the order belong to this genus. The leaves are long, rigid, armed with sharp teeth, and the flowers, which are usually two inches, or even more, long, are produced in profusion on very stout, erect spikes. One described has flower stems thirty-three and one-half feet high, the flowers disposed in panicles and reckoned at not less than 8,000! There are some magnificent life-size paintings of several Puyas in the North gallery at Kew.

CARAGUATA.—(Thirty-nine species.) Handsome, stemless plants, *Tillandsia*-like in habit and foliage, the two genera differing only in the former having a gamopetalous corolla. The flowers are on erect spikes, sometimes in a globose head, crowned with a tuft of usually bright colored small leaves. The lower part of the spike is often clothed with bright scarlet bract-leaves. The species in cultivation are very ornamental. *C. lingulata*, *C. sanguinea*, *C. Tahnii* and *C. musaica* are fairly well known among stove plants.

TILLANDSIA.—(Three hundred and twenty-three species.) This genus now includes *Vriesia*. It is very variable in size and beauty, but a large number of handsome garden plants are among those already introduced to cultivation. The leaves are unarmed, in some species prettily varied or variegated, *i. e.*, *T. hieroglyphica*, *T. fenestralis*, *T. tessellata*; in others they are of a uniform brown or pale plum color, *i. e.*, *T. amethystina*, *T. angustifolia*. The flowers are brilliant in color in all the *Vriesia* section, bright yellow and scarlet or crimson predominating. In *T. Lindenii* and its variety *Vira* they are of quite exceptional beauty. *T. regina* is of very large proportions, almost as large as a Century plant.

Enough, I think, has been said to show that the order is all that is claimed for it here, and Mr. Baker's book is exactly what was wanted to give a correct idea of the horticultural merit of many of the Bromeliads at present known.

Kew.

W. Watson.

Figs in the South.

THE Fig succeeds on any kind of land in the South, clay or sand, high or low, hummock or Pine, and requires little or no cultivation. It comes early into bearing, only two years from the cutting, is easy of propagation, and may be trained to tree shape and growth by allowing only one shoot or stem to the root. The chief obstacle to drying the fruit in the sun in Florida is that the ripening occurs during the periodic wet season. It begins to ripen about the first of July for the general crop, and fruit has been obtained from the cutting the first year.

The varieties that have given the best satisfaction in this state are the White Adriatic and White Smyrna, which are very choice for drying or table use; Celestial, very sweet, small and a prolific bearer; Black Ischia, a bluish black variety of good quality, and the Brown Turkey, another prolific bearer.

These situations best suited for the Fig-orchard are those which have a northern exposure, which will serve as a sort of protection from the cold. If a southern exposure is selected, the young trees will take on such a rapid growth during winter

that a sudden frost will kill them while in the sappy state. A northern exposure keeps back this growth, and makes the young shoots strong enough to resist the ordinary attacks of frost. As we come farther north, in Georgia and the Carolinas, where the frosts are heavier, this precaution is needed all the more. The frost does not easily kill the trees, but it sets them back in their growth, and prevents the maturing of good crops of fruit.

The fig is destined to become an important fruit in the South, and when better methods of drying them for the market are observed the imported fruit will be driven out of the market as completely as Mediterranean oranges, lemons and other tropical fruits have been in the past. Fig culture for profit has not, so far, obtained much success in this country, but many are now going into the business for money. Experiments were made last year in several parts of the south in placing green figs upon the northern markets. The success of the enterprises seems to have justified the growers in their expectations of a profitable business, and larger groves have been planted since.

The figs are sold in any kind of condition, often being put up in old pickle jars or bottles of different sizes. This is very different from the nicely packed, pressed and dried fruit that comes from the Mediterranean, with the trade-mark and label of the growers marked fancifully on the box covers. In order to compete successfully with the imported fruit, it is necessary to have the fruit properly prepared, and neatly put up, according to rule, in a regular preserving factory. Fresh figs could also be sent north as well as the dried fruit, and there is no doubt but the demand for them will be great.

Fig-trees do the best when planted in rows about fifteen feet apart each way. The fields are marked off in squares, and holes dug for the cuttings, or young trees, to be put in. The cuttings consist of twigs of last year's wood, which are buried in the ground about six inches from the surface. The cuttings can be taken off and planted in a trench until early spring, when the Fig trees are beginning to put out their leaves. When the trees get very large every alternate one can be taken out, often with the best results. There is little cultivation needed after the trees once get a start. *George B. Walsh.*

New York.

The Flower-Garden in Autumn.

THE time to protect the flower borders has now arrived, and preparation should at once be made for this work before the advent of severe frost, for although this may be delayed for some weeks, yet everything should be ready for it. We often observe elaborate directions about "cleaning up," but some gardeners carry their worship of the idol of cleanliness too far. We should never forget the necessity of leaving on the plants just that natural form of protection which they duly provide for themselves—that is, dead leaves and flower stalks. An example or two will illustrate my meaning, and the rest can be left to the judgment. Many gardeners, for the sake of appearance, in fall cut off all ripened foliage from such plants as *Iris laevigata*. Now, we have proved to our satisfaction that this is highly injurious, as frost and melted snow make use of the opportunity to get down into the very hearts of the plants, and the inevitable result is that next season one waits in vain for the reappearance in their accustomed vigor of the young shoots, and when they do come they are liable during the earlier stages of their growth to be injured by late spring frosts if deprived of their natural protection. *Eulalia Japonica*, and its varieties, are plants that are generally regarded as of doubtful hardiness, and we confess to having lifted them every fall during the past two seasons. However, we have taken notice of a large circular bed of this Grass at a neighboring railroad-station which thrives amazingly year after year, by no means on account of the attention given to it, but simply because it is left alone until the time for tidying up in spring, and then the tops are cut off. Meanwhile some of our own plants, left out, with their tops cut off and carefully covered with soil, were completely killed, not one surviving. Another instance of mistaken zeal is the removal of the dead flowering stems of Lilies. These, of all other plants, are susceptible to injury from moisture in winter, and when the stems are removed an excellent passage for water is made straight to the centre of the bulbs, and decay is the inevitable result. Nature has tried to enforce this lesson upon us by the tenacity with which the perfectly lifeless stems cling to the living bulbs until the young shoots are prepared to take their place in spring, after which the old stems are easily removed. Many other instances might be cited, but the judgment of the cultivator may be relied upon to furnish them for himself. The

object in view while writing this is to point out that, while "cleanliness is next to godliness," it is by no means the best practice to remove every vestige of dead leaves and flower stems from the flower-garden while protecting the flowers against the ravages of a winter's frost. *E. O. Orpet.*

Passaic, N. J.

Palms for Small Places.

WHEREVER a green-house, if only a small one, is found in connection with an American garden a *Latania* or two at least is likely to be found, and yet there seems, in some quarters, a lack of positive knowledge as to the most suitable species and varieties of Palms to be grown in places having only

with their glaucous under surfaces, making it one of the most ornamental and effective plants in cultivation, either for the green-house or on the dinner-table. This plant is a native of South America, and grows best in a stove temperature. It does not require heavy watering at the root, at least during the winter, but enjoys copious syringing overhead in bright weather.

Next in merit to this, perhaps, on the ground of general utility, though of very different appearance, are the different kinds of *Rhapis*, an elegant and very distinct family of Palms, from Japan and China. Palms of this genus are dwarf growers, of bushy habit, throwing up numerous cane-like stems, well clothed with shining, dark green, flabellate



Fig. 145.—*Viburnum Sieboldii*.—See page 556.

limited accommodations. In the minds of many persons, a Palm is always associated with spacious and lofty conservatories, and although it is true that ample room is needed for the best development of many species, this is by no means a general rule.

Perhaps, therefore, it will be worth while to invite attention to a few of the many species well adapted to more modest quarters—that is, to those of comparatively dwarf habit and of easy cultivation.

At the head of the list of miniature Palms should be placed *Cocos Weddelliana*, the dwarf Cocoanut, one of the most graceful of Palms, its delicate, pinnate leaves of dark green,

leaves, which are very tough in texture and capable of withstanding much hard usage.

R. flabelliformis is adapted to a variety of uses, and is equally effective for house-decoration, for the conservatory or for sub-tropical bedding in the summer, and it will thrive under green-house treatment. A prettily variegated form of this is also in cultivation, but is more rare and also more delicate, and is therefore not to be recommended for general use. *R. humilis* is also an excellent variety, somewhat similar in general appearance to *R. flabelliformis*, but having longer leaflets, which are gracefully arched.

Among the Fan Palms, probably the hardiest and most

easily procured (with the exception of *Livistonia Chinensis*) of the dwarf growers are found among the *Chamærops*, a genus widely distributed. Probably the best known of them are *C. Fortunei* and *C. humilis*, the latter being a native of southern Europe; and although it has been known to reach a height of twenty feet, yet it may be considered a dwarf plant, from the fact that it takes a number of years before it forms any trunk, and its growth is always slow.

Another handsome plant well suited to our purpose is *Livistonia australis*, formerly known as *Corypha australis*, a sturdy grower, and capable of bearing great changes of atmosphere without much injury. This also belongs to the Fan-leaved section, and, though of slow growth, it is highly ornamental, and will flourish in a temperature of fifty degrees; and is useful as an out-door plant in the summer.

Where a stove temperature can be afforded them, some of the *Calamus* will be found a welcome addition to the collection, being very graceful in habit and comparatively rapid in growth. They are mostly natives of the East Indies, and are of slender form, bearing long, light green, pinnate leaves, the foot-stalks of which are all more or less clothed with long brown or black spines. Among the most beautiful varieties of this genus are *C. palembanicus*, *C. adspersus* and *C. hystrix*, and a compost of two-thirds sandy loam to one of peat will be found a good one for them. *Calamus* should be given an abundant supply of water and a moist atmosphere, as when allowed to become too dry they are liable to an attack of red spider.

The *Chamædoreas* are another useful class of small growing Palms, some varieties of which are very well known, being easy to grow and not very particular as to their surroundings, provided they receive plenty of water and a reasonable degree of heat. They have been mostly introduced from Mexico and Central America, and have pinnate, or occasionally entire leaves, light green in color. An interesting feature of most of the varieties of this species are the flower-spikes, which are freely produced from the axils of the leaves even in small plants, the inflorescence being usually either orange or red. Probably the best known variety of the *Chamædoreas* is *C. elegans*, with its graceful pinnate leaves from two to four feet long. *C. Ernesti-Augusti* is one of the best representatives of the entire-leaved section of these plants. It has handsome foliage about two to three feet in length, deeply cut at the apex into two sharp pointed lobes. Other notably good varieties of this genus are *C. graminifolius*, *C. Sartorii* and *C. Wendlandii*.

Of course, such a general favorite as *Areca lutescens* is indispensable in any collection of Palms, and is too well known to need further reference in this connection.

In this brief enumeration of Palms suitable for small establishments, no attempt has been made to offer explicit directions in regard to treatment; but it may be said that no Palm should be allowed to become very dry at the root at any period of its growth, and with reasonable care in ventilating, heating and shading in summer any of the sorts mentioned may be kept in fair condition.

Holmesburg, Pa.

W. H. Taplin.

Orchid Notes.

Odontoglossum grande.—Dr. Lindley, when he described this fine *Odontoglossum*, for the first time, in the *Botanical Register*, would probably have found it difficult to find a more appropriate specific name than "grande" for it—a name to which it does full justice by the great size and conspicuous beauty of its flowers, which mark it as one of the very finest species of the group to which it belongs. Nowadays good specimens may be obtained at a very modest price, which appears a mere trifle when compared with the enormous sums which were willingly paid for this plant several years ago, when the culture of Orchids was a rage with the most wealthy only.

O. grande may be said to celebrate its jubilee of cultivation this year, for it was just fifty years ago that it was first introduced by Mr. George Ure Skinner from the shady ravines of Guatemala. It seems to be confined to this region, notwithstanding the fact that the traveler, Warscewicz, sent a specimen to Professor Reichenbach labeled as having been found in Costa Rica.

The chief characteristics of this fine species are its ovoid, compressed, dull green pseudo-bulbs, which, when young, are encased in strong greenish sheaths. Generally two oblong-lanceolate leaves, about six inches long, are borne on the summit of each pseudo-bulb. They are grayish green above, paler beneath, often copiously spotted with brown and distinctly traversed by curvilinear veins. The erect spikes, bearing from five to eight flowers, which often measure seven inches

across, are produced when the growth is about half over. The oblong, acute sepals are bright yellow, transversely barred with glossy cinnamon-brown, and the broader petals are of deep, shiny cinnamon-brown, except at the tips and margins, which are bright yellow. The sub-orbicular lip is, as a rule, whitish, and more or less densely covered with brownish red blotches, while the bifurcated crest is rich orange-yellow, blotched with cinnamon, and the bright yellow column is furnished with a rather large pubescent wing on each side. Some hundreds of plants have been in flower here since the beginning of September, and now, in the first days of November, there are still several in bloom.

O. grande is not hard to grow. In its native country it inhabits damp, shady places where the temperature ranges from sixty to seventy degrees Fahr. during the summer and a minimum of about twenty degrees lower in the winter. The plants should, therefore, be grown in a house whose summer temperature conforms as near as possible to that of their natural condition. When growing, water may be freely given, but when the plants have finished both growing and flowering—that is, about November—the supply should be much decreased and the plants allowed to rest for about three months with as little water as possible. The usual compost of rough peat and sphagnum in conjunction with well drained pots seem to be most suitable for this species.

St. Albans, England.

John Weathers.

Arachnanthes (Vanda) Cathcartii.—This interesting Orchid is very seldom seen in bloom, and is by no means plentiful. The growth is peculiar, scrambling, with a slender, woody stem, clothed with distichous, pale green, fleshy leaves, about seven inches long and two broad. The pendent racemes springing from the side of the stem bear four or five flowers about three inches across. In color these are white on the outside, while the interior is yellow, banded with reddish brown. The lip is divided into three lobes, the two lateral ones being white, streaked with red at the base, and the middle lobe whitish, with a yellow, crenate, incurved border. *A. Cathcartii* was introduced from the Himalayas in 1864, and grows freely in the East India house with the usual *Vanda* treatment, but should have a good exposure to sunlight with accompanying dryness after growth is finished to induce it to flower freely.

Saccolabium bigibbum, a rare and attractive little plant, is now flowering freely here. Its greatest disadvantage is the extreme shortness of its raceme, which seldom exceeds two inches, and, when more than a dozen fair sized flowers are crowded in this short space, many of them remain hidden between the leaves. The flowers are very pretty, with yellow sepals and petals, and a saccate, triangular white lip, with beautifully fringed edges and a yellow centre. It is a compact growing plant, with bright green leathery leaves about six inches long, growing and flowering very freely when accorded the usual warm-house treatment. It lasts a long time in bloom, and should be grown in a basket, to show its flowers to full advantage.

Kenwood, N. Y.

F. Goldring.

Melothria punctata.—This is a delicate and graceful plant of the Cucumber family, sometimes known as *Bryonia punctata*, and in gardens more frequently as *Pilogyne suavis*. It was discovered a century ago at the Cape of Good Hope, and is now known to be widely distributed in Africa as far north as Abyssinia. I saw it this year used with excellent effect covering the tubs of large standard plants in Herr Borsig's beautiful city garden in Berlin; and once I have seen it used to form the delicate festoons of living green the Germans are so fond of carrying along the borders of their garden walks. But it is evidently much less used now in Germany than it was twenty or thirty years ago, for a correspondent of *The Gardeners' Chronicle*, writing in 1861 about *Pilogyne suavis*, says: "It is universally employed in Germany and Belgium for hiding the bare stems of standard Roses and making little festoons between them, and for any similar purpose. As it is a very neat and pretty plant, not inclined to become a rampant grower, it is particularly adapted for this purpose; and it has become so great a favorite there that it is found in every garden."

"The treatment that *Pilogyne* requires is as simple as could well be desired. In autumn a few cuttings are struck and kept in store pots in a warm green-house through the winter. In the spring they are potted off. If there is not a sufficient number, a stock can soon be obtained, for they strike as readily as *Verbenas*; they are hardened off with the bedding plants, and as soon as the weather permits planted wherever they may be required. They need but little further

attention; a string being placed where the festoon is required, the plants attach themselves to it and very soon produce a rope of verdure. This plant has yet another good quality to recommend it; in the evening, or after a shower of rain, it emits a very pleasant, faint, musk-like perfume."

The leaves are rough to the touch on the upper surface, five-lobed, one or one and a half inches in diameter, and bright green. The flowers are small and quite inconspicuous, and as only the male plant is known, apparently, in cultivation, it never produces fruit. It is for its foliage, therefore, that this *Melothria* is used, and it is certainly well suited for making a temporary covering over any unsightly object in the garden. If it is not known in this country, it might be introduced advantageously from Germany. S.

Begonia Socotrana.—Botanically, this is one of the most interesting Begonias known. It was discovered in Socotra in 1880 by Dr. Balfour, who sent tubers of it to Kew, where it flowered the year following. Sir Joseph Hooker, when figuring it in the *Botanical Magazine*, said that "Socotra was one of the last places in the world where a Begonia would have been expected to occur." Horticulturally, it has proved exceptionally valuable, partly from its own merits as a winter-flowering species with remarkable foliage, and handsome, deep rose, large flowers, but chiefly as the parent of a race of Begonias which promise to be as useful for in-door gardening in winter as the progeny of the Andean tuberous species are in summer. I allude, of course, to the several hybrids raised by Messrs. Veitch, and named John Heal, Adonis and Winter Gem. These grow about a foot high, have bright green foliage and rosy crimson flowers, large and numerous enough to make a rich glow in the stove in winter. The most remarkable character in the flowers of these plants is that of keeping fresh several weeks in water, or if left on the plants they last a month or more before withering on the stalks. They do not fall as all other Begonia flowers do. *B. Socotrana* is represented by a large group of plants in the Begonia house at Kew, and it will be attractive until Christmas. The leaves are large, petate, cupped, shining green, and they spring almost upright from a short, fleshy stem. This plant and its offspring go to rest in spring, and start into growth again about July. They should be started and grown in a warm, sunny green-house till the beginning of October, when they require a stove temperature.

Jasminum gracillimum.—This plant ought to be in every collection of stove-plants. It is by far the finest of all the tropical Jasmines, although *J. pubescens*, an old garden plant and a near ally of *J. gracillimum*, is not much its inferior. When first introduced it was grown as a dwarf pot plant, in which form the Messrs. Veitch exhibited it for the first time in 1881. Now, however, it is known to be best when treated as a climber, and when grown against pillars or along rafters in stoves it is seen to great advantage. At Kew it is trained on pillars, and its long shoots hang gracefully all round, each one bearing a large terminal cluster of beautiful white, star-like flowers, one and a quarter inches across and sweet scented. As a basket plant this species also produces a fine effect. It is a native of north Borneo. W.

American-grown Cauliflower Seed.—Last spring two packets of Cauliflower seed, grown at Fidalgo, Washington, were sent to this station for trial. The seed was of the Erfurt and Snowball varieties. It was sown in the open ground on May 14th. In due time the plants were transplanted to the garden, and they have headed better than plants of the same varieties grown in former years from imported seed, and that, too, in spite of an extremely dry autumn. Every plant has either formed a fair-sized head or it gives promise of doing so in a few days. The heads are not large, but that is not surprising, as we have had almost no rain for the past two months. They are neatly formed, and when tied early, to exclude the bright sunshine, are white and of excellent flavor. If the seeds planted in this trial are fair samples of the Cauliflower seed that may be produced in the Puget's Sound region, there are good reasons for believing that we shall soon be able to grow all our own seed of this delicious vegetable.

Two New Squashes.—Last spring Messrs. Vilmorin, Andrieux & Co., of Paris, advertised in their catalogues two new Squashes, under the names Very Early Prolific (*Courge prolifique très hâtive*) and Missions Squash (*Courge des missions*). Like most of the varieties of the Cucurbit family developed in France, these do not appear to have qualities that would commend them in this country. The first is an early Squash, similar to our Dunlap's Marrow and Orange Marrow, but the

fruits are smaller in size and the plants less productive. The second is a winter Squash, the color of the Perfect Gem, or a shade more grayish, and of a form resembling that of our Bay State. The quality is very good, but in our test the plants were quite unproductive, and the fruits were formed so late that few of them attained their size before frost.

Wisconsin Experiment Station.

F. S. Goff.

Correspondence.

Growing Timber Without Knots.

To the Editor of GARDEN AND FOREST:

Sir.—What is the best treatment of Pine-trees in a forest when the lower branches on the trunks are dying? The trees are wanted for timber.

Duluth, Minn.

S.

Your correspondent fails to state whether he has in view particular conditions, to which the information is to be applied, and as a doctor can only prescribe after diagnosis of the special case, the answer can only be general.

To grow timber free of knots, and that means a shaft free from branches, the best plan is to provide for it from the start by keeping the growth densely crowded. Close planting is recommended largely for this reason. The physiological explanation of the effect of dense growth in preventing the formation of branches, or, if formed, in soon killing them, lies in this, that leaves, and dependent upon their activity wood-growth, require for their development and life a certain amount of light. Failing to receive this, no buds are developed, and where the branches that have developed are excluded from the light, or receive insufficient light, they lose first their foliage and then die a natural death. This is the forester's natural method of growing clear timber—by timely management.

As knife and medicine become necessary, where the rules of hygiene have been neglected, so the pruning knife and saw are called into requisition to fit trees for a purpose, for which they were not managed in time. The system of pruning the branches for the purpose of producing clear timber has not, as a rule, proved satisfactory in France, where it was most strenuously advocated and practiced. Dead and dry branches can usually be removed without danger to the tree. In fact, their timely removal by a sharp cut close to the trunk reduces the danger of rot, which is apt to start in the stubs of broken branches. The removal of living or partly dead branches is practiced at the risk of inducing decay, unless done with great care. The open, unprotected wound first dries, then splits open and gapes, water enters, with the spores of fungi, which produce rot, and the disease may spread and ruin the whole shaft. If the tree is in vigorous growth, with a fully developed crown, on a favorable site, it will heal a wound made by the amputation of a branch not thicker than three or four inches by "walling over." Where the conditions are less favorable, it becomes necessary to guard against decay by covering the wound.

To avoid, then, the occurrence of knots in future sawlogs, and to produce trunks free from branches, these must be shaded out when young. Since, however, a full development of the crown is necessary for the full and normal development of the trunk—the trunk being a product of the crown and its mass proportional to it—it is evident that the right time for bringing the growth out of the dense position of its early years to the roomy position which insures proper development of crown and trunk, is an important consideration for the grower of timber. This time occurs when the maximum height-growth has been attained; that is to say, when the trunk proper has grown to nearly its full length and now requires filling out—diameter development—under the full activity of the crown.

According to species and character of site this period varies, and accordingly also the time of first thinning, its recurrence and degree require the judgment of a forester and cannot be briefly formulated.

Thinning out takes place in a dense forest growth sooner or later, more rapidly or more slowly, according to the

species which form it, the soil-conditions and several other factors. Some species, like the Beech, Fir and Spruce, have the capacity to develop their leaves, and vegetate with very little light at their command; others, like Birches, Poplars, Ashes, require much light, and therefore thin out very soon under their own shade, exerted by their crown. The former class, which may be called shade-enduring timbers, can develop in about fifty to seventy-five per cent. of the room which the latter, the light-needing, require for full development. This means that fewer individuals of the latter are allowed to live on a given area than of the former, and the natural cleaning of dead branches takes place much more rapidly, and earlier.

On the better qualities of soil this struggle for existence is brought to a close much sooner than on poorer land and in higher altitudes, where the energy of growth is less vigorous. Therefore, we can say, summarily, that in a normal, natural forest growth, the average room occupied per tree is larger in proportion as the growth is older, the species more light-needing, the soil conditions better and the locality less elevated.

The treatise on pruning forest and ornamental trees, by Des Cars, translated by Professor Sargent, contains all information necessary as to the methods of pruning. Where walling over of the wound is expected, it may be said that if the pruning is done in July rather than in the autumn the healing process will begin the first season, and to some extent the danger of frost to the wound will be avoided. The main point is to cut with a fine-toothed saw as close as possible to the trunk, taking care to make a smooth, uniform cut, and to avoid loosening the bark; this necessitates, in heavy branches, two cuts, the first lopping the branch at a distance from the trunk to relieve the weight. Conifers usually furnish the water-proof coat by the exudation of resin. Deciduous trees require artificial protection by means of coal-tar thinned with turpentine and applied with a brush.

How far pruning may be depended upon to produce timber free from knots is still an open question, and depends on circumstances often beyond our control.

Washington, D. C.

B. E. Fernow.

Ocneria dispar.

To the Editor of GARDEN AND FOREST:

Sir.—In the Boston *Evening Transcript* of October 31st there is an article headed "Save the Trees" giving some account of this European moth, which has become seriously abundant at Medford, Massachusetts. The writer of the article states that the insects were "first noticed three or four years ago. . . . For a while the extent of their work was so limited that not much attention was paid to them, but early last summer their numbers had so increased that much damage was caused."

Although there can be no doubt that the insect will commit serious ravages, if unchecked in any way, the prospect that "a great danger threatens the country unless prompt and effective measures are taken to stamp out the pest" seems remote, when it is known that over twenty years have elapsed since it was accidentally introduced by M. L. Trouvelot, a French naturalist, who made experiments in silk raising near Medford, but whose efforts in this direction were unsuccessful, partly because he also unintentionally imported one of the diseases so fatal to the silk worm. This *Ocneria* (also known under the generic names *Hypogymna* and *Liparis*) is nearly allied to the troublesome tent-caterpillar (*Clisiocampa*), and to the *Orgyia*, which is often so destructive to the foliage of many of our shade trees.

The males and females of the species differ strikingly. The former are small bodied, with dark reddish brown wings, which expand about an inch and a half, and the large bodied females have white or greenish white wings, with black and brown markings. They expand about two and one-half inches.

The egg masses are deposited on the limbs of the plants upon which the caterpillars feed. When fully grown the latter are larger than our common tent-caterpillar (*Clisiocampa*), and are dark in color and sparingly covered with small tufts of long hairs. They are almost omnivorous in their feeding habits and in Europe they eat the foliage of such differing plants as the Apple, Peach, Linden, Azalea, Oak, Larch, Juniper and White Pine.

In the article in the *Transcript* it is stated that the State Board of Agriculture "intends to ask the Legislature for an appropriation sufficient to meet the emergency," and it seems to be expected that a liberal appropriation will exterminate the pest.

Professor Fernald, the Entomologist of the Hatch Experiment Station, is also said to be preparing circulars, illustrated by plates, which "will be sent to all the residents of Medford in order that they may watch for the re-appearance of the pest and co-operate in the work of stamping it out." The outcome of these efforts will be very interesting.

It is, at least, very improbable that every specimen in such a considerable area (about one and a half square miles, according to the article quoted) can be destroyed. The insect has probably come to stay, and, ultimately, the best way to keep it in check, outside of the artificial remedies, may be the importation of the parasites and natural enemies to which it is liable in Europe.

European specimens of the insect in all its stages have been for many years on exhibition at the Zoölogical Museum, at Cambridge, Massachusetts. One of the earliest notices of its introduction occurs in the *American Entomologist*, vol. ii., p. 111 (February, 1870), and the case is also mentioned in Professor Riley's report on the insects of Missouri for the same year.

Cambridge.

Quis.

Exhibitions.

The Chrysanthemum Show at Philadelphia.

GARDENERS complain that this has been a trying year for Chrysanthemums, and yet the collection of plants in Horticultural Hall last week was one of the largest ever shown there, and, beyond question, the best in quality. Not only were the plants exceptionally good, but they were well arranged and displayed. They were not placed in a solid mass, but were separated into two sections by a broad wall of green which ran lengthwise through the middle of the hall. This stretch of green began near the entrance with a remarkable collection of Ferns on a low table, beyond which towered a superb *Cibotium regale*. Then came tall Palms, with branches overarched a mound of rich foliage, while further on, the low tables, covered with Marantas, Dracænas and plants of this class, stretched toward the stage. The bank of Palms across the stage-front, like the Ferns, from the gardens of Mr. A. J. Drexel, were all good examples of choice kinds like *Pritchardia grandis* and *Livistonia Chinensis aurea*. Around the whole the walls were hung with evergreen and autumn leaves, and the galleries were wreathed and festooned with garlands of the same.

All this made an admirable frame and setting for the long double rows of flowering plants on either side of the hall. These were in great variety, including the best known of the old kinds of established reputation and a strong showing of later introductions. Among the plants and cut blooms were examples of some forty kinds which had never been exhibited before. It is worth putting on record, too, that of the plants and flowers, both old and new, which attracted most attention, at least one out of every four, and perhaps a still larger proportion, were originated by Mr. W. K. Harris. Beyond doubt the seedling Chrysanthemums of the first quality which, as the product of Mr. Harris' skill, now enrich our gardens, far outnumber those originated by any other American.

Among the plants the group of twelve, which took the prize for the best collection of that number, displayed wonderful cultural skill. These plants are naturally of different habit and time of blooming, and yet they were all at their very best on this special occasion, and while they had not been tortured into any formal shapes, they were surprisingly even in size and proportion—that is, about three feet high and five feet across, with a fully developed flower, erect on every branchlet. There were better single plants in the room than any individual of this dozen, but every one was a striking specimen, and all were so uniformly vigorous and floriferous that one looking down upon them would find it difficult to point out in what particular any one of them was more satisfactorily grown than another. As a matter for future reference, we give the names of this prize list: Mrs. A. Blanc, Gold, Mrs. Irving Clarke, Miss May Wheeler, Frank Wilcox, Mrs. Frank Thompson, Robert Crawford, Robert Bottomly, Puritan, Grandiflorum, Bride, and W. H. Lincoln. Of these all but three are American seedlings. They were exhibited by James Verner, gardener to A. J. Drexel. Of other plants, one of the most interesting was a specimen of Mrs. William Bowen, carrying about a hundred blooms, with florets of an intense crimson within and bronze reverse. Very striking, too, was a plant of Mrs. Irving Clarke,

with semi-globular flowers of immense size and a delicate pink color. *Kioto*; *Cullingfordii*, unrivaled yet in its deep crimson; *Source d'Or*, of an orange tint which has never yet been duplicated in any other flower, and many more, were shown in almost perfect specimens. By the way, Mr. Verner's collection would have been improved if *Cullingfordii* had been substituted for one of the pink flowers. Five pink varieties are too large a proportion of that color in a dozen *Chrysanthemums*.

Of flowers for the first time shown, Harry E. Weidener, a bright lemon yellow, of the *Grandiflorum* type and perfectly incurved, took the *Blanc* prize. It was raised by William Jamison and shown by Hugh Graham's Sons. The same firm gained an award for a white seedling, incurved, and also of perfect form and immense size. *Crown Prince*, grown by James Monahan, gardener to Mr. Charles Trotter, is an evident improvement on Mrs. Wheeler, much larger and of freer growth. J. T. Emler is in the way of Mrs. Carnegie, and has a better form than that fine flower. *Molly Bawn* is a white sport from the well known *Syringa*—a novel form in a white flower. Thomas A. Edison is very large and valuable for its color—a creamy lilac and quite new. *Eldorado* is of the deepest yellow—a yellow flushed with orange—and Mrs. Trotter is a beautiful flower of a novel lilac shade. John Hughes, gardener to George W. Childs, showed several fine seedlings, a firm white and a delicate rose with pale reverse, both being especially good. Mr. W. H. Graham showed one large, incurved blush white with broad florets, and another of pure white. The flower which won the premium as the best single bloom was Mrs. W. K. Harris, to which the plant prize went last year. It is a large, rich yellow, incurved, very deep, and carrying as many florets, perhaps, as any *Chrysanthemum* in cultivation.

Of many other admirable new flowers, like *Progression*, *Coronet*, E. G. Hill and *Ada Spaulding*, we have no space to speak; but it is to be hoped that by another year the National *Chrysanthemum* Society will be prepared to give certificates to such as merit the distinction. Mr. Peter Henderson's new *Louis Boehmer* would have caused a sensation two years ago, since it is almost an exact reproduction of Mrs. Hardy, except in color, which is called by some a silver rose and by others a rosy lilac. It is not a lively tint, and the pubescence, which is quite as dense as that on Mrs. Hardy, rather dulls than brightens it. The plant is interesting as a new example of downy florets, and it will prove useful to the hybridizer. The cut flowers, as a class, were good, but inferior in quality to the plants. The twelve blooms which took the grand prize were H. Cannell, *Domination*, *Compte de Germiny*, *Kioto*, Lord Byron, Mrs. Frank Thompson, Mrs. Langtry, W. W. Coles, Mrs. W. Barr, *Gloriosum*, E. Molyneux and Mrs. Houston.

Among the principal prize-takers besides those named above, were J. W. Colflesh, Gordon Smirl, F. R. Sykes, Thomas Long, E. P. Wilbur and George L. Fowler.

Philadelphia.

S.

The Chrysanthemum Exhibition in Boston.

THE exhibition of *Chrysanthemums* of the Massachusetts Horticultural Society, which opened in Boston on Tuesday of last week, was the most successful the Society has given. The season has not been a particularly good one for the growth of the *Chrysanthemum* and several of the Massachusetts collections have suffered seriously from the attacks of a species of *Typhlocyba*, closely allied to the Rose-leaf hopper, which, unless some method for keeping it in check can be found, seems destined to interfere seriously with the successful cultivation of this popular plant.

The exhibition, however, in spite of these drawbacks, was surprisingly good, and contained a larger number of well grown plants and of cut specimen flowers than any of its predecessors. The arrangement was good; the lower hall being devoted to cut flowers, while in the larger upper hall the specimens were most effectively arranged in great groups and banks. The exhibition was varied, but hardly improved by the introduction of a number of tall, single stemmed plants with one flower, or, at most, a couple of flowers at the top of the stem. This is the favorite English fashion of growing *Chrysanthemums*, and an unnatural one it is, and not to be encouraged except when abnormally large, single flowers are wanted for exhibition purposes. The tall standard plants, with naked stems five or six feet high and surmounted with a scanty parasol-head bearing occasional tired looking flowers—wonderful examples, no doubt, of cultural patience—were hardly attractive either, and not to be compared, from an ornamental or from a useful point of view, with the compact half specimens, like those with which Mr. Walter Hunnewell took the first prize in the class for twenty named varieties. These were

models of what *Chrysanthemums* should be; compact, well grown plants, with rather short stems, covered to the pot with large, healthy, deep green foliage, and profusely flowered, with blooms not too large to appear unnatural or to lack substance. A better or more even lot of twenty well grown and well selected plants has not been seen in Boston.

The big flowers, however, attracted the masses, and a stand of eighteen cut flowers, of Japanese varieties, shown by Mr. Simpkins, of Yarmouth, was surrounded from morning till night by crowds of people, who learned here, perhaps for the first time, what a *Chrysanthemum* flower, in the hands of a first-rate gardener, can be developed into. The flowers which represented most of the new favorite varieties were simply marvelous in size and quality, and it is not easy to imagine that larger or better grown specimens have ever been produced.

An interesting feature of the lower hall was the row of tall vases occupying the end platform, containing cut flowers of many of the best varieties, with stems a yard long, and evidently grown specially for this purpose. The beauty of the flowers was heightened by the fact that only three or four specimens, always of the same variety, were used together in the same vase. This exhibition was made by Galvin Brothers, and showed how the *Chrysanthemum* can be used for the very best effect in large decoration.

The usual number of new varieties and of seedlings were shown. But it is not wise to judge of these from an acquaintance which does not extend beyond the show-table; and the number of novelties which are produced now in all countries is so great that a new variety should be subjected to the severe trial of long cultivation and to varied conditions before the public can take much interest in it. The new seedling, *Ada Spaulding*, is a case in point. This is the variety which, at Indianapolis the other day, won the cup offered by the wife of the President of the United States for the best American seedling *Chrysanthemum* for the year, and which has thus gained a sort of national reputation. The flower was, no doubt, badly shown in Boston; as seen here it was not large, and lacked substance; the color was weak and washy, as if it had been taken from a weak plant and had suffered from traveling. But due allowance being made for all this, it was no better than a dozen other seedlings of the year, which appeared here, and there were many better varieties shown in the exhibition.

The following first prizes were awarded by the Society: For a display of twenty named plants, distinct varieties, to Walter Hunnewell; for twelve plants, to Mrs. Francis B. Hayes; for sixteen Chinese varieties, to Dr. H. P. Walcott; for six Japanese varieties, to Dr. H. P. Walcott; for six Chinese varieties, four blooms each, Dr. C. G. Weld; for a specimen plant of Chinese variety, H. L. Higginson; specimen Japanese "Snow-storm," H. L. Higginson; specimen *Pompon* plant, Dr. H. P. Walcott; specimen *Anemone* plant, H. L. Higginson; best standard specimen plant, Dr. C. G. Weld; for twelve blooms of Chinese varieties, Joseph P. Melley; twelve blooms Japanese variety, John Simpkins; six blooms of Chinese varieties, E. A. Wood; six blooms of Japanese varieties, John Simpkins; for best fifty blooms, E. A. Fewkes & Sons, who received also, for fifty blooms, a piece of plate provided from the Bradley fund. A special prize, the Society's Silver Medal, was awarded to James Brydon, gardener to Mr. Simpkins, for the best seedling of 1889; Fewkes & Son and George Hollis winning the second and third prizes for new seedlings.

Boston.

D.

[The *Chrysanthemum*, *Ada Spaulding*, is rather an early variety, and it was not as good a flower when seen in Boston and Philadelphia as it was the week before in Indianapolis. It has bloomed the second season and we can now speak of it with some confidence. Its color is not the most desirable, but it has unusually good form, size and substance. Our correspondent does well to note the fact that every year brings a host of novelties, which are no better than the old kinds. But certainly no one would discourage the production of new seedlings—for this is the only road to improvement. Only a small fraction of one per cent. of the kinds raised prove worth propagating; but it is proper to offer prizes for the best *Chrysanthemum* of the year and in such contests it is plain that the new ones cannot compete with the older sorts. What we need is not fewer seedlings—but some tribunal to pass vigorous and impartial judgment on them. If our National *Chrysanthemum* Society will assume this authority and exercise it firmly and judiciously, they will place every friend of this flower under obligations.—Ep.]

Notes.

A lot of Chrysanthemums, imported from Japan by Messrs. Pitcher & Manda, have just bloomed, and one of them turns out to be the veritable Mrs. Hardy, now introduced for the second time into American gardens.

Mr. F. T. McFadden contributed 300 Chrysanthemum blooms to the Indianapolis Exhibition—twelve each of twenty-five varieties—which were pronounced by John Thorpe the best collection of such a size ever seen in America.

We are glad to know that the demand for Mr. Ellwanger's pleasant book, "The Garden's Story," has been such that a second edition has already been issued. The book appears in heavier paper, with a new and most appropriate design for the cover.

The Emperor of Brazil has recently sent to our correspondent, M. Naudin, the decoration of Commander of the Order of the Rose of Brazil, in remembrance of his visit to the gardens of the Villa Thuret, and as a token of his appreciation of M. Naudin's eminent services to botany and horticulture.

Reports from Los Angeles confirm what has already been stated in regard to the effective work of the parasite which was imported to check the increase of the Cottony Cushion Scale. The prospect now is that the *Icerya*, which threatened to destroy the Orange orchards of California, will itself be exterminated by its microscopic enemy.

A variety of the Chinese Juniper (*J. Chinensis*) with distinctly pendulous branches is one of the interesting and attractive novelties among the numerous conifers of abnormal growth which have lately appeared in European nurseries. It originated on the Continent a few years ago, and has been propagated at Knap Hill by Mr. Anthony Waterer.

The interesting History of the Chrysanthemum, which was prepared for the *Gardeners' Magazine* by Mr. C. Harman Payne, is illustrated by portraits of men who hold positions of prominence in the annals of the flower, from Sabine and Bernet down to the present time. Dr. H. P. Walcott and Mr. John Thorpe represent America in this picture gallery.

Spring is, of course, the time to see a bulb-garden in the Netherlands at its best. But from an account of a visit to one at Haarlem in the early autumn, recently published in a German journal, they must be very beautiful at that season too, gay with a multitude of Tritomas, Tigridias, Amaryllis, Gladioli, Nerines and Autumn Crocuses, and their borders adorned with a multitude of late flowering shrubs and annuals.

Among the announcements of articles to appear in *Scribner's Magazine* during the coming year we note the promise of a series dealing with American homes and their surroundings in town, suburb and country. This announcement is a cheering proof that, in the opinion of the editors, the interest which Americans have of recent years shown in the construction and arrangement of the home building is extending itself to the home surroundings, and that they are, in truth, one and indivisible.

Among horticulturists promoted to the grade of officer in the Légion d'Honneur for their connection with the Paris Exposition, may be mentioned M. Ed. André, the distinguished landscape-gardener and the editor of the *Revue Horticole*; M. Henry L. de Vilmorin, President of the Botanical Society of France and head of the house of Vilmorin, Andrieux & Co.; MM. Croux and Moser, the well known nurserymen; and M. Choisy, professor of landscape-gardening in the national school at Versailles.

A number of plants of *Cattleya Bowringiana*, including an immense mass with twenty-five spikes, recently imported, are now in flower in Mr. Ames' Cattleya-house. This is one of the handsomest of the early autumn-flowering Orchids. The flowers, of which a dozen or more are borne on a spike, vary from pale lilac to rose-purple, shaded to dark crimson on the front lobe of the lip. It is a native of Honduras, and was introduced into England by Veitch & Co. in 1884. It is considered an easy plant to manage.

The foliage of Hall's Honeysuckle continues bright and green, as it usually does at this season, and it will, no doubt, persist up to the holidays. It is rather late for the flowers, however, but they are still opening in considerable numbers where the vine has a sheltered and sunny exposure. For some days past a vine trained against the south side of the Pennsylvania Railroad Station at Marion, New Jersey, has attracted much attention for the cheerful display of bloom it is making in the face of approaching winter.

There is certainly real cause for regret that the Japanese Maples are so unreliable in the climate of this country, for some of the forms of *Acer polymorphum* especially are unsurpassed by any other plant in the beauty of the colors which their leaves assume here in late autumn after the foliage has fallen from nearly all the native trees and shrubs. They are hardy enough, and grow rapidly, and then, perhaps, at the end of two or three years, or possibly ten or fifteen, just as they begin to show their real habit and character, they often commence to die branch by branch, and then soon disappear.

On the evening of the fourteenth instant the local Florists' Club at Summit, New Jersey, formally took possession of a new reading-room and bowling alley, which had been provided for the club by Mr. John N. May, upon his grounds. There were a hundred guests present, many of them from distant points, like Boston and Philadelphia, and including the secretary and four former presidents of the Society of American Florists. A collation was served in Mr. May's long potting shed, which was converted into a veritable bower of beauty by a profuse use of greenery, with Roses, Orchids and Chrysanthemums.

Not long ago we spoke of the value of *Ceratostigma plumbaginoides*—the blue Plumbago—as a hardy, low-growing perennial plant; and in one of his pleasant letters, Mr. Nicholson lately described the dazzling effect of a mass of this plant along the top of a wall in the Via Petrarca. It is worth noting that after the flowers have been checked by frost the foliage turns to a deep red. According to Mr. Nicholson, the plant requires a rather dry and poor soil and a sunny situation. We have in mind a mass of it in deep, rich soil, partially shaded and certainly not dry this year, and the foliage is now fairly glowing with a color which is nearly a maroon.

Kerria Japonica, one of the first plants brought from Japan, and an inhabitant of most old-fashioned country gardens, has much to recommend it, especially the single flowered form, which is much less commonly seen than that with intensely double flowers. This shrub is beautiful in winter, with its conspicuous, slender, light green branches; it is beautiful when it is covered in early June with its bright yellow flowers, and just now it is particularly attractive. The foliage turns late always, but when it does turn it takes on a clear, brilliant, sunny yellow, which is unsurpassed. There is no more beautiful or distinct looking shrub during the early days of November than the *Corchorus*, the old familiar name for *Kerria*.

A law case of general interest to horticulturists is reported in a late issue of the *Gardeners' Chronicle*. The plaintiff, a nurseryman, had purchased 500 roots of what he was led to believe was *Spiraea palmata*. He took them home with him, potted them, and grew them from November until June, when the plants flowered, and it was discovered that, instead of being *Spiraea palmata*, they were *Spiraea elegans*, a comparatively worthless species, it appears, for his purpose at least; and he was able to show that the plants he had purchased possessed no commercial value. The plaintiff claimed the one shilling and three pence for each of the 500 plants, which he would have obtained for them when fully grown had they been of the kind he supposed he was buying. No charge of fraud was made against the defendant, who, evidently, was selling in good faith what he thought was *Spiraea palmata*; but the jury found for the plaintiff the full amount claimed, and judgment was given accordingly.

The Chrysanthemum has fairly captured the town of Boston. The public flocked to the Horticultural Society's exhibition of the favorite flower, which fills every florist's window to overflowing. It is sold at the street corner in profusion and excellence, and a woman is rarely seen in the streets without a bunch, big or little, in her hands or on her dress. This remarkable popularity has grown in recent years, for it appears, from an authoritative article published last week in the *Boston Evening Transcript*, that the first record of the exhibition of Chrysanthemums in this country was in 1830, when fifteen varieties were shown at an exhibition of the Massachusetts Society. The first prizes for Chrysanthemums, amounting to a total of \$17, were offered in 1861. Seven years later the fall exhibition of the Society was first called the "Chrysanthemum Show," and the prizes were increased to \$55. They were increased to \$150 in 1879, and an entire day was devoted to the exhibition. The exhibition in 1882, although planned for only a single day, excited so much interest that it was kept open two days, and this plan was continued until 1886, when three days were required, as they have been in succeeding years, to satisfy the popular curiosity. The prizes, too, have been gradually increased until they now amount, in the aggregate, to the handsome sum of \$741.

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Central Park and the Exposition.

TWO or three weeks ago the committee whose duty it is to select a site for the World's Fair, to be held in this city in 1892, formally abandoned their plan to include a portion of Central Park in the exhibition grounds. This step seemed necessary on account of the opposition which the threatened occupation of the Park aroused—an opposition which grew stronger every day, and resulted at last in the resignation of several members of the committee and a public declaration by a large majority of the legislators elected from this city that they would vote against a repeal of the law which now protects the park from any invasion of this kind. We are not surprised at this result, for the park has been rescued from similar dangers many times before by the power of public sentiment when opportunity has been offered for full discussion. And yet this renewed manifestation of jealous regard for the park and intelligent appreciation of its purpose and value is an encouraging fact. If this action of the committee is final it will not only establish another precedent against future assaults upon Central Park, but it will give additional security to every acre of park area in every city of the United States for all time to come. On the contrary, if our chief city should allow the most famous park in the country to be desolated when it is only approaching mature development and has hardly begun its career of usefulness, there would be little hope that parks in other cities would be able to withstand the pressure for admission constantly brought to bear upon them by all sorts of enterprises foreign to the purpose for which they were created.

It is well to remember that the conversion of Central Park into an exhibition ground would be more than a mere local calamity. Public-spirited men in other cities who are helping by their moral support to avert such a calamity are strengthening the barriers which protect their own parks against intrusion. They are helping to give security to every public pleasure-ground, national park and botanic garden in the country, and they are encouraging the establishment of other institutions which must live and grow for long years before they attain the full measure of their usefulness. And the people of this state should remember that they can bring their influence to bear directly to this end by instructing their representatives in Albany to oppose

any relaxation of the law which now protects the rights of the people in the park against invasion.

The recent wise action of the Site Committee is no guarantee that some scheme to capture a portion of the park for the Exposition will not be revived. If the fair is held on the site now designated, it will reach out for room in every direction. Even now it is proposed to change the law so as to include the Museum buildings and Harlem Mere. But no amendment to the statute should be tolerated. The law was passed deliberately, not only with the sanction but in accordance with the urgent demand of every reputable paper in this city. It was passed just after the park had been threatened by one World's Fair, and for the express purpose of protecting it in precisely such an emergency as the present. The more imposing the proposed fair, the greater the danger to the park. The fiercer the rivalry and the wilder the enthusiasm, the more need of safeguards erected in quiet times and with cool judgment. The law will never be able to do better service than it is doing on this particular occasion, and certainly this is not the time to repeal it, when the first opportunity is offered to prove its value. It is no time to open it for amendment, for one exception will make room for another. There is absolute safety while the law stands as it is—and absolute safety is what every friend of the park should insist upon.

Mr. Nicholson describes on another page his visit to Pallanza, on the shore of Lake Maggiore—a spot which has perhaps no equal in Europe for the rare and beautiful trees, especially coniferous trees, which abound in its neighborhood and thrive in a manner quite unknown in less favored regions. Here may be seen growing side by side, in perfect health, species from the Alps of Europe and the Andes of South America; from the mountains of northern Africa and the hills of southern China; from the plateau of Mexico and the plains of Canada; from the Himalaya and the Sierra Nevada; from our southern Pine-belt and from Japan; from Asia Minor and the mountains of Brazil. The best specimen in Europe of the curious Keteleeria of southern China is growing in Signor Rovelli's garden near a plant of the hardly less curious Pseudolarix, which has no rival in cultivation, except in the finer specimen still to be seen in the old Parsons Nursery at Flushing. Across the bay from Pallanza, on Isola Madre, is one of the most perfect natural gardens, in which our White Pine, with a robustness of growth and depth of color almost unknown in its native forests, towers high above Yews and Evergreen Oaks of extraordinary dimensions. There are Canadian Hemlocks in this Borromean garden which it would be difficult to match anywhere, growing among Himalayan Rhododendrons, Mexican Yuccas; and here, perhaps, is the finest Californian Incense Cedar in Europe, and a Himalayan Fir unsurpassed in its loveliness. On the curious but far less attractive and interesting Isola Bella the tree-lover will find in the court-yard of the palace a plant of the American Persimmon, of a size almost unheard of in Arkansas even, where the Persimmon attains to its best estate; and on the terrace not far from the group of great White Pines, which make every American feel proud, is a remarkable specimen of the Evergreen Carolina Cherry of our southern states.

Large specimens of several Mexican Pines are interesting features in many of the gardens on the shores of Lake Maggiore, where they find apparently the congenial conditions necessary for their growth. Here the variable *Pinus Montezume*, always healthy and sometimes handsome, appears under many grotesque and unfamiliar names. *Pinus patula* displays the beauty of its slender, graceful, pale green foliage, and in the garden of the Grand Hotel of Pallanza, *Pinus Ayacahuite*, the White Pine of Mexico, produces freely its enormous cones. A short hour's drive from Pallanza will carry the lover of trees to the garden of the Villa Ada, in which Prince Trubetskoy planted his remarkable collection of conifers, rich in specimens of Retinospora of remarkable size, in

many Mexican Pines, in a wonderful plant of the Lacebark Pine of China (*P. Bungeana*), in a great collection of Cupressus of many interesting forms, and in a number of specimens of the bright blue variety of the Mt. Atlas Cedar, so vigorous in health, so graceful in outline and of such brilliant coloring that one may well exclaim in looking on these trees for the first time, "I have never seen a beautiful conifer before." Not far away are the grounds of the Villa Franzosini, rich in fine trees, and the best example, perhaps, of a well arranged and well planted garden, simple and convenient in treatment and uninjured by any gaudy horticultural innovation, which can be seen on the shores of the Italian lakes, a region famous for beautiful gardens.

The great botanical establishment which the people of New York are still talking about vaguely is to be realized in St. Louis. It is provided for under the will of Mr. Henry Shaw, who died during the past summer, having for many years devoted his leisure and a considerable part of his income to the establishment and care of a public garden in his adopted city. The whole of his estate, with the exception of a few small legacies, is now left to a board of trustees for the benefit of this garden. It has been appraised at nearly \$3,000,000 and produces a net income of about \$50,000; but as a large part of Mr. Shaw's property is invested in unimproved real estate within the city limits of St. Louis, the income of his estate may be expected to increase enormously with the growth of that city; and Professor William Trelease, the newly appointed director, will, in all probability, soon find himself at the head of a better endowed establishment than any other of its kind which has ever existed. There is no botanical garden in the world, with the exception of that at Kew, where the annual expenditures are not far from \$100,000, which enjoys an income of anything like \$50,000, and a vast amount of good and useful work can be accomplished every year with that sum of money. Professor Trelease, with the income now at his command or which will be available for his purpose in a short time, will be able to lay the foundation of an establishment of such scope that it will soon make St. Louis the botanical centre of the New World and draw to it students from every quarter of the globe. His early efforts, very properly, will be devoted to elucidating the botany of North America; and he is fortunate in possessing as a nucleus of the St. Louis herbarium the collections of Engelmann, which, in certain groups of plants, are of inestimable value.

Of special interest to young men who desire to become gardeners is the plan, not yet entirely matured, of offering, in connection with the Shaw Garden, six scholarships for garden pupils, for the benefit of young men between fourteen and twenty years of age, who are to be taken for six years, and who will be expected to work in the different departments of the garden, receiving, besides, theoretical instruction in botany, horticulture, economic entomology, and as much land surveying and bookkeeping as is necessary for a gardener having the charge of a large estate. It is proposed by means of these scholarships to make gardeners, and not botanists, and a taste for the manual work of the garden will be insisted on in the young men who hold them. They will receive pay for their work, and be given, free of cost, plain and comfortable lodgings near the garden, as well as free tuition in the School of Botany of Washington University, and such other instruction as may be necessary. Never before has such a chance been offered in this country to young men desiring to become thoroughly educated and trained gardeners, and the influence which Mr. Shaw's munificent bequest will exert through these scholarships upon horticulture in the United States can hardly fail to be great and lasting.

The Trustees of the Shaw Garden have it in their power to build up a great and useful institution of science and learning. Their opportunity is magnificent, and their responsibility is correspondingly great.

The Exhibition Grounds, Paris.

AS the question of a World's Fair to be held in New York is being so generally discussed, it seemed desirable to publish for our readers the best view that could be obtained of the grounds of the great exhibition recently closed in Paris, although, of course, no single picture can give any adequate idea of the skill with which they were disposed, or of the gay, yet monumental, effect they presented. The illustration on p. 571 is from a photograph taken from the first platform of the Eiffel Tower, looking southward, away from the Seine, toward the largest buildings. In the centre we have the Palace of Industry, with its chief entrance, and the great central dome, that rose above the vestibule. Behind this is the higher mass of Machinery Hall. In the buildings to right and left the industrial display was continued; and could we see those which followed them, nearer the tower, we should see the Palace of the Fine Arts and the Palace of the Liberal Arts. The smaller structures near the great entrance held the exhibits which illustrated the history and condition of the city of Paris. The long tents on either side of the walks were for protection from the sun or rain, covering nothing but chairs and small booths where light refreshments were sold. The fountains in the centre are those which, when illuminated at night, proved the most popular attraction of the exhibition. The main jet then rose from the circle of bronze plants near the foreground, and not only beneath the tents, but up to the edge of the grass, spectators were massed in the densest lines. Between the four great feet of the tower was a lawn with a central fountain; on either side of it were gardens containing many small pavilions; and to the north, opposite the present point of view, was a large open space; then the bridge across the river, covered for the time with a red and white tasseled awning, and then the rising ground on the Trocadéro side, with a great cascade in the centre falling from beneath the Trocadéro Palace on top of the hill. Of course, the grounds were much larger than this description implies, extending along the *quais* for a great distance, and running back from the river again, nearly a mile further east, to fill the broad *Esplanade des Invalides*. But the present view shows their most effective portion, and though the horticultural exhibition was accommodated on the Trocadéro slope, there was much here of interest to the lover of plants and of gardening design. The harmonious contrast between the formal central walks and the more naturally disposed paths on either side should be remarked, and it should be remembered that the various pieces of statuary were not makeshift decorations, but admirable works in marble, produced for their especial purpose by well known artists. The hardy trees were set out when the design was made a year or two years in advance. Particularly effective were certain large, isolated specimens of *Phoenix Canariensis*, planted on the lawns, which, with the other isolated plants and flower-beds, were most appropriate to the semi-formality of the design. The terraces in front of the Palaces of the Arts were banked with fine Rhododendrons, exhibited by M. Moser and by Croux & Son; and here, too, were some admirable specimens of *Chamærops excelsa*. The little kiosks and pavilions had been carefully designed, and, in short, in every detail one saw the hand of the skillful artist disposing of the most excellent horticultural material. A particularly pretty idea was the encircling of the grass plots with rows of small electric lights set close to the ground. As viewed from the tower at night, these starry bands had an enchanting effect in contrast to the flashing splendor of the illuminated fountains, which in their turn were relieved against the transparent masses of the façades beyond, crowned by the great dome, with its tasteful festoons of lights, where the yellow of gas was effectively mingled with the whiter light of electricity. These gardens seemed then a fairyland indeed, and one was filled with admiration for the good taste which could produce so dazzling an effect, and yet

not fall into extravagance or mere glare and show. Nothing more impressive could be imagined than the view at night from the tower when great bodies of people filled all the open spaces, and the murmur of their voices added to the gaiety of light and color. During the day-time on Sundays every one was allowed to walk, sit and eat on the grass; and the sight was then equally amusing and attractive, a myriad white napkins and bright spots of color enlivening every green expanse.

Among the Pines of Northern Michigan.—II.

THE view of a country from the car window is not always satisfactory. We are often provoked by a curiosity to search some parts of a region over more in detail. It is better to walk or drive, with plenty of time at command. To enjoy such a trip most keenly, one should be accompanied by one or two others—seldom more—and all should be botanists, with an interest in gardening. If they are interested in collecting living plants for the garden, monstrosities and nice specimens for a museum, and plants for a herbarium, with a view to making a report, the enjoyment will be much enhanced. The person who is merely hunting for game or looking for the best trees for lumber knows little of the pleasure realized by the naturalist.

It is not an uncommon thing to see Hemlocks, Birches and sometimes other trees growing on low land with the roots next to the "stump" part of the tree all above the ground, like a spider on the tips of its long legs. Such trees were started as seedlings on a decaying log, which has since all disappeared in decay. In one place near Kingsley we found ten or a dozen small Hemlocks of this kind all in a row, where the log had only partially decayed.

Toward the south of the district we are considering are some very fine specimens of the Hornbeam. Especially are they beautiful in moist, rich soil, with plenty of room. I never fully appreciated the beauty of a well grown Hornbeam till I saw, for the first time, some well grown specimens in Central Park. The smooth-fluted gray trunks, the dense, clean foliage and the peculiar drooping fruit surrounded by a pair of mitten-shaped bracts, distinguish it from everything else.

Occasionally, where the soil is thin and the forests have been mainly cut away, may be seen villages which are now nearly deserted. Such a village is Cheeney, in Crawford County, and Fife Lake, in Grand Traverse County, is likely to reach the same condition. The mills burn down, are removed or the machinery has been taken out, while the shabby old building remains on guard near the piles of saw-dust, and a few worthless old logs never cut into lumber. The dwelling-houses can scarcely be given away, and there they stand fast going into decay. No one sees much beauty in a dead village, not even the botanist.

Akin to the above are the deserted homesteads and farms often found on the Jack Pine-plains. There remains the neat house made of logs or rough boards. The barn and out-buildings, the fences and gates, the remains of orchard trees and small fruits, of shrubbery and perennial herbs and the introduced weeds—all remain to tell of the culture and wasted capital and energies. There might have been some mismanagement, but the energy and care bestowed would, under more favorable circumstances, have won eminent success. It is to test such lands and give assistance to the owners that experiments are now being conducted by the Agricultural College.

The beautiful and the picturesque are often strangely blended. The dead trees and black stubs and logs, the ragged thistles and fireweeds, perhaps help to add interest to things that are beautiful. There is nothing to admire in the dead tree-tops and rubbish left where the trees have been felled, cut into mill logs and drawn away. The rubbish courts a fire which it is most sure to burst out on the arrival of the first very dry weather.

Railways require the removal of earth, cutting and filling, exposing much bare surface. In places there are irregular depressions sunk near the road to procure earth for the road. It is surprising with what rapidity kind nature begins to repair such damages as these. The remaining charitable old Hemlocks and Pines and Maples vie with each other in producing bountiful crops of seeds which, by the aid of the wind, they scatter on the bare slopes and in the naked places; and where enough moisture and shade are found, such spots are quickly covered by a crop of beautiful young trees.

In the newly exposed places, plants vie with each other to see which can do the most. Hanging over the crest of the

banks, or some of the pits from which earth has been taken, are many beautiful plants from which lessons may be learned.

The Wintergreen, Bearberry, Trailing Arbutus, Dwarf Blueberries, Dwarf June Berry, Violets, wild Asters, the Sweet Golden-rod, Anemones, the Andropogons and bunchy Panicums among Grasses, and Dwarf Sedges, are among the most common and attractive plants in such places.

I must refer to the three-toothed cinquefoil, *Potentilla tridentata*, which is common in many sandy places in northern Michigan. The leaves are wedge-oblong, coarsely three-toothed, evergreen and glossy; the petals white. The plant spreads readily by root-stocks, and is perfectly at home in poor, sandy soil. It is attractive and good to use in patches, or when mingled with other small perennials.

Agricultural College, Mich.

W. J. Beal.

Holiday Notes in Southern France and Northern Italy.—VI.

AT Luino we took steamer and passed a succession of picturesque villages charmingly situated amidst the Olive groves, vineyards and luxurious vegetation of the mountain slopes. Our destination was Pallanza, a thriving little town of some repute as a winter resort, built on the warmest and most sheltered spot on the Lago Maggiore. From the landing stage a row of *Magnolia grandiflora*—the Big Laurel of the southern states—attracted our attention; this is not often used as a street tree. My companion, however, informed me that he had seen it so employed at Angers, in western France. The nursery of Messrs. Rovelli, situated on a tongue of land jutting out into the lake, is now one of the show places of the district. Thirty-five years ago it was not adorned with a single tree, but the firm having bought out a considerable number of small proprietors, and then planted fine exotic conifers and other rare plants, many visitors with no special love for plants are attracted to it because guide-books, etc., announce it as one of the sights. To real lovers of trees there is much to instruct and delight, some of the specimens being probably unique in Europe as regards beauty and size. The following notes by no means exhaust the objects of interest; lack of space alone compels me to select the most striking features and to leave alone much that is wonderful to a traveler from more northern regions.

Amongst the conifers, perhaps the most remarkable is a large, handsome tree of the Chinese Golden Larch (*Pseudolarix Kämpferi*); this cones very freely, and thousands of healthy seedlings carpeted the ground beneath the spreading branches; it has been found advisable to allow the seed to germinate where it falls, much better results being thus obtained than by collecting the seed and sowing it in pans under glass. Next comes a Chinese Abies, *A. Fortunei* (*Keteleeria Fortunei*), with large numbers of round, broad-scaled cones; a photograph of the tree itself, of the male catkins, cones and curious corky bark, have been published in the *Gardeners' Chronicle*. In England, and then solely in sheltered spots, this appears to be able only to keep alive. Other Firs are represented by examples of *A. Nordmanniana*—upward of fifty feet in height—*A. Cilicica* and of *A. bracteata*, both very beautiful specimens, and a curious columnar form of the common European Silver Fir (*A. pectinata*)—which the courteous proprietor informed us passed under the name of *A. laxa* in southern nurseries—in all probability it is Carrière's variety *Columnaris*. *Pinus Canariensis*—more than forty feet high—is here a fine object, and on the hot, dry limestone rocks of the Riviera it also grows apace. The Mexican *P. patula* does well, a striking species from the same country bearing the name of *P. Russelliana*. *P. longifolia*, a graceful, long-leaved Himalayan tree which must be cultivated under glass at Kew, has here attained tree dimensions, and the Georgia Pine, *P. palustris*, is at home in its company. The Japanese *P. Koraiensis* was bearing its first crop of cones, which, in addition to the habit, indicated clearly enough its relationship, from a systematic point of view, with the Arole (*P. Cembra*) of Switzerland. As might have been expected, the Monterey Cypress (*Cupressus macrocarpa*) does well at Pallanza, and we afterward frequently saw it along the Riviera. The Californian White Cedar (*Libocedrus decurrens*) had attained a greater size here than ever we had seen it before; the trunk was three feet in diameter. Trees of *Cryptomeria Japonica* showed how picturesque this species is under really favorable conditions, and so did one of *Cunninghamia Sinensis*—nearly fifty feet high. *Araucaria Brasiliensis*, bearing cones, came as a surprise to us who had only seen it grown under

glass. *Fitzroya Patagonica*, fifteen feet high, a beautiful mass of *Podocarpus Chilina*, with its long, narrow, dark green leaves, and two small growing conifers which have originated in the Pallanza establishment, must conclude my list of the Pine and Fir tribes. One of these—here called *Thujopsis nidifera*—is a dwarf plant with gracefully curved branches, suggesting a bird's nest; it is said to be a hybrid between *Chamaecyparis Nutkaensis* and the Oregon Cedar (*C. Lawsoniana*). The other is *Retinospora Trubetzkoyana*, named in honor of Prince Trubetzkoy, whose famous garden we, unfortunately, had no time to visit.

Camellias are a great feature at Rovelli's; they grow as freely as do the Cherry Laurels in England, and are cultivated in great numbers, from small stuff in pots to big bushes in the open ground. A goodly proportion are exported to other countries, the bushes selected for dispatch in autumn (as early as the beginning of September), being transplanted in spring. *C. Sasanqua* and its varieties are the first to flower; they begin in November; the others commence to blossom in January and continue until April. Other members of the Camellia family deserving of notice are Tea-plants, both from Assam and China; from his fine bushes of these Signor Rovelli—who has traveled a good deal and knows what tea is—told us that he had manufactured tea of fairly good quality.

The Camphor tree (*Cinnamomum Camphora*) grows as freely at Pallanza as a Willow or Poplar in many countries, and gives some trouble in pruning to prevent its exceeding the limits assigned to it; the trunk measured between two and three feet in diameter. The East Indian *C. glandulifera* also thrives equally well; here, however, the name under which it is grown is *Laurus glandulifera*, a title now incorrect and somewhat misleading, as there are no true Laurels in India, the Sweet Bay—the Laurel of the classical writers—being confined to the Mediterranean region, and the only other species of *Laurus* being a native of the Canary Islands. The California Olive (*Umbellularia Californica*) also grows to tree size and is everywhere known in the regions visited by us as *Laurus regalis*. In England it requires to be treated as a wall plant—except, perhaps, in such favored spots as Cornwall, and a few others.

Palms were not represented by many species, and of all of them much finer examples are to be seen along the Riviera. *Phoenix Canariensis* is hardier here than the Date Palm, and the Japanese Fan Palm (*Trachycarpus* [*Chamaerops*] *excelsus*) is more robust and hardy than *Chamaerops humilis*, which is a native of the Mediterranean region. *Cocos campestris*, a graceful species, is hardy, but it grows much more slowly here than along the Riviera. A fine example of *Jubæa spectabilis*, with a trunk two feet in diameter, is the most remarkable Palm at Pallanza.

Cycas revoluta is the only Cycad which thrives in the open air here. *Viburnum Awafuki*—met with in southern gardens under the name of *V. lucidum*—thrives wonderfully well; one grand plant, at least twenty-five feet in height, was bearing a crop of coral red berries. The most noteworthy Oak was the Portuguese and north African *Quercus Mirbecki*, a tree upward of fifty feet high, which bears acorns annually. Bamboos were very beautiful and vigorous; it is sad that the garden nomenclature of these graceful plants is in such a state of utter confusion. *Bambusa Simoni*—more correctly, *Arundinari Simoni*—is worth particular mention, not only on account of its merits as an ornamental plant, but because it does not die after flowering, as do many of its relatives. The Climbing Fig (*Ficus repens*), so popular in its small-leaved condition for clothing bare walls of plant houses in England, had here overtopped its wall, and developed large-leaved, rigid branches, which bore a crop of fruit.

Leaving Pallanza, where we had a fine view of the snow-clad glaciers and peaks of the Simplon group, we sailed past the far-famed Borromean Islands, which were converted in the seventeenth century by Count Vitalio Borromeo from barren rocks into gardens which now have a world-wide reputation. Unluckily, we had no time to go to Isola Bella, which boasts of many fine American trees. Gardening proper can, however, hardly be said to exist in this beautiful spot, terrace upon terrace with bewildering array of statues, vases, fountains and grottoes making a formal, unlovely combination, quite distressing to those who hold that a garden should exist primarily for plants and that the work of the sculptor should be a secondary consideration. Oranges and Lemons clothed the terrace walls, and fine Oleanders and other flowering shrubs somewhat relieved the monotony of stone-work.

Kew.

George Nicholson.

New or Little Known Plants.

Yucca elata.

THE two large arborescent Yuccas of the valley of the lower Rio Grande, *Y. Treculiana* and *Y. filifera*, were figured in the early issues of this journal. The illustration upon page 569 of the present number represents a plant of the tall Yucca peculiar to the dry, desert region west of the Rocky Mountains, situated on both sides of the boundary between the territory of the United States and that of Mexico. It is the *Yucca elata* of Engelman, who, at the time his classical monograph upon the genus Yucca was written, considered this plant a southern, and arborescent form of the stemless *Y. angustifolia* of northern New Mexico and Colorado (*Y. angustifolia*, var. *elata*). He was fortunate enough to see it growing, however, during a journey which we made together to the Santa Rita Mountains in southern Arizona, during the autumn of 1880, and became convinced that it had best be considered a distinct species.* The Arizona plant may be distinguished from the allied Colorado species by the tall, stout trunk, ten to twelve feet high, with a diameter of eight to ten inches at the ground, and by its long flowering scape, seven to ten feet high, naked below, and bearing a much branched panicle often five feet long. The perianth is spreading, three and a half to four inches wide when fully expanded (those of the allied species are more globose), with oval-concave segments, which are waxy white and deliciously fragrant. Young plants begin to flower before they form a trunk, but even these are easily distinguished by the tall, naked scape and by the shape of the flowers.

A full panicle of flowers of this Yucca is an object of surpassing and surprising beauty. Our illustration is from a photograph made by Mr. C. G. Pringle on the dry plains between the town of Tucson and the Rincon Mountains in Arizona. It shows an old plant with two flower-panicles, the ends of the branches bearing green and living leaves, while a third branch and the upper half of the trunk are covered and armed with the reflexed dead leaves of many previous years.

Yucca elata was first detected by the botanists of the Mexican Boundary Survey more than thirty years ago, but it is probable that it has not been introduced into cultivation until quite recently. Seeds have now, however, been distributed among several European gardens, through the agency of the Arnold Arboretum. C. S. S.

Acanthopanax ricinifolia.

THIS great tree Aralia of northern Japan promises to become one of the most striking and remarkable ornamental trees which can be grown in the climate of the northern states. It was introduced several years ago into the Arnold Arboretum, where the largest of the two specimens which the Arboretum possesses is now nine feet high, having grown at the rate of about one foot a year. Although planted in low ground and in an exposed situation, they have shown no sign of suffering during the most severe winter they have experienced here. Flowers have not appeared yet, but the deeply divided and sharply lobed leaves fully a foot across, and borne on petioles nine or ten inches long, serve to give an idea of what this tree will look like if it ever reaches in this country the size which it attains in Japan. There is no plant in the collection which presents, even in its young and undeveloped state, an appearance so dissimilar to our native vegetation.

The following popular account of this plant, extracted from Rein's "Industries of Japan," may interest the lovers of rare trees who have not access to the work itself:

"This beautiful tree is distinguished by its great, lobed, shiny leaves, its white flower-umbels and black fruit of the

* "*Yucca elata*.—Trunk, three to five feet, or more, high; leaves, linear, rigid, sharp pointed, filamentose on the white margins; with white, oval, acute or acuminate bracts as long as the pedicels; flowers white; segments, ovate-acute; ovary attenuated into a whitish style; capsule, cylindrical-ovate, obtuse, short cuspidate; seeds, large, one-half inch wide, narrowly wing-margined."—Engelman in *Botanical Gazette*, vii. 17.

size of pepper corns, resembling, like its flowers, the *Aralia* and Ivy. Like *Magnolia hypoleuca* and *Esculus turbinata*, it is scattered in the high mountain forests of Japan from Kiushiu to Yezo, but is most numerous in the north. In Yezo, trunks of from nine to twelve feet circumference and ninety feet height may be seen. I often found them in Hondo quite as high, but generally not so thick. In high forests the trunks are often somewhat bent, and do not branch until they are sixty feet high. Their dark, thick, rugged bark makes them as noticeable as their beautiful foliage. The white wood shades often into brown, and is moderately light, rough fibred and more or less porous. Cross cut, it shows year-rings, but no pith-rays. The pores are of two kinds: one sort microscopic and scattered about in the thick summer-wood; the other apparent to the naked eye, and denoting the spring girdles. According to Böhmner, the Ainos make their canoes out of the large trunks from eighteen to twenty-seven feet long.

Acanthopanax ricinifolia is sometimes found in gardens under the name of *Aralia Maximowiczii*. C. S. S.



Fig. 146.—*Yucca elata*.—See page 568.

Cultural Department.

The Pecan Tree.

(*Hickoria Pecan*.)

ALTHOUGH this tree demands attention chiefly for its nuts, which form one of the valuable products of the Atlantic forest-region throughout all its southwestern section, it also has merits as a timber-tree. I venture to reply to many inquiries from all parts of the country concerning the character of this tree, the method of cultivating it, and the profit to be derived from it, the more readily because I have some new

experience to report since I read a paper on these subjects before the Mississippi Valley Agricultural Society in 1883. For the latest information in regard to the propagation of the Pecan, I am indebted to Mr. J. J. Delchamps, of Mobile, an energetic cultivator of this tree, who has given it his attention during nearly forty years.

DISTRIBUTION.—The Pecan is found growing from northern Louisiana and Mississippi through the alluvial lands of the Mississippi River and its larger tributaries, as far north as southern Indiana, southwestern Kentucky, and along the Missouri to eastern Kansas, as well as in the Indian Territory, Arkansas, Texas and the adjoining regions of northern Mexico.

SOIL AND SITE.—Naturally, this tree is confined to the rich, cool and damp soil of the river-bottom lands, with a sub-soil which offers to its long tap-root a constant supply of moisture. This water supply and abundant plant food are essential to the perfect growth of the tree and the production of nuts of the best quality. The Pecan shuns a dry, silicious soil, and the attempts to raise it on the sandy rolling Pine lands have resulted in disappointment, the highly porous soil rendering the application of fertilizers of little benefit to the tree. It fails, also, on lands with a rocky subsoil, which impedes the growth of its tap-root.

RATE OF GROWTH.—The Pecan grows rapidly, reaching a height of from twenty to twenty-five feet within ten years. It begins to bloom and produce a few nuts in its seventh or eighth year. Trees three years old, when taken from the nursery in 1873, began to bear in my garden six years later, and the crop of less than half a bushel to the tree in 1883 has increased steadily until this year, when it was two and a half bushels of nuts of a quality that would command fifteen cents a pound. Another tree in my immediate neighborhood, from a nut planted in 1867 and left undisturbed, yields at present from three and a half to four bushels of nuts of a higher grade, commanding a price of twenty cents a pound. This tree is fully seventy-five feet high, with a girth of about sixty-six inches. I lately had the opportunity to measure several trees which have never been transplanted, but stand where the nuts were planted in 1866, in the sandy loam of the coast plain of Mobile, where the subsoil is a damp clay. By actual measurement they were found from seventy to seventy-five feet high, with a circumference of fully five feet breast high, and a crown varying from sixty to sixty-six feet in greatest diameter, yielding crops of good quality and quantity and coming true from seed. According to Mr. Delchamps, trees, undisturbed in their growth by transplanting, bloom several years earlier and produce remunerative crops of nuts correspondingly sooner than seedlings brought from the nursery; while it is not until the tenth year that the latter can be depended upon under the best conditions of soil and methods of cultivation to produce fruit. The crops increase every season for a long series of years, extending most probably over more than a century.

CULTIVATION.—The practice generally adopted is to plant the nuts early in the fall in drills two or two and a half feet apart in a generous, loamy soil, enriched, if necessary, by well rotted compost, and to keep the seedlings for the following two or three years under good cultivation. Having by the end of that time reached a height of from four to five feet, the young trees are carefully taken up, and, without delay, transferred to their permanent position. Care is taken not to expose the long tap-root, which is provided with only a few lateral rootlets, to the dry air. The fall of the year, after the first frosts, is considered the best time for transplanting. In the poorer and lighter soils of the coast of the lower Atlantic and Gulf states the soil should be from the outset enriched by a liberal application of well-rotted stable manure, repeated from year to year, particularly after the tree begins to yield large crops. To insure the best development of the tree and the production of nuts of good quality on the lands of the class described, annual mulching and manuring are absolute necessities. A mixture of stable manure and pure bone meal is the best compost. The Pecan is a strong feeder. It soon exhausts the plant-food in a naturally poor soil and shows the want of more by an immediate failure to produce perfect seeds. In the deep, rich soils of the Mississippi silt, manuring can be dispensed with for a long period. In such localities, under the sunny skies of lower latitudes, nuts of the finest quality are produced almost without failure every year, and by trees far beyond the first half century of their existence, provided the land is above the line of protracted overflows.

THE TAP ROOTS.—The theory that earlier fruiting is secured by shortening the tap-roots leads many nurserymen to cut off these roots of the young seedlings with a sharp spade. Mr. Delchamps asserts that in no instance within his knowledge

has any such root-pruned and transplanted tree proved an early bearer; that, on the contrary, such trees do not bear fruit until they are twelve, and even fifteen, years old. Experience, of late, leads more and more to the planting of the nuts where the tree is to stand. Several nuts, soon after their gathering, are placed in a hill well supplied with rotted litter. The following season the strongest of the seedlings is left standing. The hills are placed at a distance of from thirty to forty feet. Judging, however, from the diameter of the crown, as displayed by trees long before they have reached the fullness of their growth, it is evident that they should stand at least fifty feet apart.

QUALITY OF FRUIT.—The nuts from different individuals of spontaneous growth or under cultivation present an endless variation in size, shape, thickness of shell and plumpness and flavor of kernel. The nuts of the trees growing in the alluvial forests east of the Mississippi River are somewhat spindle-shaped in form, small, hard shelled and of scarcely any value for marketing. West of the Mississippi River, in the open belts of timber fringing the streams in Texas, west of the valley of the Trinity, the nuts are more oval, with a thinner shell and of better size and flavor. Nowhere else are such fine, natural crops of nuts produced as in western Texas. These are of no small importance to the settlers of that section. Many hundreds of thousands of pounds of nuts annually reach the markets of San Antonio and Austin, where they sell by the wagon-load at five to six cents a pound, and where they are assorted according to their quality before they are shipped to distant markets. Nuts of highest quality, oblong-ovate in shape, one and a half inches long, with shells so thin that they can be crushed between the fingers, and unsurpassed in richness of flavor, are grown with cultivation throughout Louisiana west of the Mississippi River. The earlier settlers along the so-called Mississippi coast parishes, in the Red River district of Bayou Têche, have given attention to the improvement of the Pecan-nut, and, of late, similar efforts have been made successfully in Mississippi, Alabama, Florida and South Carolina.

HYBRIDS.—The influences which cause the variations in the quality of the Pecan nuts, outside of those depending upon climate and soil, cannot be discussed at present. There can, however, be no doubt that in these deviations from the original type, much is due to cross-fertilization between individuals possessed of slight variations, originally mere sports. It is a fact that scarcely any other tree is more subject to hybridization by the crossing with other individuals of its kind. Such hybrids are met with in the forest and also among cultivated trees, to the great dismay of the planter, yielding fruit as unsightly as it is unpalatable. Crosses between this species and the Water Hickory (*Hickoria integrifolia*—*Carya aquatica*, Nutt.) are frequently met with. The fertilization in the case of these trees being entirely left to the agency of the wind, it is clear that intercrossings between the different species of Hickory, hybrids, variety hybrids, and the forms presenting slight deviations from the original character, must lead to the production of a multitude of variations, and that to keep a desired race pure, individuals bearing fruit of inferior grades growing in the immediate neighborhood of the grove should be removed.

PROPAGATION BY SEED.—The opinion held by many that the fruit does not always prove true to that of the parent tree, and that the propagation by seed of trees bearing the finest nuts cannot be depended upon with certainty, receives confirmation every year. Mr. Delchamps, convinced of the uncertainty of producing fruit in every respect equal to that of the parent tree, holds the opinion that there is a limit to the improvement of all fruits, and that if this limit is once reached, the tendency is strong to revert to the original type. According to his experience, this tendency is well marked in the Pecan, and repeated observation shows that trees grown from the finest nuts often produce fruit of very inferior quality. In the selection of nuts for planting he would reject the very finest as well as the poorest, and limit his choice to medium sized nuts, well shaped and of good flavor. He is confident of obtaining in this way a greater percentage of fine nuts and fewer inferior ones.

PROPAGATION BY GRAFTING.—To obtain just such nuts as are desired—that is, to propagate and multiply extra fine qualities—as in other fruit-trees, grafting must be resorted to.

The cultivator quoted states that, in the face of the bold assertions to the contrary made years ago, he succeeded without failure in whip-grafting or tongue-grafting the Pecan on a common Hickory (the Mockernut), the stock being sawn off close to the ground. He would layer well shaped and well flavored nuts in sand until January and February (in the latitude

of Mobile), and plant them where the tree is to stand permanently. Under good cultivation, in a year most if not all the young trees will be stout enough to tongue-graft. The cions, taken from choice trees, should be cut some time before they are used, say about Christmas, and kept in sand until needed. As soon as the stock trees show signs of swelling the buds, say about the beginning of February, they should be cut to the ground and the cions grafted on them. If any are still too slender, the grafting can be deferred till the next year.

PECANS AT THE NORTH.—The possibility of propagating successfully trees bearing nuts of finest quality in the territory north of the southern states is yet a question to be settled by experiment. This is the only way that it can be decided whether late frosts in the spring prove an obstacle by causing injury to the flower-buds, or whether the earlier frosts near the close of the season will interfere with the full maturing of the fruit.

INSECT ENEMIES.—The Pecan-tree has some insect enemies which endanger its health and life. Amongst those are the larvæ of a cerambycid beetle, which bores into the very heart of the tree, and a species of tent caterpillar, which causes less injury to the tree, but gives it an unsightly look from the numerous nests infesting the crown.

POSSIBLE PROFITS OF CULTIVATION.—The Pecan-tree yields its crops of nuts almost without failure every season; however, not in equal abundance, one year of fruitfulness being generally followed by one of considerably shorter crops. From numerous inquiries made it can be asserted that a tree, after having reached the twentieth year, will for generations to come yield an income averaging from fifteen dollars to twenty dollars a year at ruling market prices. Considering the facilities with which the shipping and marketing of the Pecan-nut is attended and its possible transportation to the most distant points without any injury—considering, too, the increasing demand for this fine dessert nut in this country and in foreign markets—there can be no doubt about the profits to be derived from the establishment of a Pecan-grove. No part of an estate will prove of greater and more permanent value as a bequest to posterity.

In the southern states, in the region best suited to the cultivation of the Pecan-nut, lands of the required conditions are easily obtainable, abundant and cheap, particularly on the lower Atlantic or the Gulf coasts. As the trees come into bearing those found to yield nuts of inferior quality, and therefore of little market value, should be immediately taken from the grove and replaced by grafted trees of vigorous growth.

Mobile, Ala.

Charles Mohr.

Rose Notes.

THE dull, cloudy weather which has prevailed for the past month has plainly affected both the size and color of many of the best forcing Roses, and in some varieties it has also caused many malformed flowers, a trouble not usually met with so early in the season. There are some good flowers to be found, it is true, but there are also many poor ones.

This was quite noticeable at the recent exhibition of the Pennsylvania Horticultural Society, in Philadelphia, where few superior blooms were seen among the cut Roses. Dull colors and in many instances comparatively small size was the rule among these flowers, and beyond question this was due rather to lack of sunshine than to lack of intelligent care on the part of their growers.

Very prominent just now among the newer Roses is the so-called dark La France, the Duchess of Albany, a flower which has attained much popularity, for its first season, in some localities. It is very similar to La France in general appearance, the chief difference being in its color, which is a deep pink. Perhaps, even, it may be termed a rosy red. There are, however, decided differences of opinion as to the comparative attractiveness of the new color, and it will probably be hard to persuade some persons that the newcomer is really better than a good La France.

Madame Hoste is to be seen in good quality, and some buds are as large as those of Cornelia Koch, although not furnished with so stiff a stem. Madame Hoste seems free of habit both in growth and bloom, and may prove very useful, for it forces well. Its greatest drawback is its undecided color, the lemon yellow of the centre fading to white in the outer petals, and there is apparently considerable density in its shades of color.

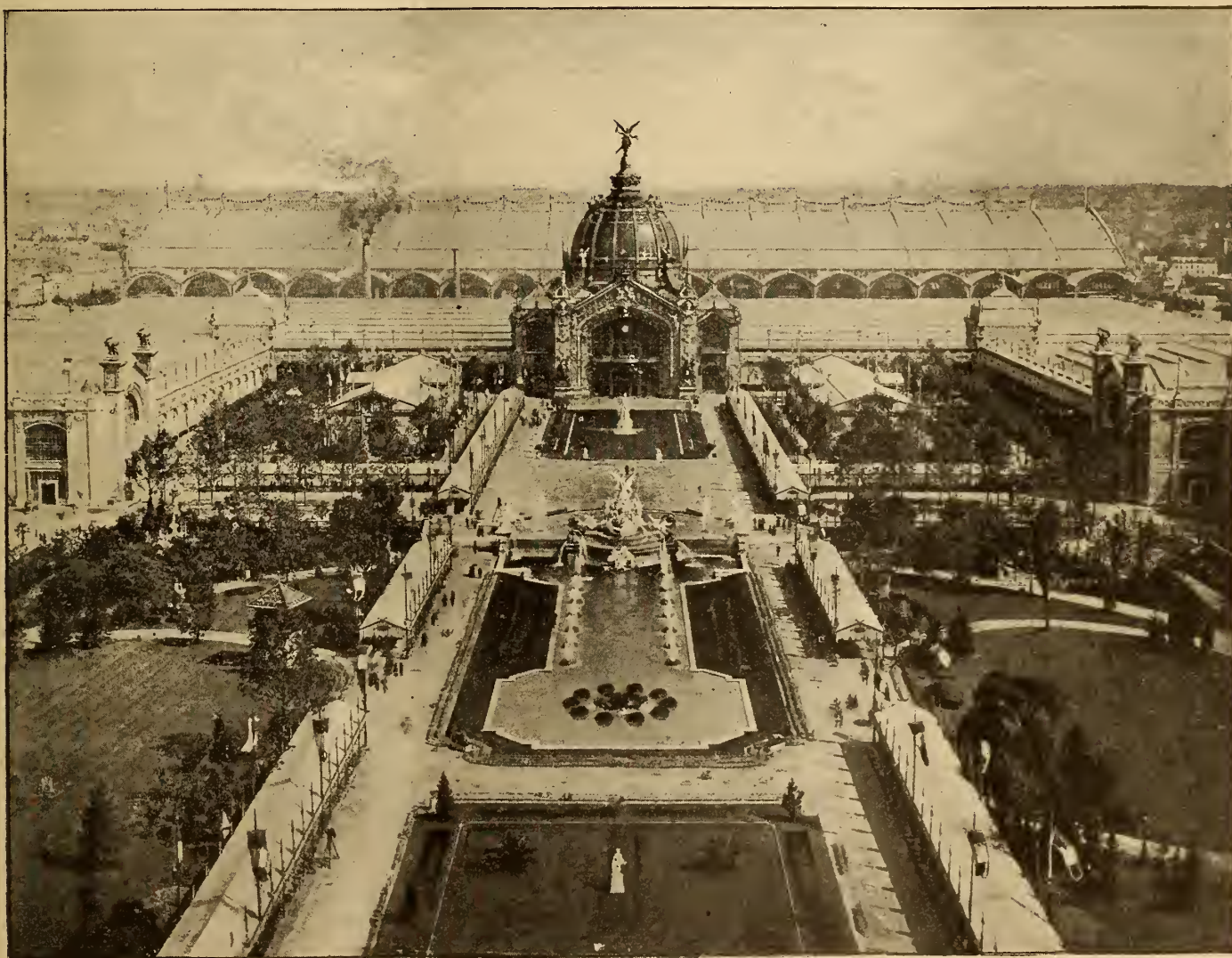
A Rose, not often seen in quantity now, is Ma Capucine, but at the Philadelphia Exhibition before alluded to, a glass filled with blooms of this pretty little Tea attracted much notice. Ellwanger describes its color as "nasturtium yellow." It is of slender growth and not large enough in bud to satisfy the popular demand for big Roses; and yet Ma Capucine is much

used in Europe as a button-hole flower, and it was thoroughly tested as a forcing Rose in this country some ten or twelve years ago.

A nice bunch of Meteor, in one of the exhibition collections, reminded one that, when in good condition, this is a remarkably pretty, dark variety, but, unfortunately, it is such a shy bloomer during the winter that it can hardly be considered a profitable sort for commercial growers.

The flowers of Souvenir of Wootton thus far have hardly met the high expectations it had raised, but the season is young yet and much better results may be produced later on. The bold looking foliage and sturdy growth give promise of better flowers. It seems to have the fault of producing its blossoms in clusters, and it will, therefore, be found necessary, when this is the case, to disbud it to a single flower. By this means larger blooms may be secured.

Pansies in recent years, a race of intermediate plants has been secured which is hardy, vigorous, free blooming, with most charming flowers, pure in color, and in many varieties having a very distinct perfume. As they have a more tufted habit than the ordinary Pansy, Mr. Robinson, of *The Garden*, an enthusiastic admirer of the race, has suggested that they be known as "Tufted Pansies." A recent issue of *The Garden* contains a plate of the variety Ariel—with a delicate mauve and white flower. This supplements two previous colored figures of other dainty beauties, and the series shows well the types of perfection in this flower. In comparison with the modern Pansy, the Tufted Pansy is a flower of moderate or even small size, but beside its more free blooming character, its tufted habit and somewhat less succulent stems, it is pleasing for its great purity and delicacy of color, with no trace of coarseness. The self-colored sorts are very beautiful, and a



Grounds of the Paris Exhibition from the Platform of the Eiffel Tower.—See page 566.

There are such wide differences between the climates of Great Britain and of the United States, that an opinion, based on European experience, cannot safely be offered in regard to the merits or demerits of a new Rose (or an old one, for that matter) in this country until it has been thoroughly tested here. An illustration of this was seen in the discussion that took place a few months ago in the columns of an English horticultural journal, as to whether the Rose Madame Lambard was or was not one of the most generally useful of the entire Tea class. A majority of the correspondents seemed to think it was decidedly the most useful; while on this side of the ocean a very different opinion prevails, and it is but little used.

Holmesburg, Pa.

W. H. Taplin.

Tufted Pansies.

AMONG charming and desirable hardy spring-blooming plants the Hybrid Violets must take a foremost place. By judicious hybridizing of various alpine Violets and fine

mass of one of the good whites, as the "Countess of Hopton," is a charming floral picture. As bedding plants Tufted Pansies are most desirable, coming into flower very early and blooming freely and continuously. Much attention has been paid to this race by the best English and Scotch florists, especially the latter, and numerous named varieties are offered. And it is to be hoped that some of our growers will interest themselves in these plants, which apparently have excited little attention here, but which will certainly become popular when their merits are known. It may seem a retrogression to cultivate Pansies of less than the standard three inches and upward; but the increase in size of the modern Pansy has been accompanied by an unpleasing tendency to coarseness, and there are still flower-fanciers who do not look upon big blooms of everything as of first importance, a fact which seems to require emphasis in these days. These Pansies may be had from seed, which is offered by English seedsmen, though finest varieties do not reproduce themselves truly.

However, a packet of seed will produce many charming varieties and good kinds may be selected from these if named plants are not obtainable. The culture is the same as for Pansies—a good, deep, cool, well enriched soil and frame protection in winter.

Elizabeth, N. J.

J. N. Gerard.

Orchid Notes.

Cape Orchids.—During the last few years an effort has been made to popularize some of the elegant little terrestrial Orchids of the Cape of Good Hope in British gardens, and the movement has been attended with a certain amount of success, though much remains to be done if they are to take a permanent place among our cultivated Orchids. Beautiful as some of them are, their successful cultivation is by no means such an easy matter as is that of the majority of the epiphytic species, and even when they appear to be doing well some of them have a way of taking French leave during the resting season that is particularly irritating. One cause of failure is, doubtless, the difficulty of imitating, under cultivation, the conditions under which they exist in their native homes, and when these conditions are understood and successfully imitated, these plants may become more familiar to us. A few years ago it was considered quite a feat to grow the beautiful *Disa grandiflora* successfully, and for the simple reason that its requirements were not understood. A writer in the *Gardener's Chronicle* has recently described the Disa-house of Messrs. James Backhouse & Son, of York, and shown what can be done when the task is set about properly. It is ninety-eight feet long by twelve and a half feet wide, partly sunk, and the sliding lights are taken off in fine weather from early spring to late autumn, while they are always left open at night. The tubers are planted out in a prepared compost and liberally watered. Under this treatment over five hundred spikes were produced which bore over a thousand flowers, and one spike was nearly three feet high and bore nine large flowers. Such a sight must have been worth going a long way to see.

Other species which have been successfully grown are *Disa crassicornis*, *D. lacera*, *D. racemosa*, *D. tripetaloides*, *Satyrion carneum* and *S. coriifolium*, with several others of considerable interest. Speaking of *Satyrion*s, a recent writer recommends that the tubers should be potted much as Hyacinth bulbs would be, and remarks that they are not more difficult to flower when properly grown.

The blue flowered group of Disas have long been sought after by cultivators, but hitherto they have been grown with very little success. During the present year several plants of *D. lacera* have flowered, and one of them has been figured in the *Botanical Magazine*; but, in spite of its novel color, the figure seems to suggest that only when grown in strong clumps would it make a very showy garden plant. Whether this is practicable remains to be proved, and at present appearances seem rather against it, unfortunately.

Cultivators of Cape Orchids will doubtless welcome a little work entitled "The Orchids of the Cape Peninsula," by Mr. Harry Bolus, F.L.S., which appeared some little time ago, in which much interesting matter relating to this subject is to be found. It appears that the majority of the species flower in early summer, yet there is no month (excepting, perhaps, April, in some unfavorable year) in which some Orchid may not be found in flower on the Cape Peninsula. Beginning in April the flowers of *Disa tenuis* and *Liparis Capensis* may be found. These continue in various situations until June, and are succeeded in July by *Disperis Capensis*, scattered everywhere over the Flats. These all have green or dull colored flowers, but a note of brighter color is struck when *Satyrion coriifolium*, with its orange flowers, and *Disa obliqua*, with flesh colored flowers striped and blotched with purple, appear. Several others quickly follow, until in October the maximum is reached. In November and December the Orchids on the Flats have disappeared, though they are still abundant on the mountains. "After December the number rapidly diminishes, yet the peerless *Disa uniflora* is in its glory on the rivulets of Table Mountain in February. The last to linger are the lovely blue *Disa graminifolia* and the flame colored *D. ferruginea*, which may often be found until late in March. The three last named are the brilliant product of the unclouded summer sun; and with them Nature gloriously closes, as in a gorgeous and many-colored sunset, the splendid array of these beauties of the floral year."

The *D. uniflora* here mentioned is none other than *D. grandiflora*, being an earlier name of the species, and we may conclude with the following remarks upon it, from the pen of Mr. Bolus: "This beautiful flower is the object of universal

admiration, and the name which has been given to it, the 'Pride of Table Mountain,' indicates the honor in which it is held. It is indeed the queen of terrestrial Orchids in the southern Hemisphere, as *Cypripedium spectabile* may be said to reign, though with less magnificence, in the northern. . . . It is still abundant on Table Mountain, although of late years large quantities of the tubers have been annually exported to Europe, and much needless destruction, arising from wasteful gathering by unskilled hands, resulted. But the summit of the mountains being Crown land, the government has recently intervened and restricted the removal of tubers within reasonable limits, so that, if this supervision be continued, there will be little reason to fear the extinction of this truly noble species."

London.

Calypto.

***Zygopetalum Burkei*.**—This is quite a handsome plant, and not at all common. It was introduced from Guiana in 1883, where it was found growing among the grass in swampy places and also on the drier uplands. It should be placed in the warmest house; indeed, we could do nothing with it until we placed it in the warmest corner of the Phalænopsis house, in company with *Phajus tuberosus*, *Odontoglossum Roezlii* and other so-called "miffy" Orchids. It now grows like a weed, potted in a mixture of loam, sand and decayed leaves, kept very wet, and syringed overhead at least twice a day. After growth is finished a little less water may be given. This species has a clustered habit, with oblong, lanceolate bulbs about three inches long, and two lanceolate, acuminate leaves about one foot long. The scapes, which appear with the young growths, are about twenty inches long, bearing half a dozen very attractive flowers, with greenish sepals and petals prettily mottled and barred with brown. The ovate, acuminate lip is pure white, faintly tinged on the margin with yellow; the crest, or ruff, has crimson colored folds. The flowers last quite a long time in perfection, and are found valuable for cutting.

Kenwood, N. Y.

F. Goldring.

***Urceolina aurea*.**—A group of a dozen pots of this plant, and comprising nearly forty spikes of its elegant brightly colored flowers, is very ornamental at this time of year, or indeed at any time. This species is an old garden plant, but it is not much cultivated nowadays. To be effective it should be grown in quantity and massed when in flower, and as the bulbs yield offsets very freely, there is no difficulty in soon obtaining a good number of flowering bulbs. The erect spikes are a foot long, and each one bears from three to five pendent flowers on thin pedicels, hanging like ear-drops. The corolla is urn-shaped, two inches long, the lower half bright yellow, the upper emerald green. The flower-spikes are developed after the leaves have withered. The plants should be potted in fibrous peat and sand and grown on a shelf in a stove. They do not like bright sunshine, being accustomed to the shade of woods, where they grow wild in the Andes of Peru. During growth they require a regular supply of water, but after the leaves change color no water should be given. There are two other species, viz., *latifolia*, which is larger in bulb and bears about eight flowers on a scape; and *miniata*, generally known as *Pentlandia*, which has bright scarlet flowers, and thrives in a green-house. It flowered at Kew in July last. The most useful of the three, however, is *U. pendula* (syn. *U. aurea*).

Kew.

W. Watson.

Work in the Vineyard.—The frequent rainy days this fall have interfered seriously with working the soil, especially where it is of a clayey nature, but opportunity has thus been given for early pruning of the vines. This work is more easily and expeditiously and more comfortably done in mild weather than in the winter when the ground is frozen or covered with snow. A few grape-growers hold to the antiquated notion that no pruning should be done except in February, but experience has proved that no harm comes from early cutting. The work of the plant is not completed with the ripening of the fruit and the fall of the leaves. The wood continues to harden, and meanwhile the sap does not cease its movements. This sap, which in spring will follow the cut of the knife or shears like water, is much thicker at this season of the year, and exudes, if at all, in a thick gummy condition. If, as some suppose, the ripening of unnecessary wood is a tax on the plant, its removal now certainly must be a relief and a benefit to the remaining wood. Whether this theory is correct or not, autumn pruning of the Vine is on the increase, and constantly growing in favor. It not only gives the plants a neater appearance, but affords much better facilities for clearing up the ground and putting it in good condition for passing the winter. If the plants need laying down for protection it is

more easily accomplished. My Vines were all pruned last month much earlier than usual, and whatever the happening of the winter, the job is out of the way and causes no apprehensions.

Montclair, N. J.

E. Williams.

Brussels Sprouts.—This delicious vegetable is grown quite extensively in the Cauliflower districts of Long Island, and is proving a profitable industry now that its cultivation is getting better understood. It is grown in the same manner as the Cauliflower, the seed being sown early in June and the plants set about the 1st of August. The usual custom is to set the plants in the same field as the Cauliflower, as they require the same treatment in all respects, and are followed by the same crop, which is usually Corn. The crop of Brussels Sprouts comes in conveniently, as it need not be sent to market until the Cauliflower season is past, as ten or twelve degrees of frost does not in the least injure it, while a few degrees of frost is beneficial, having the same effect as it does on the Ruta-baga. Some of the growers have found by experiment that the seed grown on the island does far better than that which is usually sown, the plants being more vigorous and more productive. The crop is far more remunerative than Cauliflower, as it is more sure, and the prices better, while there is a great saving in freight. A bushel of sprouts will bring as much, usually, as a barrel of Cauliflower, while the yield per acre will not be materially less. It is surprising that Brussels Sprouts are not found in every private garden, as they are among the most palatable of vegetables and easy to grow.

Floral Park, L. I.

C. L. Allen.

The Japan Persimmon.—A neighboring gardener has just brought me some excellent fruit of the Japanese Persimmon, to show what a small bush in close quarters can produce. His plant is in a box but eighteen inches square, and it is but three feet high. During the summer a place is found for it under the shade of a Grape-arbor, and in the winter in a cool cellar. There are about a dozen ripe fruits on it now and last year fourteen were gathered. The possessor of this Persimmon says that it requires less care than any plant he has. As the fruit of some varieties is delicious, I think it should be more generally known that its cultivation is very simple. Would it not be a good addition to the list of fruits for cultivation under glass?

Germantown, Pa.

Joseph Meehan.

Correspondence.

The Abandoned Farms of New Hampshire.

To the Editor of GARDEN AND FOREST:

Sir.—Mr. N. J. Bachelder, the Commissioner of Agriculture and Immigration, sends me a price list of more than one hundred abandoned farms in this state. An accompanying note says that these farms have been reported by the selectmen of the various towns to have fairly comfortable buildings, and that they comprise but a small part of the abandoned farms of the state, a full description of which will be given in a forthcoming catalogue, if the necessary facts are reported by the owners. The Commissioner observes that "in most instances these farms have not been abandoned because the soil has become exhausted, or from the lack of natural fertility, but from various causes appearing in the social and economic history of the state, which will be more fully discussed hereafter."

This is an interesting and important undertaking. The law authorizes the collection of necessary information in regard to the opportunities for developing the agricultural resources of the state through immigration, and the facts obtained and the advantages offered to immigrants are to be circulated where the Governor and Council may consider it for the best interest of the state. The inquiry and discussion which will result cannot fail to be of great interest and value, and I hope that everybody will co-operate with Mr. Bachelder in his purpose to make the investigation as thorough as possible. At this stage I submit some notes of observations made while living here during the last ten years.

Some of the abandoned farms belong to men who left them in early life and have established occupations and homes elsewhere. There is nothing mysterious or remarkable in their having remained away; the point of interest is in the fact that nobody has cared to buy and work these farms, as many of them have long been for sale on extremely easy terms. One of the chief reasons why men who could have bought such farms have not done so, is that they have preferred to go west and take the chances of bettering their condition there. I have seen many of them, in all the regions from western Iowa and Minnesota to the Pacific coast; most of them working

harder than they would have to work here, and having a much poorer living, the life of the women a long starvation from homesickness and hunger of mind and heart. But a few of these emigrants have grown rich, and they all leave their old homes in the hope of being among the few fortunate ones.

The conditions of soil and climate in this state are such that farming will yield a living on most of the land that has been brought under cultivation, if the farmer and his family do all, or nearly all, of the work, and practice reasonable economy. Some accumulation would be possible, but the gain would be slow. Some of the best farms would admit of the employment of a hired man, during a part of the year, at least, if he would work faithfully and efficiently for moderate wages, as in earlier times; but, in general, the farmer and his wife and children would have to do nearly all the work. The return for their toil, the prospect or outlook for them, would be the possession of a home of their own, with the same steady hard work kept up till age unfits them for it, when they may hope to have laid by something for the support of their later years.

Now the race of men and women who will go on thus toiling patiently and practicing small economies all their lives for the sake of a mere living, is very nearly extinct in this region. The young men and women will not stay here under such conditions; they will go elsewhere for the chance of doing better. Illusion is an important element in the life of most Americans. We do not value security very highly, but prefer the possibility of splendid fortunes to the certainty of moderate gains. Usually the possibility is only imaginary, but the fascination of the game lures young men on, and there is still an element of inflation and romance in the practical life of our country.

It is also to be noted that the growth of manufacturing industries has brought about great economic and social changes. In many instances the former town-organization has been modified by the development and dominance of the manufacturing villages, with their population of operatives, often largely a floating or changing one, in the employ of the proprietors of the mills; and it is often apparent that the farmers have less interest and prominence in town affairs than they had under the old order of things. One effect of the change is that the sense of community, of a common interest in the welfare of the town, has been to a considerable degree eliminated. There appears to be less of public spirit, and, at any rate, what remains is not distributed among so many citizens as formerly.

The truth is that the old New England civilization and organization of society has here mostly come to an end. It has run its course, has completed its cycle, and we are beginning again with new and very different materials. We have already large populations of French Canadians and other foreigners, and it is plain that for a long time to come we shall have, in the principal communities of this state, the civilization and the intellectual and social life which these people and the Roman Catholic Church will produce under the new conditions of life in New England. The farmers still stand by the churches of the earlier time, but the bond which they formerly supplied for the social life and public spirit of the towns has become less vital and efficient with the decline of the rural population.

Many people here advise the encouragement of immigration from the north of Europe; and I have no doubt that Swedes and Norwegians could make a living on these abandoned farms, because they would do more work and consume less for their living than native New Englanders, and the value of taxable property and the volume of business in the towns would be increased. But the gain would be temporary. If the new inhabitants send their children to our schools we shall soon Americanize them to such a degree that they will not stay on the hills, and in twenty or twenty-five years the farms will be more abandoned than they are now. I think there can be no permanent restoration of farming in this state without some considerable changes in the methods of it, and in the thought and methods of life of our people; and beginnings in such things are apt to be difficult.

Natural conditions are favorable for stock-raising, and many of our leading citizens have done much to promote the general welfare by improving the character of farm animals. The state is adapted, in a peculiar degree, to the growing of sheep. I have eaten mutton in every part of our country which produces it, but have never anywhere else found any that approached the excellence of that which is grown in New Hampshire. If the people of the cities were aware of its quality there would be a great demand for it at the best prices, but there is not enough to supply the few people who use it in the

villages here. The dog is a kind of sacred animal with us, and dominates the community. He is the object of a personal affection, a sentiment of romantic regard, which rises far above such sordid considerations as the possible profits of sheep raising. Our best people—and some others—keep dogs, and when the instinct of the chase awakens in them and they go forth upon the hills and hunt down the sheep, and have to die themselves for their frolic, we all mourn their fate. The sheep can be paid for out of the public treasury—there is a tax on dogs—but nobody has any sentiment about sheep. We are in that stage of development in which we grow dogs and delight in them, but not sheep.

There is considerable land in farms in this state which, if properly managed, would be more profitable for the production of timber than for any other crop, and which would be worth more than it is to-day if forest-conditions had always been maintained on it. But timber land here needs to be handled with judgment and foresight. It has to be protected against fire and pasturage, of course, and unless the timber, when it has grown, is cut off intelligently, forest land is not always a good permanent investment. It is the opinion of many of our intelligent lumbermen that much of our timberland might be made more profitable by improved methods of management.

The results of our system of cultivation, as shown in many of the farms in all the older parts of our country which have not been abandoned, and the inclination of so many of our people to seek their fortunes by leaving their early homes, point to the fact that a considerable proportion of our material success has been achieved by the partial exhaustion of our capital in the fertility of the soil. We have amassed wealth by robbing the future, and we are transmitting our impaired and damaged heritage to those who come after us. Whatever may be the fertility of the abandoned farms of this state, the methods of culture widely followed in our country have seriously diminished the productive capacity of the soil, and many farms in other parts of the United States would in time be abandoned if there were still, as formerly, a boundless area of virgin land for our people to appropriate. Perhaps we may in time come to understand that the earth is adapted to yield a living to a considerable number of men if they will wisely till it and husband its capacities; but that its resources are not profuse enough to sustain indolent luxury or careless waste, and that toil and scant indulgence are, in the long run, inevitable for the mass of men. Thus far in human history slavery and war have been pretty constant conditions. The forms change, but the essential facts abide hitherto, and perhaps they may still do so.

In my judgment, existing conditions co-operate to make an opportunity for an important change in the economic and social elements in the life of the state. I think that many of the abandoned farms, and many of the hill farms which have not been abandoned, would be good investments for men of means who live in the cities, and who would like to have summer homes for their families in the country. The climate of our state does not suit everybody, of course. But for those whom it does suit, it would be hard to find anywhere on the planet a more salubrious and delightful region than this is for the time between the first of June and the last of October. No other mountain country that I have seen has such expanses of uncontaminated and vital air. I think that, looking far ahead, as a few men at least should try to do, looking at all conditions and relations comprehensively, the best and wisest thing for all concerned would be a considerable movement of men of wealth from the great cities of our country to the hill farms of this state. They should be men of intelligence, with adequate knowledge and judgment for the management of their woodlands, so that the growing of timber as a crop would be profitable. There is no ground of hope for the future prosperity of our people unless forest-conditions are permanently maintained on a large proportion of the land of the state. At the same time a system of highly concentrated farming should be followed on whatever land is kept in cultivation. The ownership of farms here by men from the cities would render such methods of culture possible, would give profitable employment to many laborers, and would increase the value of land and the amount of business in every part of the state occupied by the new summer homes. It would be the establishment of better conditions, the beginning of a new order of things which would be permanently favorable to the interests of our entire population.

I should be glad to stimulate public interest in the investigations which are now in progress under the direction of the government of this state, and I am sure that the reports of the New Hampshire Commissioner of Agriculture and Immigra-

tion will deserve the attention of all students of American civilization.

Franklin Falls, N. H.

J. B. Harrison.

Native Shrubs.

To the Editor of GARDEN AND FOREST:

Sir.—I was much pleased with your article calling attention to the *Viburnum lantanoides* and speaking of its great beauty. It may not flourish in the dry, sunny garden of the nurseryman, as you say; I have found it, however, very easy to transplant into places shaded by deciduous trees. Small bushes taken from the neighboring woods in the fall, and even when in flower in the spring, not only survive but grow luxuriously. Some of these thus transplanted are now ten feet high and are very delightful in their striking and beautiful foliage as well as in their blossom.

The name of Moosewood, given by you as the common nomenclature, is also applied to the Striped Maple (*Acer Pennsylvanicum*), though not so commonly as the Viburnum. The Striped Maple is more of a tree, and is very graceful and pleasing, and also easy to transplant.

There are other of our native shrubs of great merit, which can easily be transplanted. The Ground Cedar or Savin (*Juniperus communis*), with its vigorous, close growing, shining foliage and hardy habit, can be used with good effect in rocky, sterile places where it is difficult to get other shrubs to grow.

Nothing, however, is finer than the Mountain Laurel (*Kalmia latifolia*); nor is it difficult of cultivation, as many suppose. In preparing places for this plant I have found that it grows and blossoms best in beds made like those used for Rhododendrons, of a depth of about two and a half feet, and filled with one-half peat mud and the other half loam and manure and some sand. The peat I suppose is useful in retaining moisture. The Laurel has many small roots that do not extend a great way from the bush, but permeate every inch of the soil they reach in ground prepared in this way.

Beverly Farms.

C. W. L.

Forest Fires.

To the Editor of GARDEN AND FOREST:

Sir.—The Nemadji River drains, in Wisconsin and Minnesota, very little land except deep beds of clay with some layers of fine sand.

The surface rises, westward from Lake Superior, some 400 feet by terraces, and through these the streams have cut deep ravines. The banks of these ravines are now held in place by a dense growth of Dogwood, Hazel, Elm, Poplar and Balm.

If, with the settlement and clearing which will soon come, these banks are stripped by escaped fires (no thoughtful person would clear them), land-slides into the streams will be frequent and much earth will be washed into the bay; and thus not only will valuable farming lands be destroyed, but navigation will be obstructed.

The situation can be indicated by the simple statement that many homesteaders have killed their own standing Pine by setting fires they could not control.

Practically we have no law to restrain any person from setting fire as he may choose.

Duluth, Minn.

H. B. A.

Recent Publications.

Die Natürlichen Pflanzenfamilien, conducted by A. Engler and K. Prantel, Leipsic, Verlag von Wilhelm Englemann, 1889. This book is indispensable to the library of every working botanist, who will discover in it vast stores of exact information which, thanks to small but clear typography and a system of abbreviation, is compassed in a wonderfully small space. It is copiously and handsomely illustrated with exceedingly well chosen and well executed figures, which display the structure of the different families and genera discussed, as well as their larger aspects, as the species appear growing in their native haunts. The first volume is devoted to *Cycadaceæ* by Professor Eichler; *Cordaitaceæ* and *Coniferae* by the same, the last most carefully and elaborately worked up and admirably illustrated; Professor Eichler has also elaborated the *Gnetaceæ*. The *Angiospermae* are by Engler, the *Potamogetonaceæ* by Ascherson, the *Najadaceæ* by Magnus; the *Juncaginaceæ* by Buchenau and G. Hieronymus, the *Gramineæ* by Heckel, the *Cyperaceæ* by Pax, the *Palmae* by Drude, the *Araceæ* and *Liliaceæ* by Engler, the *Antiarthlidaceæ* by Pax, the *Orchidaceæ* by Pfitzer. This bare enumeration serves to show that several of the largest and certainly some of the

most difficult families of plants have received fresh and careful treatment at the hands of some of the most distinguished specialists of the day. This great work is being continued with regularity, and, considering its character, with wonderful and commendable rapidity.

The *Annual Administration Report for the Forest Department of the Madras Presidency, 1887-88*, has reached us, and shows that no less than 564 square miles of reserved forest and 1,498 square miles of reserved lands have been added to the areas under the control of the Forest Department during the year. Some remarks upon the Madura district, by Colonel Campbell Walker, Inspector-General of the Forest Presidency, which appear in this report, are as applicable to our western forests as they are to those of the whole of the dry regions of India; and as they are spoken by one of the most capable and experienced forest-officers of the age, they may well be weighed carefully by persons in this country who see no danger in the destruction of the forests on our western mountains. "It takes a long time to reclothe the denuded slopes; but nothing struck me more, after a long and intimate knowledge of the district, than the good results apparent from conservancy and protection, which the villagers themselves admit. It cannot be too clearly borne in mind that we just stepped in in time to prevent utter ruin, for not only had all trees and shrubs been cut, but the very roots rubbed up, and the hilly slopes were fast approaching the last stage, in which remedial measures are all but impracticable, except at very great cost; the soil having been washed away and all seed-bearing trees and shrubs exterminated, nothing being left beyond bare and arid slopes seamed with mountain torrents and ravines, which carried off the rain immediately it fell."

The financial results of protecting the Indian forests are most gratifying. Twenty-five years ago they produced nothing whatever to the government. They began to yield a considerable net income, however, in a few years after forest-conservancy had been established, and it has increased steadily every year since, now amounting to from \$5,000,000 to \$6,000,000 annually.

Report of the Progress and Condition of the Botanic Garden of Southern Australia during the year 1888. Dr. R. Schomburgk, Director.

The operations of the garden were considerably interfered with by the unprecedented droughts of the year. The amount of rain was only 14.543 inches, or nearly the lowest average ever recorded, and 6.446 inches below the general average of the forty-nine years preceding. Excessive heat, with the thermometer rising to 170 and 177 degrees in the shade, added to the difficulties of conducting horticultural or agricultural operations in the colony; but unfavorable as this condition of things was, it adds to the value of a series of experiments carried on in the garden to determine the value for dry regions of various Grasses and fodder plants. Dr. Schomburgk reports that among these the most successful in withstanding the drought was a newly introduced Grass, a native of South America, *Paspalum dilatatum*. "This valuable Grass has maintained its luxuriant growth without irrigation during the disastrous drought. It grows in tufts, attains considerable size and makes a good leafy growth and roots strongly. Prairie Grass (*Bromus unioloides*) proves one of the best and most nutritious of Grasses, and is little affected by our driest season. The drought did not seem to have the slightest effect upon it. One good characteristic of this Grass is that the self-sown seeds grow freely, and the Grass extends. It is one of the best Grasses for hay." The dry weather made no impression on the California Bunch Grass (*Elymus condensatus*), and *Panicum Crus-galli* stood the severest drought, growing vigorously during December, January and February, supplying nourishing feed for cattle. The Japan Clover, so called (*Lepedeza striata*), does not succeed in the dry climate of South Australia, a fact which confirms the experience of persons who have tried this plant in dry Mediterranean countries. It is evident that moisture is essential for its rapid growth, as is proved by the way this plant has spread in a comparatively short time over a large part of our south Atlantic states.

The value of this report is increased by the addition of a number of colored portraits of specimen trees growing in the garden. Of these, the most interesting to Americans is the so-called Pepper tree, a native of Peru, and of late years largely planted in California for shade and ornament. The specimen in the Adelaide garden was planted in 1863, and has attained the height of sixty-four feet seven inches. The spread of its branches is fifty-four feet, and the girth of the trunk three feet from the ground is nine feet nine inches, a remarkable development for a tree which does not often attain such dimensions.

A specimen of *Pinus Sabiniana*, the Digger Pine of California, planted in 1868, has grown to the height of fifty feet, with a spread of branches of thirty-five feet, while the trunk four feet from the ground is seven feet in circumference—certainly a satisfactory growth.

Recent Plant Portraits.

BILLBERGIA VEXILLARIA, *Revue Horticole*, October 16th; a beautiful hybrid obtained by M. André by crossing *B. thyrsoidea* and *B. Moreli*, the latter being the pollen parent. It is a striking plant, with compact habit and showy inflorescence, the scarlet bracts making a strong contrast with the white stem and ovaries and deep dark purple corollas.

Botanical Magazine, November.

CARLUDOVICA ROTUNDIFOLIA, *t.* 7083; a noble species from Costa Rica, nearly related to *C. palmata*, from the leaves of which are manufactured the well known Panama hats, but with larger leaves, borne on petioles sometimes nine feet long.

IRIS BAKERIANA, *t.* 7084; under this name, Professor Foster describes a slender new Iris from Armenia. It is one of the bulbous species, not unlike *I. reticulata* in general appearance, but the cylindrical leaves separate it from that species. It flowers in England in February and March, and some of the flowers are delightfully fragrant with the odor of Violets.

XYLOBIUM LEONTOGLOSSUM, *t.* 7085.

PHAJUS PAUCIFLORUS, *t.* 7086; a native of Java, belonging "to a section of the genus with small flowers which are produced upon the stem, and not amongst the leaves or on tall scapes from the base of the old pseudo-bulbs, as in others of this genus. In this respect, as also in the form of the lip, it approaches those Indian species of *Calanthe*, in which the lip is at the base of the column, and which render it very difficult to give technical characters for the separation of the two genera."

GERBERA JAMESONI, *t.* 7087; the first representative of this South African genus of *Compositæ* introduced into European gardens; a showy plant, the ray-florets represented as dull yellow on the lower side and bright orange or flame-colored above.

Notes.

Mr. George W. Childs was chosen President of the Pennsylvania Horticultural Society at the annual meeting for electing officers held on Tuesday, the 19th instant.

Five books dealing with the pleasures of contemplative outdoor life and the minor beauties of nature as thereby revealed were recently reviewed in a single issue of the *Atlantic Monthly*.

No plant is prettier in a hanging-basket than the common wild Strawberry. In France one often sees it, used alone, falling in graceful, long tendrils, and equally charming whether in blossom or in fruit.

The hardwood trees of Maine are yearly becoming of more importance in the sum of its lumber exports. As one item we may note that during the past year seven million spool-bars of birch have been shipped to Scotland.

A bibliography of French publications on forests and forest-science, prepared by one of the Professors of the National Forest School, at Nancy, for the exhibit of the Forest Department at the Paris Exposition, contains 8,000 titles, a fact which shows the value placed on forests by the most civilized nations.

Mrs. Mary E. Schenley, a lady of Pennsylvanian origin who has long lived in England, has recently given 300 acres in the city of Pittsburgh for use as a public park, and when it is conveyed to the city there will be granted the privilege of purchasing, at current rates, 100 additional acres which adjoin it.

On Saturday last the *Detroit Journal* gave to each one of 2,000 little girls under twelve years of age a potted Hyacinth bulb, with instructions how to care for it. The flowers are to be exhibited at a charity festival next spring and it is hoped that the children's display will be an attractive feature of the affair.

Among the plants introduced into this country from Japan by Mr. Thomas Hogg is a dwarf, compact, pyramidal variety of the Japanese Hemlock (*Tsuga Sieboldii*), which does not seem to be much known yet beyond the borders of the Flushing Nursery. It is an attractive and interesting plant, nevertheless, well suited to occupy a place in a small garden, and well worth cultivating in any collection of conifers.

The handsome new Brazilian Cucurbitaceous plant recently described by M. Naudin, under the name of *Sicana odorifera*, has this year set fruits for the first time in Europe in the gardens of the Villa Thuret, where it is expected that they will ripen and perfect seed.

Upon a few small plants of *Syringa oblata* which have come under our notice near this city the leaves still remain fresh and green. There is no mildew, nor is there any sign of turning to bright autumn colors, which is said to distinguish this Lilac from others. From other species and varieties near these plants the leaves fell weeks ago.

Among the Chrysanthemums which competed with Ada Spaulding for the cup offered by Mrs. Harrison, Mistletoe, raised by Mr. Frederick Dorner, is said by *The American Florist* to be remarkable for a shade not before seen in Chrysanthemums. This is described as a deep wine color on the upper side of the florets, with a showy mauve reverse. The flower is incurved.

According to the *Pacific Rural Press*, the Sugar Pine-region on the Georgetown divide has been fired in twenty places by the sheep-herders to improve the pasture next year. The mountaineers complain bitterly of the herders, who have destroyed, as is asserted, hundreds of acres of the finest timber. It is claimed that nearly all the destructive forest fires in that vicinity of late have been deliberately kindled by the sheep men.

At the close of the Philadelphia Chrysanthemum Exhibition a committee was appointed for the selection of the finest plant in the hall, to be presented to Mrs. Elizabeth Schaffer, the lady who presented the valuable hall building to the Philadelphia Horticultural Society. The plant selected was one of the two specimens of Mrs. A. Blanc, both prize winners, exhibited by Mr. James Verner, gardener to Mr. A. J. Drexel, who kindly consented to the presentation. This variety was sent out last year by Messrs. Craig & Bro., of Philadelphia.

Professor Bailey, in a recent Bulletin on Tomatoes, from the Cornell Experiment Station, says that out of 200 varieties tested, six could be selected which would combine the desirable market qualities of the entire list. These would be Ignatum, Beauty (or Acme), Mikado, Perfection, Favorite, and Potato Leaf; for very early, perhaps Advance, or Salzer, or Prelude might be added. Of recent varieties especially valuable for amateur cultivation, Dwarf Champion, Lorillard, Peach and Prelude are mentioned. Good varieties seem to run out in about ten years. It is impossible now to get a sample of the Tilden Tomato, once very popular. Trophy is becoming inferior, and Paragon begins to show the same weakness. Frequent transplanting of the young plant and good tillage are essential. Liberal manuring, too, is good practice, although there is a prevailing notion that strong feeding encourages an unprofitable growth of the plant at the expense of the yield of fruit.

The great horticultural exhibition to be held in Berlin next spring will differ from its predecessors in the paramount attention paid to the decorative side of the art—that is, to the employment of plants and flowers in in-door decoration. Only a small part of the exhibits will be shown out-of-doors, the majority of them finding place in a large, permanent exhibition palace, to which green-houses are attached, and in a temporary building to be erected near by. The decoration of ball-rooms, living-rooms, banqueting tables, winter-gardens, etc., will be displayed in appropriate apartments; fountains of various sorts will be shown amid varied groupings of plants; window and balcony gardening will be illustrated, and garden sculpture shown; one immense hall will give room for the erection of arbors and pavilions; decorations for christenings, for weddings and for funerals will be displayed, and all these branches will be open for competitive essays. Of course, with all this, the usual features of a horticultural exhibition will be found, and, moreover, a display of gardening literature and landscape-gardening designs. According to the full descriptions and the numerous plans published in a recent number of *Gartenflora*, this exhibition promises to be of singular interest. It is called a "General Exhibition," but whether it is to be an international one or not we have not seen distinctly stated.

Several large collections of trees and shrubs formed an important and interesting feature in the permanent arrangement of the gardens of the Trocadéro at the Paris Exposition during the past summer. The broad-leaved evergreens and then the conifers were naturally the most conspicuous and satisfactory features in these exhibits, because these plants

recover from the effects of transplanting and push out new growths sooner than plants with deciduous leaves, which often do not get hold of the ground fairly for two or three years after they have been transplanted. The number of new plants in these collections, or even of very rare ones, was surprisingly small; and many species of North America, and of eastern Asia, now comparatively well known in American gardens, were entirely unrepresented at the Exposition; although nearly all such plants may be confidently expected to flourish in central Europe. The naming of plants in these collections was not, on the whole, satisfactory; but certainly it was not less so than the nomenclature in commercial establishments everywhere. The largest collections were those of Croux & Fils, of Val d'Aulnay, near Sceaux, and of Honoré Defresne, of Vitry. In both collections there were fine series of specimen plants of our evergreen Magnolia (*M. grandiflora*)—deservedly one of the popular trees in western and southern France, and for many years a specialty in several of the great French nurseries—of Ivies, and of standard, and half specimen of Rhododendrons in many varieties. In the Croux collection were gathered together from the gardens of southern Europe many evergreens, rarely seen at the north. These added interest to the collection, of course, although hardly to be placed among so-called hardy plants. M. Croux showed three conifers which were described as "new." These were a White Pine (*P. Strobus*), with leaves faintly marked with transverse bands of yellow; a dwarf variety of the Norway Spruce (*Picea excelsa*), with a globular head, out of which a few straggling branches grow up irregularly; and a dwarf, compact growing form of the Scotch Pine, called *P. sylvestris columnaris compacta*. This is a feathery and a rather striking looking plant, which, until closely examined, would hardly be taken for any form of Scotch Pine; it was the only one of the three plants of any real value; and perhaps the most interesting novelty in its class shown at the Exposition.

On the 29th of September last the centennial of the birth of Peter Joseph Lenné was celebrated by a gathering of German landscape-gardeners at the village of Bornstedt, near Potsdam, where he lies buried. Holding for many years the position of Director of the Royal Gardens in Prussia, Lenné is considered, by his fellow-countrymen at least, the greatest landscape-gardener of his time. The son of a court-gardener at Bonn, he studied first at home and then in Paris, and later traveled widely in Europe, being greatly influenced, as he confessed, by the example of Kent. Thoroughly versed in horticulture, architecture and engineering, as well as in the principles of landscape-design, he was charged, while still a young man, with numerous tasks in Potsdam and its vicinity, building the so-called "Russian Village" at Potsdam, and restoring the royal gardens, which had suffered from grievous neglect during the long wars with Napoleon. Frederick the Great's gardens at Sans Souci were remodeled, and, we must believe, greatly improved by his hand, and the work was very quickly done, for he had previously established government nurseries, whence he could draw an abundance of material, and preparatory schools, which supplied him with efficient assistants. In 1832, he transformed the Thiergarten, in Berlin, originally a royal hunting-park, into a public garden, which, improved by his successors, is now one of the most beautiful in Europe. It was an idea of Lenné's that it should be ornamented with memorials of national significance. In 1845 he laid out another park, the Friedrichshain, in Berlin, and transformed many squares within the city into blooming gardens. In 1848 he turned a flat kitchen garden at Potsdam into the Marly Park, which has been called "an ideal work in the English style," and later designed the "Sicilian" and "Northern" gardens, with their contrasting forms of vegetation. These are but a few of Lenné's chief undertakings. In speaking of their number and variety a recent writer in *Gartenflora* says: "In all his works, which were conceived on broad, vigorous lines and with a masterly power of in-grouping, he took creative Nature as his guide and developed thereby his own creations in a personal style which found many followers." But any one who remembers the stately terraces and plant-houses at Sans Souci, for example, or the effect of the great central avenue in the Thiergarten, will recognize that his following of Nature did not mean servile imitation, but that he knew what differences of treatment were required in different situations, and could work well in a semi-formal as well as in a thoroughly natural way. He died in 1866, and is commemorated by a bust of Rauch's in the garden of the new palace in Potsdam, by a portrait in the Town Hall of Berlin, and by a street in Berlin and one in Dresden, which have been called by his name. *Magnolia Lenné*, the handsomest of the hybrid Magnolias, recalls his name to all lovers of trees.

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Forestry in the Agricultural Colleges and Experiment Stations.

A BULLETIN on the subject of Forestry has lately been issued by the Agricultural Experiment Station at Brookings, South Dakota. When we consider how young this station is, and how much time is necessary to determine and prove the substantial facts in relation to forestry; and when we consider further that a climate in which the rainfall from the first of September, 1888, to the thirty-first of August, 1889, was less than ten inches is rather a discouraging one for the tree-planter, we need hardly expect to find in this record much that is of general interest and application. And yet every reader will be pleased to note that so far as they go, these experiments indicate that fruit-growing and forest-planting can be made successful on some of the Dakota prairies.

The bulletin goes into particulars as to planting and cultivation, and gives in detail just such information as the tree-planters of that region stand in need of. The problems discussed, however, are not all of merely local interest, for no one can read without profit the testimony in favor of shallow cultivation as a means of mitigating the effect of drought, for it illustrates a principle of universal application. Even in sections where the annual rainfall is much greater than it is at Brookings, it is important in our hot, dry summers to husband the supply of soil water. The records of the Dakota Station show that but a fraction more than three inches of rain fell during the three spring months of this year, and that a hot June followed with a rainfall of less than one and a half inches. It is not surprising that the prairie grass seemed dead for want of water, but it is instructive to read that, even then, moist soil could be found anywhere in the plantation of young forest-trees by brushing away a little of the surface with the foot. This condition was due to frequent shallow stirring with harrow-tooth cultivators, and it is another evidence that a thin layer of loose earth—a "dust blanket"—is a most efficient mulch in any climate, and that if "there is a remedy short of irrigation for long seasons of drought, it will be found in deep plowing and thorough shallow cultivation."

The purpose of this article, however, is not so much to

discuss the matter of this particular bulletin as to call attention to the fact that the country has a right to expect from the agricultural colleges and stations a good deal of substantial work in forestry, even if it is elementary. At the late meeting of the American Forestry Association in Philadelphia, Mr. N. H. Egleston, of Washington, offered a resolution "that our agricultural colleges should regard it as one of their most manifest duties to give the subject of forestry a prominent place in their curricula of instruction, and that every experiment station should engage in investigating those branches of forestry which have special importance in the localities in which they are situated, or which are of general interest to agriculture and the arts." This resolution was adopted without reference to a committee, and the facts of the case seem to give ample justification for it.

The forests of the country have, beyond question, important relations to agriculture and the mechanic arts, and it was for the promotion of these that the colleges were founded by the general government. The experiment stations were endowed for the purpose of research in the sciences connected with agriculture, and this purpose would naturally include investigations in the field of forestry. The colleges have an endowment of about \$15,000,000, with some 700 professors and 12,000 students. There are forty-six experiment stations, with eleven branch stations, employing 370 observers, a large portion of them trained in the prosecution of experimental inquiry, and in addition to \$125,000 a year given by individual states, besides fees for analyses and the like, these stations receive from the general government \$600,000 a year. Institutions manned and equipped with such care and at such cost ought to be able to give some attention to so important a subject as that of forestry. Some of the colleges and stations have begun forestry work in earnest, as this Dakota bulletin testifies, and perhaps preparation for the work is going on in all of them. In the great majority of them, however, neither catalogues, reports nor bulletins make mention of the subject.

In a country where there is no systematic forest practice, and therefore no trained foresters, we cannot expect the colleges to give instruction in the refinements of the art, nor would it be profitable for the stations to make such investigations as are carried on in the older forest experiment stations of Europe. But much work of immediate practical utility can be prosecuted in the nursery, the field, the laboratory and in the natural forest, where there is one within reach and under the control of the station or college. This is not the place to state the problems which can be hopefully attacked in this way, but an admirable outline of the general field of research is given in Mr. Fernow's report for 1887, which was reviewed in these columns at the time it appeared. What is first wanted is a realization by the colleges and stations of the necessity for work in forestry and a determination to undertake it. The particular course to be pursued by each will be matter for after consideration.

Peter Kalm, a Swedish naturalist and a pupil of Linnæus, visited America in 1748, at the instigation of the Swedish government, for the purpose of examining the natural resources of this country. His journal, afterward translated into English, gives one of the best accounts of the natural features of the northern states, in which Kalm traveled extensively, and of the agricultural resources of the people that appeared during the last century. The following quotation from this journal is as true to-day as when it was written 130 years ago. The same wasteful methods of treating forest-property are still in force over a large part of the territory of the United States. They have wrought inestimable damage to great areas of country, and must sooner or later destroy the productiveness of this land. That this habit of annual burning has not done already greater damage than it has, shows the wonderful fruitfulness of this country and the recuperative powers of the

forest in the moist and salubrious climate of eastern North America. It can be a question of time only, however, when the annual burning which Kalm lamented in the following passage, will exterminate the forests and destroy the reproductive strength of the soil:

"The leaves which dropt last autumn had covered the ground, in depth three or four inches. As this seems to hinder the growth of the grass, it was customary to burn it in March, or at the end of that month (according to the old stile), in order to give the grass the liberty of growing up. I found several spots burnt in this manner to-day; but if it be useful one way, it does a great deal of damage in another; all the young shoots of several trees were burnt with the dead leaves, which diminishes the woods considerably; and, in such places where the dead leaves had been burnt for several years together, the old trees were only left, which being cut down, there remains nothing but a great field, without any wood. At the same time, all sorts of trees and plants are consumed by the fire, or at least deprived of their power of budding; a great number of plants and most of the grasses here are annual; their seeds fall between the leaves, and by that means are burnt: this is another cause of universal complaint, that grass is much scarcer at present in the woods than it was formerly; a great number of dry and hollow trees are burnt at the same time, though they could serve as fuel in the houses, and by that means spare part of the forests. The upper mould, likewise, burns away in part by that means, not to mention several other inconveniencies with which this burning of the dead leaves is attended. To this purpose the government of Pennsylvania have lately published an edict which prohibits this burning; nevertheless every one did as he pleased, and this prohibition met with a general censure."

It would be interesting to know whether the people of Pennsylvania have acquired sufficient intelligence and self-restraint during the last century and a half to submit willingly to the enforcement of the act which met with such general censure at the hands of their ancestors.

Professor Shelton, of the Kansas Agricultural College, explains in a recent number of *The Industrialist*—a bright little paper edited and published by the faculty of that institution—a new irrigation project for the western or "arid" section of that state, which will be watched with interest. It seems to have been known for a long time that at almost any point in the wide valley of the Arkansas River, water can by drilling be reached at a very shallow depth, usually from four to nine feet. This water is found in a stratum of sand so thoroughly saturated that enormous quantities can be pumped up without diminishing the supply in any appreciable degree. This subsoil water is supposed to have a distinct movement, flowing along as the river flows, and it is argued that the river itself is but the visible and superficial outflowing of the great underground stream. Professor Shelton adds:

With these facts in view, Judge Gregory, editor of the Garden City *Sentinel*, has advanced the idea that, by tapping this underflow with a ditch of suitable size and depth, a permanent supply of water for irrigation may be led to elevated regions, just as water from the river is ordinarily led away for use on the uplands. This original plan has been brought to the attention of the public with great persistence and force by means of circular addresses and newspaper articles. As a result of this agitation, conducted by Mr. Gregory, the attention of practical irrigators has been drawn to the subject, and measures have been taken to give the new scheme a practical test upon a large scale. The corporation owning the great Dodge City ditch—a canal twenty-five feet wide and nearly 100 miles long—is already at work upon an extension of their main ditch which will intercept a full mile and a quarter of this sub-flow. This, with the number of powerful steam pumps planned for use another season, will certainly prove to what extent the underflow of the water of the Arkansas River is available to the husbandman.

No doubt these enterprising men realize that a permanent water supply is quite as necessary to sustain the even flow of an underground current as it is in the case of an ordinary stream. While they are tapping this hidden river, therefore, the projectors of this scheme should use every effort to save the forests where it takes its rise.

Holiday Notes in Southern France and Northern Italy.—VII.

MY note-book was next brought into requisition in the picturesque situated and beautiful city of Genoa, where there is abundance of interesting things to note for the benefit of the stay-at-home gardener.

Immediately after leaving the large, handsome station we come upon the Columbus monument, surrounded by Date Palms and other members of more or less tropical floras, which we were destined to see in great number, vigor and beauty for some distance along this beautiful coast. The Cape of Good Hope, Mexico and Australia are centres of plant life, which seem to find their counterpart in the hot, almost rainless, summers and the very mild winters of Genoa and its neighborhood. At any rate, large numbers of shrubs and trees from these countries thrive in the Riviera so well that it is difficult to imagine their succeeding any better even in their native habitats. Acacias, Myoporums and Pittosporums of large size, fine *Dasyliirions* and enormous *Agaves* combine to produce a strangely exotic effect. Here, as well as elsewhere, we were somewhat disappointed to find little or no use made of such beautiful native shrubs as the Myrtle, Terebinth and the like.

Acqua Sola, a small park at the north-east end of the city, and about 140 feet above the level of the sea, is a favorite promenade. It occupies the site of part of the old ramparts, and was laid out in its present form about half a century ago. Then we pass on to the Villetta di Negro, a well kept garden with winding promenades, which ascend to a bastion about 150 feet above the level of Acqua Sola. Fine views of the harbor, city and neighborhood are obtained from this spot. The old walls have allowed plenty of space for climbers, and such things as the yellow *Bignonia Tweediana*, *Solanum jasminoides* and other plants of similar character have thriven exceedingly. The common Ivy (*Hedera Helix*) clothed some of the steep, sunny banks, and here and there *Convolvulus Mauritanicus*, with its slender shoots bearing a profusion of pale blue flowers, grew out of the Ivy carpet, seemingly quite satisfied with its quarters. *Fluggea Japonica* was here also used for forming a turf in dense shade, just as we had seen it in the gardens on the north Italian lakes, and so far we have seen nothing which produced such satisfactory results. Very tall Date Palms, with thick stems, were, in the opinion of my companion and myself, spoiled by training Ivy and other creepers round them. A sort of ravine, with a small watercourse, provided suitable places for *Colocasias*, and other moisture-loving, fine foliage plants. *Melia Azedarach* (laden at the time of our visit with panicles of small round fruits about the size of peas) is a Genoa shade tree, as is also the Carob (*Cerotonia Siliqua*), with its handsome, leathery, black-green, pinnate leaves.

Cycads were only represented by *Cycas revoluta*, and Palms by scarcely half a dozen species. The common Date Palm (*Phoenix dactylifera*) and a dwarf species (*P. reclinata*), the South European *Chamærops humilis*, the Japanese and Chinese *Trachycarpus excelsus*—or, as nurserymen mostly prefer to call it, *Chamærops excelsa*—and the Californian Fan Palm, *Washingtonia filifera* (better known as *Pritchardia filifera*), conclude the list as far as the public gardens of Genoa are concerned. The last-mentioned Palm is a remarkably quick grower, and magnificent examples of it are to be seen along the Riviera—some before long will become the rivals of the celebrated pair in the Californian city of Los Angeles. The Director of the Public Parks and Gardens at Rio de Janeiro told me a week or two ago that a specimen in one of the Rio gardens has attained huge dimensions and produces fruit in abundance. In a small pond, too much shaded by trees for the perfect happiness of sun-loving aquatic plants, we noticed *Nelumbium speciosum* in flower.

Leaving Genoa, the railway skirts the Mediterranean coast line, and affords the traveler a succession of enchantingly beautiful views. The train carries him past bare, frowning, lofty rocks, with their bases washed by the sea and their summits crowned with ruined towers erected in former ages for protection against pirates; then extensive, terraced Olive groves—gnarled and picturesque—Citrons, Oranges, etc. Here and there between the railway and the sea are small patches of flat ground, and these are generally utilized for growing fruit and vegetables. Constant irrigation is, however, necessary, and we became quite familiar with the sight of water being raised from a well by a donkey working in a circle under a thick, vine-clad roof, and then conducted along small channels to the slightly sunken beds. Not a weed was visible in these gardens, and very fine crops of Tomatoes, Aubergines, Lettuces and other vegetables were the rule.

Bordighiera, a few miles from the French frontier, is specially famous for its Palm groves, and presents an exceedingly picturesque aspect. According to Dean Alford, there are more Palms here than in the whole of the Holy Land. A considerable trade in Palm leaves is done in Bordighiera; in fact, that town may be said to possess the monopoly of supplying blanched Palm leaves for church purposes. The young growths are tied up tightly in order to make them the requisite color, and plants so treated are anything but ornamental in appearance. Fortunately, however, a comparatively small proportion of the Bordighiera Palms are undergoing such treatment at one time. The Date Palm is said to have been introduced to this coast more than a thousand years ago, and in the garden (of the French Consul at Bordighiera) which now occupies the site of a Dominican monastery, there are huge trees which are believed by their present possessors to have been planted by the Dominicans upward of ten centuries ago. All along this district, too, the Olive is seen in its full beauty—and a fine Olive tree is a really beautiful sight. It is not pollarded, as in southern France toward Marseilles, and in Languedoc, but allowed to attain tree size and grow in a perfectly natural way. *George Nicholson.*

Pinus Banksiana on the Maine Coast.

IT has been known for some years to a few botanists and others that the northern Gray or Scrub Pine (*Pinus Banksiana*) grew abundantly on the coast of Maine much farther south than had ever been supposed, but until recently no statement of the fact has ever been published. Those who are curious to know how the discovery occurred will now find in the November number of the *Bulletin of the Torrey Botanical Club* (vol. xvi., No. 11) some notes relating to the fact written by Mr. John H. Redfield and myself.

The station is on Schoodic Peninsula, in the town of Gouldsboro, Maine, lying opposite the eastern shores of Mount Desert Island across the expanse of Frenchman's Bay, and is well marked by the bare, flat-topped mass of Schoodic Mountain, 417 feet in height. Apart from this elevation the surface of the peninsula is for the most part level, and often boggy, overgrown by an uninteresting growth of low deciduous trees and the common conifers of the coast, with here and there, especially on the mountain slopes, great Alder patches. Throughout this region, from within sound of the sea to the interior of the peninsula, and stretching at intervals miles beyond its limits to the northward, grows *Pinus Banksiana* in its most southern home now on record, the latitude being about forty-four degrees twenty minutes. In the lowlands this Pine here attains a height of twenty to thirty feet, forming a slender, graceful tree, well distinguished from the Spruces, in spite of its short leaves, by its less conical form, by the bunching of its leaves toward the extremity of the twigs in the manner of Pines generally, and by its peculiar cones curved at the tip. On the east it forms almost a forest, nearly displacing the usual conifers of the Maine coast. Toward the west, however, the growth becomes thin—although this may be due to a free use of the axe—and decreases until only scattered trees appear here and there. On the mountain-top it again appears, but in a much changed form. There it is a true Scrub Pine, dwarfed, weather-beaten, twisted into many a strange shape, along the bare, exposed and wind-swept summit. On the peninsula it certainly is the prevailing Pine, almost to the exclusion of the other species. Beyond here its extent northward and inland is not well known. As Mr. Redfield remarks, it would be interesting to know what degree of continuity there may be between this station and the larger areas in northern Maine.

The presence of this interesting Pine on the Maine coast appears to have a certain appropriateness. Despised as it may be elsewhere in comparison with the beauty and value of the other Pines, here its whole character is in keeping with the rugged, storm-swept surroundings. As a tree for cliff or shore planting on this rocky coast I am convinced it would have great worth, for it appears able to adapt itself to the most exposed situations. To me, I confess, it has as a tree a peculiar beauty of its own, and even as a dwarfed shrub it appears to greater advantage than the other conifers of the coast.

Boston.

Edward L. Rand.

In a lawn of small dimensions the losing of the turf under the shrubs is of the utmost importance, as it gives an appearance of extent to its limited proportion. To help this, Periwinkle, St. John's-Wort and other ground creepers may be planted with the shrubs, and by uniting them with the lawn will tend to diminish the hard line of the border, a thing that cannot be too strongly insisted on, as essential to continuity and repose.—*W. S. Gilpin's "Practical Hints,"* 1832.

The Kauri Pine.

OUR illustration upon page 583 represents a fine specimen of the Kauri Pine of New Zealand, one of the giants of the vegetable kingdom, and, economically, a tree of very great value.

It belongs to the small genus *Agathis* (Dammara of many authors, who have adopted for these trees the name applied by Rumphius indiscriminately to several resin-bearing trees of different families), closely related to *Araucaria* and *Cunninghamia*, and characterized by diœcious flowers; the male in short, cylindrical, extra-axillary heads, with numerous stamens with short, eight to fifteen celled anthers; the females terminal, maturing at the end of the second year into short, cylindrical cones, with thick, coriaceous, densely imbricated scales; and by sub-opposite, ovate-oblong or lanceolate thick, leathery leaves, one to three inches long, and an inch or more wide.

Eight or ten species of *Agathis* have been described, but it is not impossible that the number can be considerably reduced when they are better known; they are found in the Malay Archipelago, in the Fiji Islands, New Caledonia, New Zealand and east tropical Australia. The best known of the species is the Kauri Pine (*A. australis*), a native of New Zealand, where, in the Auckland district of the northern island, in sheltered mountain valleys, it often forms extensive forests, reaching a height of 150 feet, with a trunk sometimes fifteen feet in diameter. The wood of this tree is probably not surpassed in value by that of any other coniferous tree. It is pale straw-colored, moderately hard, straight-grained, sound and remarkably durable. It works easily with a beautiful silky lustre and takes a fine polish. It is an admirable cabinet-wood, and is largely used in New Zealand for railroad-ties and piling; for all sorts of building purposes and for cooperage, and is now somewhat exported into Great Britain.

The Kauri Pine produces also one of the most valuable gum-resins known, now largely used in making varnish. This resin is exported annually from New Zealand to the value of nearly two million dollars. It is not obtained, however, in great quantity from the living trees, but is dug out of the ground from the sites of old forests, where none of these trees have been known to exist since the earliest discovery of the island. This semi-fossil resin, however, which is far softer than amber, does not greatly differ from that which exudes from the living trees, which are productive only when they have passed their prime and are becoming decrepit.

It is not improbable that the Kauri Pine, and possibly some of the other species of *Agathis*, may thrive in different parts of California, although it is doubtful, perhaps, if any of the conifers of the southern hemisphere will ever attain anywhere north of the equator the age and size which they reach in their native countries, or produce as valuable material. They are, nevertheless, well worth trying in southern California, and it may well be one of the aims of the managers of the new Arboretum which is soon to be planted in connection with Mr. Stanford's University, to collect there all the most valuable timber trees of the south temperate zone. They can be grown in no other part of the United States, and among them, as we know already in the case of various species of *Eucalyptus*, are many trees apparently fairly well suited to the climate of California and of Mexico.

The Art of Gardening. An Historical Sketch.

XIV.—Suburban Rome.

CHATEAUBRIAND aptly compares the present aspect of the Roman Campagna to the desolation of Tyre and Babylon, "a silence and a solitude as vast as the noise and tumult of the men who formerly occupied the same soil." Scarcely a tree is visible, and the only product seems to be the "ruins which appear like a forest of indigenous plants, the growth of a soil composed of the skeletons of the dead." As it looked to-day, so—except for its crop of ruins—the Campagna looked in the early days of Rome, and its climate was as malarious then as now. But, in the imperial time, drainage and cultivation, an enormous supply of water brought from distant hills, and the making of multitudinous well-built roads, had redeemed it from barrenness and disease and had turned it into one vast garden. For miles around Rome lay the villas of its wealthy citizens, the richest patrician families owning not one but several, "planned and arranged on a different principle in accordance with their destination as winter, spring or

summer residences.* Some stood in extensive domains—the ruins of the various buildings belonging to one cover nearly a square mile of ground; others were of smaller size, but all were planned with a regard for comfort and surrounded with a care for systematic beauty that are nowhere paralleled on a similar scale to-day. The most common practice was to use the suburban villa in spring, spending the midwinter in Rome, and escaping to sea-side or mountains during the greatest heat of summer. The Roman citizen did not abandon the service of the commonwealth or the management of his private affairs until the decadent days of the empire; thus, when the short winter was over, he could not immediately desert the city, but spent vast sums instead on a suburban residence. Six or seven miles from the metropolis meant nothing to him, mounted on a Numidian pony or whirled along in a hooded carriage to the gates, where he was obliged, by the crowded state of the narrow streets, to transfer himself to a litter. “The number of these villas is really incredible. . . . In the golden age of the empire, before the transformation of Rome into an intrenched camp, accomplished by Aurelian, it was impossible to define, even approximately, its extent. . . . To the houses adjoining one another succeeded a second ring of houses separated by small gardens, a third ring of houses separated by larger estates, and lastly, a fourth ring of great villas and huge *latifundia*, each one constituting a populous and flourishing village. These groups of rustic dwellings were laid out in the town fashion, with the shrines of the compital or domestic gods at the street corners, and with local festivities and solemnities. . . . Great care was bestowed on the drainage of the house, which was always carried to a great distance and forced through its channel by a permanent jet of water. Remarkable, also, were the arrangements for the supply of water, which, when not actually needed, . . . was stored in huge reservoirs or cisterns, ready for any extraordinary emergency. At the crossing of the roads . . . there were fountains for the accommodation of travelers and their horses,” and seats were set under the trees for the comfort of weary pedestrians. The great arcaded aqueducts, the temples, shrines and altars, with their marble sides and roofs of bronze, the “endless marble cemeteries, shaded by the ilexes of the villa and by the Olive-trees of the farm,” followed one another in orderly succession. The villa† itself was, as a rule, “divided into two distinct and independent portions. The first comprised the lord’s manor, with more or less spacious gardens surrounding it; the second comprised the farmer’s house, the various stables and barns, the dwellings of the slaves, orchards, Olive-yards, vineyards, corn-fields, woodlands and so forth.” On the hill-sides the villa rose “in steps and terraces from the foot of the hill, each terrace supported by huge foundation walls ornamented with niches and *nymphææ*. The lower terraces never contained buildings; they were simply laid out in gardens, and less frequently in an orchard; the mansion of the landlord was perched on the very top of the hill and within the area of the highest terrace.” The type was an excellent one, affording the best possible outlook and permitting that lavish use of ornamental water which the Romans loved above all else. “But it is incredible how ingenious and clever ancient architects proved themselves to be in adapting the general type of villa to the natural conditions of the special tract of land which had been selected,” and in placing the house so that it would best serve the owner’s desire to use it as a winter or a summer residence. “The characteristic of an ornamental Roman garden was the entire absence of natural beauty. Its style can be compared, to a certain extent, to the French and Italian villas of the sixteenth century.” Topiary work was practiced (as we saw when Pliny’s far-off country-seat in Tuscany was described) to an extent so great that Lanciani ventures to say “no tree or shrub dared to grow in its own natural fashion.” . . . The *allées* were shut in by walls of green Box or Laurel with windows, doors and niches imitating the architecture of palaces. Here and there appeared threatening forms of wild beasts, bears and lions, serpents winding themselves around trees, “all cut by the skillful hand of the *topiarius* out of the green Cypress, Box, Yew-tree, Myrtle and Laurel. . . . Grounds laid out in this style, in which . . . every vestige of Nature’s free dominion is annihilated, are not only described by ancient writers . . . but actually painted, I might almost say photographed, in the frescoes

* Lanciani: “Ancient Rome in the Light of Modern Discoveries.” From this recently published and very valuable work most of the facts in this chapter have been gathered.

† *Villa urbana*, *villa pseudo-urbana* or *prætorium* was the suburban residence of a more elegant, *villa rustica* of a more simply utilitarian sort. It is the former, of course, which concerns us here, and it got its name because the disposition of the town house was closely followed, though often on a more splendid scale and always with a greater regard for external effect.

of Pompeian dining-rooms, in those of the green-house in the gardens of Mæcenas on the Esquiline, and in those found in the villa of Livia. . . . An excuse for such absurdities can be found in the fact that the means afforded by Nature in those days were but small in comparison with the abundant resources of our time. Foreign countries had not as yet unfolded their rich treasures of rare and splendid vegetation, nor their thousand shrubs and flowers; restricted to a barren flora, but little improved by culture, the Romans sought to create by artificial means a striking contrast to the free forms of nature. This is, at all events, the excuse given by Becker.* But it hardly seems a sufficient excuse. The comparatively few plants native to central Italy would have sufficed for combination into lovely “naturalistic” effects, had the taste of the time run in that direction. It is not the born lover of natural landscape beauty who asks, first of all, for endless variety in the items which the prospect supplies—it is, rather, the sophisticated horticulturist, or the scientific student, or the man in whom curiosity is stronger than the æsthetic feeling, or a delight in single objects is stronger than admiration for a general effect. The Romans loved formal gardens because their taste in all things was architectonic. In art, as in all other forms of activity, they proved themselves great organizers, practical constructors, lovers of system, regularity and usefulness, not men of poetic imagination or of purely æsthetic impulse. They were far more remarkable as architects than as poets, sculptors or painters, and their gardens were naturally those which an architect, rather than a poet or landscape-painter, would admire. But I have said that there were exceptions to the general rule of formality in the suburban gardens of provincial towns and in the imperial pleasure-grounds of Rome; and Becker believes that such was likewise the case among the villa-gardens of the Campagna. The hero of his “*Gallus*” owns a *villa urbana*, where, in addition to the symmetrical clipped garden, there is another of natural loveliness.

We are not surprised to find that these luxurious yet practical Romans were the inventors of the green-house. It is not mentioned before the first century of our era, but was then extremely common, and, as in modern times, was roofed with glass and heated by pipes. Here such exotic plants as could be obtained were carefully tended, and fruits, vegetables and flowers were assisted to early development or even forced to perfection during the winter months. Great aviaries and *viridaria* or preserves for animals were likewise common—indispensable, indeed, in places of any pretensions; and the former were often large enough to contain trees of considerable size. Huge fish-ponds, as useful as they were ornamental, were walled around with marble and kept pure by constant streams of water from the exhaustless aqueducts.

Although the poorer classes of Roman citizens were buried pell-mell in great heaps on the hill-sides near the city, much pains and money were lavished on the tombs of wealthier citizens, whether their bodies were interred or cremated. In either case the relics were enshrined in sumptuous buildings, placed along the suburban highways, greatly to the increase of their magnificence of effect. No traveler need be reminded of the remains of such monuments which are still visible on the Appian Way. The so-called Castle of St. Angelo, at Rome, is the central building of the mausoleum of Hadrian, once surrounded by a wide garden, and covered, up its terraced sides, with rich plantations; and across the river stood a similar construction which was the resting-place of Augustus.

In the Roman cemetery still preserved at Arles were long lines of small monuments overshadowed by the inevitable Cypress-tree. †

New York.

M. L. Van Rensselaer.

New or Little Known Plants.

Chrysanthemum Mrs. Fottler.

THE Chrysanthemum illustrated on page 581 is the variety Mrs. Fottler, sent from Japan two years ago in the famous Neesima collection, which included such notable kinds as Mrs. Hardy, Lilian Bird, W. H. Lincoln and Kioto. The flowers of Mrs. Fottler are borne on long, stiff stems, and they are of large size, very full, and of a distinct tint of pink. The petals are long, feathery, and very persistent, so that the flower will remain perfect for a long time. The plant not only gives fine blooms for exhibition, but it has proved very satisfactory

* See Becker’s “*Gallus*.” This book and the same author’s “*Charikles*” are romances, but were written by a learned German student of antiquity for the purpose of portraying, as accurately as possible, the life of a young aristocrat, in the one case in imperial Rome, in the other case in Athens. Their explanatory notes are much more voluminous than the text itself, and even Lanciani quotes from Becker with a lavish hand. Both works have been translated into English.

† McGibbon: “*Architecture of Provence*.”

for market purposes, and in the neighborhood of Boston it has been the most profitable pink variety grown.
 Newton Highlands, Mass.

A. H. F.

Foreign Correspondence.

London Letter.

WE are in the midst of the Chrysanthemum season, and the so-called centenary of the introduction of this plant into English gardens is being duly honored by exhibitions, conferences and publications of all kinds. The value of the Chrysanthemum as a decorative plant is second only to that of the

These are decorative plants which may stand alone and form a picture by themselves. The exhibition plant here is a totally different thing. The cut flowers are many of them really wonderful productions, and this year they are, perhaps, better than usual, though the exceptional mildness of the weather this month and last has not been favorable to Chrysanthemums, the flowers being somewhat weak and flabby.

The Conference held at Chiswick was a great success in papers by specialists and a general comparing of ideas and opinions relative to the plants. Mr. Hemsley, a member of the Kew staff, dealt with the botany and literature of the Chrysanthemum. We are not much concerned with the name



Fig. 147.—Chrysanthemum Mrs. Fottler—See page 580.

Rose. Easily grown, inexpensive, yielding splendid results in a short time, accommodating as regards size and habit, almost endless in the variety of shade, size and form of its flowers, the Chrysanthemum is indeed a magnificent garden-plant. Exhibitions such as these teach a great deal, and so also do conferences; but the real beauty of the plants is rarely revealed at either. I confess to a weakness for a plant natural in shape, well-leaved and full of flowers, not large and mop-like, with their crutch-like props, but medium in size, and plenty of them. I have seen a few such plants, their names Val d'Andorre, Alice Bird, Edwin Molyneux, Queen of England and such like. They were plants of various heights, perfect in foliage, and each bearing not three or four, but twenty or thirty, blooms.

of the species from which the garden plants originated; otherwise Mr. Hemsley's discovery that by right of priority *C. morifolium* is the proper name for the plant hitherto known as *C. Sinense* would alarm those who object to the disturbance of old names which have become as household words. Mr. Shirley Hibberd, Mr. Harman Payne and Mr. E. Molyneux, three men whose names stand first amongst admirers and growers of the Chrysanthemum, also contributed interesting papers on its history and development.

The exhibition of the National Chrysanthemum Society, which was held this week at the Aquarium, was remarkable for the display of good standard sorts rather than for anything new. The principal exhibitor of new kinds was Mr. Cannell.

Such sorts as Avalanche, Edwin Molyneux, Mr. R. Brocklebank, Boule d'Or, Princess of Wales, Lord Alcester and Mrs. H. Cannell were in splendid form, nothing among the new kinds approaching them. I have a weakness for the Japanese sorts, and Avalanche as a cut flower I consider is the purest and most beautiful of all Chrysanthemums. Amongst colors the king of all is Edwin Molyneux. The most striking of the newer sorts is Etoile de Lyon, of which Mr. Cannell showed a large number of magnificent blooms. It was certificated last year. The flowers sometimes attain a diameter of fourteen inches, and not one of the many exhibited by Mr. Cannell was less than ten inches across. The color varies from white and rose to deep rosy purple and silver. It is a broad petaled and rather flat variety of the Japanese section. The new kinds certificated were Lady Dorothy (incurved), a large flower; color deep bronzy cinnamon and gold. Mr. Cannell, who exhibited it, declares it to be one of the best and most lasting of the section. Miss Margaret (large Anemone), with rosy ray florets and sulphur centre; John Doughty (incurved), a sport from Queen of England, with the base of flowers pink and a buff centre flushed with pink; Madame A. Carrière (Japanese reflexed); Mrs. S. Coleman (incurved), pink, with pale yellow centre; Alice Stevens (Pompon), golden yellow, a fine flower; Madame Baco (Japanese), remarkable for its size, the narrowness of its petals and its delicate color—a rosy lilac. Amongst those which did not obtain certificates were several of considerable promise, but not in the best condition. One, named Admiral Sir Thomas Symonds, a very fine yellow Anemone, and fragrant, was shown by Mr. Cannell, to whom the Admiral had presented a plant which he had brought from China. Evidently much greater development in size, variety and color has resulted from the manipulations of English and French breeders of the Chrysanthemum than in the hands of the Chinese, who are said to be a long way behind. What we want now is hardier kinds, such as will flower well outside in an ordinary season. There is also a tendency to breed taller plants than is desirable.

The injurious effects of London fog on plants and flowers have been so very marked of late years that the Royal Horticultural Society has decided to collect information on the subject, with a view to discovering, if possible, some means of counteracting it. At present we are unable to decide whether the injury done is due to absence of light or to direct effect of some of the components of the fog, though, so far as my observation goes, it is almost certainly the latter. A heavy yellow London fog is a terrible demon. We do not get the worst of it at Kew, but at Chelsea it is often very bad. The Orchids there suffer much from it. Messrs. Veitch and Mr. Bull find it almost impossible to get flowers, especially white ones, in winter. I have seen a whole houseful of *Phalænopsis* spikes destroyed in a single day by a fog at Clapton. Not merely expanded flowers, but buds even as small as pin heads, are withered and reduced to pulp, as if they had been dipped in boiling water. The large flowers of *Angracum sesquipedale* suffer just as much as those of the delicate *Phalænopsis*. It is not the fact of the flowers being white that causes them to suffer, as *Masdevallia candida* and *Odontoglossum crispum* were apparently unharmed at Clapton. Bouvardias, both leaves and flowers, turn black, as if they had been scorched; the leaves of many plants wither and fall off; even such Orchids as *Vandas* suffer at Chelsea, their lower leaves turning yellow when the fog is severe. Plants under glass suffer a great deal more than those out-of-doors. The fogs in the country do not do any appreciable harm, so far at least as I have been able to ascertain. Gardening in the immediate neighborhood of the metropolis is growing more and more difficult in consequence of these dirty fogs in winter. The Messrs. Veitch have been compelled to remove the whole of their seedling Orchids to Slough, out of the reach of the London smoke, and Mr. Seden is now able to continue his work of hybridizing and plant-breeding in an atmosphere much more congenial than that of Chelsea.

Pleiones have been very good here, in spite of early fogs. A delightful bank of *P. lagenaria* was for a time the most charming feature of the Orchid-house. The plants are grown in pans a foot across, and on some of the pans I counted over eighty expanded flowers. Some plants of *Adiantum cuneatum* were arranged with the Pleiones, producing a pretty effect. These have been succeeded by equally good pans of *P. Wallichiana* and *P. maculata*. After these come *P. humilis* and *P. Hookeriana*. The Pleiones are amongst the easiest of plants to manage. As a rule, they fail through excessive heat. They are alpine plants, requiring cool or green-house treatment, except during the period when growth is most vigorous. This is usually about the end of March or in April and on until June, an intermediate temperature with an abund-

ance of moisture being then most suitable for all of them.

We are promised a considerable increase in the number of great plant exhibitions to be held next year in London. The Royal Aquarium, Westminster, caters for the public by providing attractions of a very varied nature, from white kangaroos to cannibals and Samsons. The success of the Chrysanthemum exhibitions held there has no doubt determined the authorities to compete with the Crystal Palace, the Botanical Society and the Royal Horticultural Society next year in the matter of exhibitions of plants generally. They propose to hold an exhibition on each month from March to November, and offer substantial prizes. Flower shows are supposed to foster a spirit of emulation among the crowds who go to see them, and perhaps they do a little good to horticulture by showing what has been or can be done—a kind of reporting progress. But it is easy to overdo this kind of thing; and we are not quite sure that shows which have gate money as their sole object are not to be condemned on that account. You do not appear to hold many plant exhibitions in America. Is it because the people do not believe in them, or because you have not time?

CHATSWORTH.—The very interesting notice of this famous ducal residence which appeared in a recent number of GARDEN AND FOREST has been read with pleasure here. English horticulturists are proud of Paxton and his works, and Mr. Downing did not say one word more in praise of Chatsworth and its gardener than they deserved. You may be interested to learn that Paxton was what is known as a "Chiswick lad," for it was at Chiswick that the Duke of Devonshire saw and liked him and finally engaged him as gardener. I believe his wages started at twenty-five shillings per week. After he was knighted, Paxton was member of Parliament for Coventry. Chatsworth is still a grand garden; but it is not the only one, as it was, perhaps, when Paxton was its head. So far as I could judge when I saw it a year or two ago, the keep of the gardens was first-rate, and the cultivation of some things exceptionally good. The present gardener, Mr. Owen Thomas, is known as a man of exceptional ability. Chatsworth may be looked upon as a kind of Kew for the Midlands, as it is open to crowds of visitors at almost all times. Cheap trips to Chatsworth from Sheffield, Chesterfield, Lincoln, Derby, and other towns, are often arranged, and many hundreds of people are allowed to walk through the grounds, the houses and the palace on certain days.

London.

W. Watson.

Cultural Department.

Copper Sulphate against Fungi.

EXPERIENCE during the summer of 1889 encourages the belief that we have in the solutions of copper sulphate a defense against many of the fungus pests which so seriously threaten the prosperity of our agriculture. In 1888 the efficacy of what is known as the Bordeaux Mixture as a preventive of mildew and Black Rot of the Grape was fully proved. This year experiments have taken a wider range, and many of the so-called diseases of plants have been successfully treated. The Apple-leaf rust (*Rastelia pyrata*) succumbs to an occasional spraying with the Bordeaux Mixture. The Quince blights (*Morthiera Mespili* and *Hendersonia Cydoniæ*) are likewise prevented, and the fungus which causes the blight of leaves and cracking of fruit of the Pear may now be regarded as under the control of the copper solutions.

The prevention of this Pear fungus, *Entomosporium maculatum*, is, perhaps, of greater advantage in the nursery than in the orchard. Where the disease is epidemic in the nursery it places a veto upon the budding and grafting of young Pear stocks. The leaves are destroyed just when their aid is essential to the vitality of the bud or cion. By spraying the nursery rows every three weeks during the season of growth with the Bordeaux Mixture the leaves are preserved in health and the success of the grafter's labor is assured.

But in addition to this use of the copper solution it is found to be preventive of the Tomato blight (*Macrosporium Solani*), and (which is of far wider importance to our agriculture) it prevents the Rot of the Potato, *Phytophthora infestans*. In treatment of this disease of the Potato-plant some of our experiment stations have this year been quite successful. My experiments in this line have had gratifying results. For many years in this region of southern New Jersey every attempt to grow the Peachblow Potato has been a failure. At about the time the plant is in blossom and the tubers are say one-fourth grown, this deadly blight invades the Potato field and sweeps over it like fire. I have had an acre of Peachblows showing every sign of thriftiness and giving

promise of a heavy crop, and in one week from the time of the appearance of this blight every plant was dead or dying. It is the prevailing opinion here that the Peachblow Potato is a variety which is "run out," and its culture has been generally abandoned.

Happening to see, last autumn, a few bushels of small Peachblow Potatoes for sale, I bought them for the purpose

When the plants were a foot high, and before they blossomed, I began to spray some of them with the Bordeaux Mixture, and repeated this operation every two or three weeks thereafter until nearly the last of September. The times of treatments were regulated somewhat by the weather and the frequency of heavy rains. At any rate, I aimed to keep leaves and stalks on the sprayed plats pretty thoroughly whitewashed



Fig. 148.—The Kauri Pine.—See page 579.

of giving them another fair trial under the protection of the Bordeaux Mixture. Last June I plowed a clover sod between the tree-rows of an orchard, and there planted these Potatoes in five equal plats of three rows each, manured in the row with the Mapes Potato Manure at the rate of half a ton per acre. The plats lay side by side, running north and south.

with the copper sulphate solution, so that its presence was always visible all over the plants. Whenever a drenching rain washed off the application it was renewed as soon as possible. I made the treatments with the portable Eureka spraying machine. I thus sprayed Plats 1 and 2, left Plat 3 (the middle plat) untreated, and sprayed also Plats 4 and 5.

About the time the plants blossomed the middle plat (No. 3) was, as usual, struck by the blight, and in two weeks all of the potato tops on this plat were dead and dry. The plants on the other plats were green and growing as vigorously as could be wished. They remained green and growing until killed by frost in November.

I then dug and weighed separately the total product of each plat. Plat No. 1, sprayed with Bordeaux Mixture, yielded 346 pounds of fine, large, marketable potatoes, which were sold as soon as dug for a dollar a bushel. Plat No. 3, not sprayed, yielded only 164 pounds of small-sized tubers, scarcely one of which was marketable.

The diameter of the largest tuber on the untreated plat was three inches. The diameter of the largest on the treated plat was five inches. There is a marked difference in the cooking of potatoes from the unsprayed and from the sprayed plats. Those from the plat not treated are immature and "soggy." Those from the treated plats are mealy and have all the excellence for which the Peachblow potato was formerly esteemed.

I have saved ten or fifteen bushels of these Peachblows to plant next year, in the confident expectation of a crop of 350 bushels of potatoes per acre. Under the unfavorable conditions in which these experimental plats of potatoes were grown (between rows of trees twenty feet apart and twenty years old) I did not expect a large crop. Yet the yield of the treated plat (No. 1), 346 pounds from 225 hills, is not bad, under the circumstances, being about 125 bushels per acre.

Of the Bordeaux Mixture employed the formula is: six pounds of pulverized sulphate of copper (blue vitriol), dissolved in four gallons of hot water; four pounds of fresh lime, dissolved in four gallons of cold water; mix the two solutions and dilute with cold water to make twenty-two gallons of liquid.

I believe, however, that the ammoniacal solution of carbonate of copper will be found as efficient a fungicide as the Bordeaux Mixture, and it has the advantage of being more readily prepared and more easily distributed in spray. Its formula is: carbonate of copper, three ounces; ammonia, one quart; mix. The copper carbonate will dissolve almost at once in the ammonia liquor. Then dilute this mixture with cold water to make twenty-two gallons of liquid.

From sundry experiments which I have made this year, and which I have reported in detail to the United States Department of Agriculture, I conclude that it is the copper in solution which is specifically antidotal to fungus germs, and not the other component, sulphuric acid, of the sulphate. In experimenting on treatment of the Black Rot of the Grape I tried quite extensively a mixture made similarly to the Bordeaux Mixture, only substituting sulphate of iron (copperas) for the copper-sulphate. This mixture had no effect whatever in prevention of Grape Rot. I saw some benefit from its use, however, in prevention of leaf mildew, and it is quite likely that it may be found sufficiently effective for treatment of the blights of the Potato and Tomato. It is much cheaper, pulverized sulphate of copper costing about eight cents per pound, while copperas costs only seven-eighths of one cent per pound.

Further experiments are required to teach which of these fungicides may be the preferable one, and for what uses. Certain fungi will endure with impunity applications under which others will perish, and certain varieties of plants are damaged by chemical solutions which do not harm others. Thus, the Tomato plant will not tolerate a spraying with Bordeaux Mixture as it is used for the Potato. The mixture for the Tomato must be reduced in strength at least one-half. Nor will *Vitis aestivalis* endure spraying with copper sulphate mixtures, which do not injure the vegetation of *Vitis Labrusca*.

My counsel to those who purpose engaging in these vegetable therapeutics is to go slow. When all ready for spraying try only a few patients at first, and wait to note the effects of the medicine. Otherwise there is great danger of learning pathological wisdom as did the quack doctor who found out in his practice that "what cured the shoemaker killed the tailor."

Vineland, N. J.

A. W. Pearson.

Bleaching and Keeping Celery.

THE Dwarf Celeries now used by most cultivators are grown on a level surface in rows four to six feet apart. Handling is the first work toward bleaching. I use cotton cord, and tie it loosely around the first plant, and then passing the string to the next, take a turn around this, tying it the same way, and continue through the row without breaking the cord, which is tied to the last plant. In this process all the leaves are gathered and tied firmly enough to hold the plant erect and compact. If tied too tightly the Celery, as it grows, will double back when the string is reached and injure the ap-

pearance of the heart. After the Celery is banked with earth, the string rots under the ground and gives no trouble at the time of digging.

Many methods of bleaching are practiced. During the past season I saw heavy paper tied about the plants by one grower, and earth was then drawn up against the paper. Another grower placed corn-stalks against the plants to hold them upright, and then banked against these. A third tied each plant separately with tobacco cord, and left them without banking and exposed to all weather till November 1st, when they were carried into deep hot-beds to bleach under leaves and boards. Another banked the plants half way up, and still another covered Celery almost to the tops. This last lot bleached in from two to six weeks, according as the weather was warm or cool.

The warmer the place in which Celery is kept, the quicker the bleaching will be complete. In early fall, bleaching causes little trouble, whether it is done by tile, paper, boards or earth.

The great difficulty is to keep Celery through the winter into late spring. That intended for late keeping ought to be left out-of-doors in the rows until severe freezing is threatened, and it should be banked half way up at least. The part out of ground should be protected from hard frost, for this makes the stalks hollow. After the plant has been taken from the ground it will still continue to grow. If the leaves are green when stored, they will remain green, and a growth from the centre will appear, which will always be white. Celery partly bleached when brought in will be better in quality than if the whole process of bleaching be left till after digging from the garden.

Darkness with a temperature of sixty degrees in the cellar will fit celery for the table quickly. If it is to be kept until spring, then a temperature as near forty degrees as possible should be maintained. Last season I saw 100 roots brought in before a hard frost and set on a cellar floor and against the wall, in a space ten by four feet and filled in with dirt half way up the stalks. The hatchway-door above was open daily, and the winter air drifted down upon the Celery, which kept until April, when more than half of each bunch, as put in, in the fall, was eatable. The tops were kept cool and often frozen, while the dirt between kept the stalks crisp; there was no furnace in the cellar. I see no advantage in trimming the roots before bringing them into the cellar.

West Springfield, Mass.

W. H. Bull.

Winter Flowering Plants.

AT this dull season of the year some change in arrangement and a few bright flowers make a great difference in the appearance of the plant-house. As it is rather early for many of the most showy flowers, as, for instance, Primulas in variety, Narcissi, Calceolarias, Cinerarias and Azaleas, we must look elsewhere for the glow of color which is needed. It is true that some of these plants may be had in bloom during the winter by a little forcing, but they are more often looked upon as spring flowers only.

For winter flowering some of the *Eranthemums*, though considered by many as rather too old-fashioned, will be found very useful and effective, and they have the additional merit of being among the easiest to cultivate. This is an extensive genus of plants, many of which are natives of the East Indies, and, although some of the species are rather weedy, yet there are a number of very pretty ones among them, and it is to a few of these that attention is now directed.

Perhaps the oldest, and certainly one of the prettiest, of the *Eranthemums* is *E. pulchellum*, its flowers being of a rare shade of vivid blue. It is a rapid grower, and if generously treated will give an abundance of bloom, and though the individual flowers do not last long, yet, as they open in succession on the spike, the plant continues to make a show for a considerable time. *Eranthemum tuberculatum* is another fine species. It is of slender growth and shrubby habit, the branches being more or less marked with small, knotty tubercles. Its nearly white flowers are produced from the axils of the leaves in great profusion. *Eranthemum Andersonii* is also a notably pretty member of this family, though perhaps less frequently seen than the two previously mentioned sorts. *E. Andersonii* forms spikes of bloom from six to eight and sometimes even ten inches in length, while the flowers are quite showy, the upper lobes being pure white and the lower one dotted with dark crimson.

While speaking of *Eranthemums*, it may be well to state that one kind, at least, *E. atropurpureum*, is a useful plant for bedding out in summer, its dark, glossy foliage being somewhat similar in color to that of *Achyranthes Lindenii*, though rather broader and more showy than the latter.

Either of these *Eranthemums* may easily be rooted as cuttings, and will flourish in almost any moderately light soil,

though, to make shapely plants, they should be pinched occasionally as the growth proceeds.

Another group of pretty dwarf growing plants are the Aphelandras, which are not only ornamental in flower, but also have handsome foliage. One variety in particular, *A. nitens*, is specially noticeable in this respect, the upper surface of the ovate leaves being a very glossy olive green, while the under side is dull purple, and this, contrasted with the brilliant scarlet of the flowers, gives a very striking effect. *Aphelandra Ræzii* is also a good variety, and its foliage offers a great contrast in coloring with the preceding species, the leaves of *A. Ræzii* having a silvery appearance. The flowers of this species are bright orange in color, and are produced in terminal spikes in common with the other members of the genus.

Another Aphelandra of rather more recent introduction is *A. fascinator*, also prettily marked in foliage, and a rapid grower, though the leaves have less substance than those of the last, and are consequently more subject to the attacks of red spider unless grown in quite a moist atmosphere and fairly well shaded. In addition to the above there are several other Aphelandras in cultivation, though some of them may be less easily procured than those to which special reference has been made. *A. aurantiaca*, *A. Liboniana* and *A. variegata* are all interesting.

The Aphelandras will make satisfactory progress if potted in good loam, rather sandy, to which may be added a small proportion of peat if convenient, although it is not absolutely essential to their welfare. Their propagation is easy, either by cuttings or from seeds, the latter being preferable, as seedlings not only make the best shaped plants, but there is also less trouble from insects when they are grown by this method, because old plants kept for stock are very liable to become infested with mealy bug and scale. As to temperature, sixty to sixty-five degrees will be found to suit the Aphelandras, though a somewhat lower temperature will not specially injure them. In the winter, full sunlight should be given, while some shading is necessary in summer.

Holmesburg, Pa.

W. H. Taplin.

Orchid Notes.

Oncidium varicosum.—This showy Orchid is one of the most valuable for cutting. Its golden yellow flowers are borne on large branching panicles, often three feet in length and bearing 150 to 200 flowers at one time, and these will remain in perfection nearly two months if the atmosphere is kept dry and cool. It is advisable, however, not to allow the flowers to remain on the plant so long, for it is liable to be considerably weakened, and it will eventually be killed if this course is persisted in. There is a fine variety named *Rogersii*, in which the lip measures two and three-quarters inches across; but this plant is exceedingly scarce, though many inferior varieties are sold under this name. A part of the typical plant is in the collection here. *Oncidium varicosum* was introduced about twenty years ago from Brazil, where it has a wide distribution, and, under varying conditions of climate, varies a good deal in size and habit. It grows freely in the intermediate house, requiring liberal treatment during the growing season. It should be shaded from the sun no more than necessary to keep the leaves from being burnt, and it dislikes much potting material around its roots—a thin layer of moss is sufficient; baskets are preferable to rafts or blocks. I find the plants deteriorate rapidly after being a year or so on the blocks.

Odontoglossum Kramerii.—This very rare and attractive little plant is now in flower with us, and is doing fairly well in a basket of moss in one corner of the Phalænopsis-house. It is said to be found in only one locality on a mountain-slope in Costa Rica, and was introduced from there in 1868 by Kramer. It is a small growing plant, with compressed ovate bulbs with one oblong-lanceolate leaf about seven inches long. The ascending scape bears three to five flowers one and a half inches across. These are white, shaded to violet in the centre. The clawed and half-round lip is two-lobed at the apex, dark violet, with bands of white and reddish brown at the base. The general appearance of the flower reminds one of the better known *O. citrosum*.

Kenwood, N. Y.

F. Goldring.

Cattleya Walkeriana is a splendid dwarf species, with bulb-like stems from two and one-half to four inches high, bearing an oblong-elliptic, obtuse, leathery leaf, with one, and sometimes two, beautiful rose colored flowers, the lip of which is of a richer rose than the other parts and has a very slight tinge of yellow. The flowers often measure from four and a half to five inches across. We generally have our plants bloom in November and they make a very fine display at this dull

season. The large flowers from such a small, leafless bulb always excite surprise. The blooms last from four to five weeks when kept rather cool and dry. They are very sweet scented and fill the house with their fragrance. Our plants are suspended from the roof in rather a light place, in small pans, with a small quantity of sphagnum moss and charcoal, and they flourish fairly well in this way. They do not like much sunshine.

Cattleya maxima Backhousii is a very distinct and desirable variety. The bulbs are rather short and plump, with stout, erect leaves. The sepals and petals are bright rich rose, and the lip is elegantly variegated with very dark crimson veins down the centre, and it has a beautiful yellow throat. This is, no doubt, the most beautiful of the *Maxima* type and should be found in every collection. It nearly always blooms here in October or November. We grow it both in pots and pans suspended from the roof; it likes abundant light, and a little sun appears to ripen up the bulbs and induce it to flower much more freely. Our plants are kept rather dry after flowering until they show signs of growing, and then a copious supply of water is given.

Staatsburg-on-Hudson.

F. Atkins.

Autumn Flowers.—Much has lately been written on the various shades of color to be seen in the Autumn Anemone, *A. Japonica*, ranging as they do from deep rose to pure white. In their way these plants are unquestionably without rivals for autumn decorative use. We wish to call attention, however, to a plant that flowers at the same time as the Anemones, lasts fully as long, and the color of which is a beautiful dark blue. The plant is known as *Aconitum autumnale*, although we are now informed that this is only one of the plant's many specific synonyms. It is often sold under the name of *A. napellus*, and, indeed, this is the title under which it came into our own possession; but it is very distinct from *A. napellus*, which flowers in early summer, and is not so showy as *A. autumnale*, or *A. Fischeri*, as we are to call it in future. The plant grows about three feet high, the spike is often branched so as to form a panicle, and these branches prolong the flowering period for a considerable time, and when planted with the Anemones, the combination of colors, red, white and blue, is very striking during the latter part of October. *A. Fischeri* is a native of China and is perfectly hardy. The roots are tuberous and readily admit of division for the purpose of increasing the stock, and, in addition to this means of propagation, seeds are produced abundantly, which germinate readily when sown and placed in a gentle heat.

Passaic, N. J.

O.

Gaillardia hybrida grandiflora.—Stray blooms of hybrid Gaillardias in the last week of November remind me to note that these are the most persistent bloomers among hardy plants. My plants came into bloom early in June, since which time they have flowered constantly and in profusion, and now have many buds which will not mature. This very ornamental genus has been worked up in recent years, and probably from hybridizing *G. aristata* and *G. picta*—the former giving hardiness and the latter coloring. The English florists offer constantly many new varieties, but there is a great similarity among most of them. They are usually yellow, with a more or less distinct zone of deep red, though some yellow selfs are offered. The petals are usually flattish, though sometimes quilled and fringed. A package of seed will produce many pleasing kinds, quite satisfactory to the ordinary cultivator. They bloom freely the second season from seed. The plants are entirely hardy, in this section, and rapidly increased by cuttings of the roots. Owing to this readiness to increase from pieces of roots, Gaillardias are rather difficult to eradicate from borders, unless care is taken to lift with the roots entire. They certainly may be classed among the most useful of hardy herbaceous perennials, either for show or for cutting.

Polygonum amplexicaule, var. *oxyphyllum*.—This is a Himalayan Knot weed, introduced to cultivation by Messrs. Hall-ock, of Queens, New York, under the more poetic name of Mountain Fringe. This variety, which is said to have been brought to this country several years since by Professor Gray, is a very vigorous one, too vigorous for small places, as it grows, with numerous branches, to the height of five feet. With me it came into bloom in October, bearing clusters of small creamy white flowers, which are attractive on the plant, but which soon fade after they are cut. As a sharp frost ruins the plant, shelter will be needed for it in this climate. Where bold masses are needed—in large places and parks south of this latitude—the plant will be very useful, and for persons who enjoy the foliage of Smart weed it may be used in more modest collections. But since it does not give a specially large

crop of flowers, the space it fills in small gardens can be more profitably occupied. My plants are curiously unlike the figures in the catalogues, in which they appear of a different habit and with a much larger ratio of bloom to the amount of the foliage.

Elizabeth, N. J.

J. N. Gerard.

The Forest.

Forestry in Great Britain.

DR. WILLIAM SOMERVILLE will deliver during the session of 1889-90 a hundred lectures on the Principles and Practice of Scientific Silviculture before the University of Edinburgh. The following extracts from the first of the series, which are taken from a report published in the *Gardeners' Chronicle*, are of general interest, and deserve careful reading and wide circulation in this country.

Dr. Somerville, in opening his lecture, referred to the great attention that was paid to forestry in Germany, India and other countries, and showed how the state forests in these countries were made an important source of revenue, and had a most important bearing on the welfare of the nation. He then proceeded: It is undoubtedly true that we have lost much through the scarcity of our state forests, for had they been present in greater numbers the regrettable condition of many of our private woodlands would not now have existed. This would have been a great gain to the country in general; but if the same improvements could have been brought about by some other means than the extension of government forests, the gain would have been still greater.

The experiences of other nations, however, tend to show that no other means have ever had very much effect. It is true that we have always managed to get along fairly well in other departments with the very minimum of state interference and example, and, undoubtedly, the independent spirit which has thus been developed has stood us in good stead in carrying us over many difficulties. But the peculiar conditions and circumstances consequent to the ownership of forests, all point to the state as being in a more favorable position to make the best use of land stocked with trees than the private individual can be. It is a great question, and one whose discussion in all its various ramifications would lead us far beyond our limits of time. Suffice it to say that the experience of nations and the investigations of political economists point to the conclusion that, although the state proves a bad farmer, it makes an excellent forester. But apart altogether from the purely economic bearings of the case, many circumstances may be present to compel a state to interfere with forest management in order to secure the public welfare. Extensive denudation near the head waters of rivers has often been followed by destructive floods, affecting not the owners of the cleared areas, but the inhabitants of districts situated, it may be, hundreds of miles away. This has been strikingly exemplified in many parts of Austria, where the wholesale removal of trees from large areas in the Tyrol, without any steps being taken to restock them, has resulted in widespread inundations and immense loss of life and property. The cause of these Austrian floods has, within recent years, been made the subject of government inquiry, with the result that the state has purchased large areas of private land in the Tyrolean valleys in order to preserve the existing forests and to restore those which have been spoiled. America can also furnish many cases of flooding following denudation. Besides the dangers of inundation, those arising from avalanches are also increased by denudation, and many valleys in Switzerland, the Tyrol and the north of Italy are comparatively safe only through the preservation of large masses of wood on the mountain-slopes. In these cases, and in many others which will readily occur to your minds, state interference in the management of forests is entirely justifiable on the grounds of public safety. None of them, however, apply with much force to our own country. At one time the maintenance of a supply of oak for the navy was a question of great national importance, but it is now only historically interesting. It would thus appear that in this country the state might very well refrain from meddling with forestry as an important department of national finance, were it not for the beneficial educational influences which would be started. On this account the state forests which we already possess should be made models of good management, and others should be obtained in important centres—care being taken to select places where the extra work would be a decided benefit to the rural population.

Dr. Schlich, in his recently published *Manual of Forestry*,

directs attention to the fact that Canada is the only British colony which supplies us with an appreciable quantity of wood. At any moment, however, these imports may cease, for even now the United States is able to take all the timber which Canada can spare. As a matter of fact, our wood imports from that colony have decreased thirty-two per cent. within the last five years, and, as they may be extinguished before other five years, we will have to depend entirely for our imported timber upon countries over whose policy we have no control. Dr. Schlich says that we import £13,000,000 worth of forest produce which we could grow at home, for which purpose the afforesting of 6,000,000 acres would be necessary. This land he believes to be all available in Scotland, and strongly urges the desirability of extended sylvicultural operations.

We have now touched upon two of the factors which have exerted their influence upon British forestry, namely, scarcity of state forests and our insular position; a third is to be found in our fortune in possessing such rich and extensive coal-fields. No country in Europe can approach us in this respect. Whereas wood is still the most important article of fuel in wide regions of the continent, it is but little appreciated for heating purposes in this country. Had the case been different, we should have been compelled to look to our forests to furnish an appreciable supplement to our supplies of coal fuel, and necessity would have forced us to bestow more care upon our forest management. Those who have given their attention to the subject tell us that we are now within measurable distance of the time when we shall have to face a diminishing coal supply, and, finally, exhausted coal-fields. Although it is probable that the question of providing a substitute for coal will not urgently demand a solution in our time, still it is undeniable that, sooner or later, it must be faced. Some enthusiastic foresters press the desirability of more extensive tree planting, so that a store of firewood may be laid up against the evil day. That there is some wisdom in the suggestion no one will deny; but Professor Heflerich's calculations with regard to the matter do not afford us a large measure of comfort. He says that if we take two and seven-tenths pounds of wood as giving the same quantity of heat as one pound of coal, and one acre planted with Scotch Pine trees as capable of yielding annually eighty-six and one-third cubic feet of wood, equal to twenty-eight hundredweight, without the capital stock of timber on the land being encroached upon; then, in order to yield the equivalent of the coal output of England and Wales, it would take a fully productive forest area more than six times the total extent of these countries, even supposing our present imports of timber to suffer no diminution. From this it is evident that, even with a largely extended area, our forests cannot be expected to furnish a complete substitute for coal, although undoubtedly they could assist to a considerable extent.

Correspondence.

Chrysanthemum Ada Spaulding.

To the Editor of GARDEN AND FOREST:

Sir:—Referring to the remarks of your Boston correspondent on the appearance of the *Chrysanthemum Ada Spaulding* at the recent exhibition in that city and to your note upon the same subject, allow me to say that I have no doubts as to the merits of this variety, but consider it one of the very best of the new kinds.

It is a robust grower, with short-jointed, heavy wood and foliage of the thickest texture. I have yet to see a single leaf attacked, either by white mildew or black rust. The flowers are of the largest size, distinctly globe shaped—that is, the lower half of the petals recurve to the stem, the upper ones incurving to the centre, thus forming a nearly complete sphere. The lower part of the flower is of a pleasing blush rose, the centre being pure white.

The flowers shown at Indianapolis were seven and three-fourths inches deep by six and three-fourths inches in diameter. It is plainly a mistake to exhibit seedlings or new varieties when not in good condition; which was evidently the case with this flower when shown in Boston. First impressions have much to do in determining whether one will ever fancy a new-comer. The flowers of *Ada Spaulding* which I saw at Orange and Philadelphia were small and not at all characteristic, and therefore they did injustice to a really valuable acquisition.

If it is the proper work of the National Chrysanthemum Society to determine which plants shall and which shall not be distributed, the task will be a difficult one. To condemn a

plant is a serious matter in many cases. It not only discourages the tyro from persevering, but the judgment may be unsound. It is easy to pass by varieties that are not at their best when shown before a committee, and as the legitimate season of the *Chrysanthemum* extends now from the 20th of September until the 20th of December, varieties may be neglected which may be very good either early or late. There are few *Chrysanthemums* in which I can see no beauty, but for the best interests of all there must be a limit to the propagation of varieties which are at best duplicates of existing kinds.

Pearl River, N. Y.

John Thorpe.

A Lesson in Transplanting Evergreens.

To the Editor of GARDEN AND FOREST:

Sir.—During the month of August last I witnessed the transplanting of several hundred Austrian and Scotch Pines. The result was the loss of nearly the whole lot; and it was such a surprise to me that I think the facts in regard to it worth recording. The weather was all that could be wished for, being warm and moist, and the soil was in the same condition. The Pines had been growing close together in rows and were from four to five feet high. As they were not as bushy as could be wished, we thought best to prune them in well, and, after the transplanting, a man was sent with shears to clip them closely. This he did, cutting off all the latest growth, taking from six to ten inches from the branches. Out of 300 plants all were so trimmed except some half dozen, which were purposely left unpruned to see which would do the better. At that time I confidently expected that the pruned trees would show the benefit of the work. However, they soon began to turn brown, and in the end every one died, while every one of the few left unpruned are alive to-day.

As soon as it was observed how the matter was going to end, another row was set out, unpruned, and all the plants in it are thriving to-day. No doubt the severe pruning was the cause of this failure. All the younger or active foliage had been cut away, leaving only that which was past its usefulness and which was about ready to drop off. The trees were, in fact, in just the same condition that a deciduous tree would have been if stripped of all its leaves in the middle of summer. It was a costly but a most valuable lesson and one worth putting on record as a warning to others.

Germantown, Pa.

Joseph Meehan.

Variegated Wild Plants.

To the Editor of GARDEN AND FOREST:

Sir.—I found in 1888, near here, a prettily variegated form of *Polygonatum biflorum*, and it has kept its variegation during two years of cultivation. In the garden of a friend there is a plant of *Symplocarpus fatidus*, the foliage of which is suffused with large white blotches, and he tells me this is the second he has found in his wanderings. Variegated plants of *Capsella Bursa-pastoris* and *Portulaca oleracea* are frequently to be met with here in the summer months. These instances are offered in response to the suggestion of Dr. Sturtevant.

Passaic, N. J.

E. O. Orpet.

To the Editor of GARDEN AND FOREST:

Sir.—In your issue of November 6th a correspondent asks for additions to the list of variegated wild plants, which he gives.

Rudbeckia hirta.—On marshy land near Klinger Lake, Michigan, I noticed for the first time, in 1887, a number of plants upon which the yellow rays were variegated with brown. This year more regularity and deeper coloring was observable, and in one instance, at least, a distinct circle at the base of the cone.

Dorcas E. Collins.

Klinger Lake, Mich.

Recent Publications.

Annual Report of the Royal Botanic Garden, Trinidad, 1888. By J. H. Hart, Superintendent. Handsomely illustrated with a series of views of several of the most interesting trees in the garden, including a fine specimen of the Traveler's tree (*Ravennala Madagascariensis*), of the great Bamboo, the Palmyra Palm (*Borassus flabelliformis*) and of other Palms.

As a scientific station the value of the Trinidad garden is very great, and much of its present success is due to the energy of the new superintendent, who is doing wonders in his efforts to develop the material prosperity of the British West Indies, by the publication of bulletins on various useful plants, and by the introduction of others from different parts of the tropics. The Trinidad garden, too, is the richest and

most beautiful probably in the tropics of the New World, and there is no spot where so many interesting plants of the tropics can be seen growing together which can be so easily reached from this country. It is gratifying, therefore, to read in Mr. Hart's report that the number of Americans who take advantage of this opportunity and visit the garden is steadily increasing, and that "the amount of energy and enthusiasm shown by visitors from the north is something surprising—certainly eclipsing anything seen from the European side of the world."

Department of Agriculture, 1888. The Report of the Botanist, by Dr. George Vasey, contains a description, with figures, of a number of Grasses of economic value, to which are added accounts of the western Plantain (*Plantago Patagonica*), a native of South America, but now spread into various parts of North America, and extending as far north as British Columbia on the Pacific side of the continent, and to New England on the Atlantic; of *Lygodesmia juncea*, a perennial weed common in the Rocky Mountain region, especially pernicious in vegetable gardens; and of *Solanum triflorum*, a wild Potato found growing from New Mexico into British America. A paper upon the *Pastoral Resources of Montana*, from the pen of Mr. F. W. Anderson, is appended.

The Bulletin of Miscellaneous Information from the Royal Gardens, Kew, for October, contains articles on the *Bahia Pissava*, a valuable fibre obtained from the leaf-stalks of the Brazilian Palm (*Attalea funifera*), largely imported into Great Britain, and on *Seedling Sugar-cane plants* at the Barbadoes; on the cultivation and production of the very successful *Cinchona* plantations in Jamaica; on *Gambier*, largely used in tanning and obtained from *Uncaria Gambier*, a climbing plant, native of and largely cultivated in the Strait Settlements of the East Indies, and on *Fibre Industry* at the Bahamas.

Hooker's Icones Plantarum. The October issue completes vol. xix. of the entire series and contains figures of several of the small Orchids of the Indian flora now in process of elaboration, by Sir Joseph Hooker, for his *Flora of British India*; and a continuation of the remarkable new Chinese plants which Dr. A. Henry has discovered in the western provinces. The most interesting of these are *Tetracentron Sinense*, a new genus of *Magnoliaceae*, a tree twenty to fifty feet high, with the habit of *Cercidiphyllum*, but with the flowers in long spikes; *Toricellia angulata*, the Chinese representative of a genus known previously in the Himalayas only, and belonging to *Cornaceae*; *Cercis racemosa*, an exceedingly handsome shrub or small tree, well marked by its loosely racemose inflorescence; no less than eight new species of Maples; a new genus in *Sapindaceae*, *Dipteronia Sinensis*; and several other plants which need not be enumerated to show the richness of the flora of western China in new forms, and the service to science which Dr. Henry has performed in making them known.

Notes.

The fifteenth annual meeting of the New Jersey State Horticultural Society will be held at Trenton, on Wednesday and Thursday, the 18th and 19th instant.

At one of the horticultural exhibitions held in the Exposition grounds at Paris last summer, eighty-five new varieties of Potato were shown by M. Rigault, of Croslay.

Lilium Harrisii is already found in quantities in our flower markets. This is five or six weeks earlier than usual, and it shows that florists have learned how to force these flowers more rapidly.

The Yellow Chrysanthemum, H. E. Widener, which received the Blanc cup for the best new seedling at the Philadelphia Exhibition, has passed into the hands of Mr. E. G. Hill, of Richmond, Indiana, who will send it out.

A novelty at the World's Fair in Paris was the exhibition of a group of Orchids, chosen simply for the beauty of their foliage. With the exception of *Odontoglossum Alexandrae foliis variegatis* all were natives of eastern Asia.

Barnard College, the new institution for women connected with Columbia College in this city, recently opened with a Freshman class of twenty girls, nine of whom will devote themselves exclusively to the study of botany.

An illustration of *Pilogyne punctata* was published in the *Illustrirte Garten Zeitung*, of Vienna, for November last, with a brief note highly commending the plant. A fuller description of it, with directions for cultivation, was given in GARDEN AND FOREST on the 18th of November.

M. Bruant, of Poitiers, writes to the *Revue Horticole* that he has obtained some hybrids by crossing *Rosa polyantha* with the common Bengal Rose. The plants begin to bloom early and continue to bloom a great part of the summer, when the flowers are succeeded by persistent fruit of a bright red color. A cluster of the fruits was said to make an interesting ornament.

According to *Gartenflora*, the well known variegated *Tradescantia* (*T. zebrina*) is an unfailling in-door weather prophet, if grown where it can receive the sun even for a short time daily. In the flowering season it will be filled with a multitude of buds, but these will expand into the delicate lilac flowers only when a storm is near at hand. *T. viridis* is said not to exhibit this peculiarity.

A correspondent of a German periodical writes that he possesses a variety of the common blue Chicory with white flowers, and finds that it is often thought by those who admire it to be an exotic novelty. He suggests, therefore, that horticulturists would do well to keep their eyes open in the woods and fields, as they might find other pretty things that would repay cultivation even in a commercial sense.

Flowers were in great demand in New York for the Thanksgiving holiday. Fine American Beauty Roses retailed for a dollar each, and the same price was paid for the very best Grandiflorum Chrysanthemums. Violets retailed at five dollars a hundred. They are very scarce, owing to the disease, which seems more prevalent and virulent than ever this year. The unusual number of damp and rainy days may account for the increase of the disease.

The last number of the *Bulletin of Miscellaneous Information* issued by the Director of the Royal Gardens of Kew (that for November) contains articles on *Phylloxera Regulations* at the Cape; on *Collecting and Preserving Fleshy Fungi*; on the attempt to promote in Labuan the cultivation of the plant which produces palm oil (*Elais Guineensis*), and on the different machines, lately exhibited in Paris, for the preparation of the fibre of the Ramie or Rhea-plant (*Bahmeria nivea*).

Our readers know that the *Victoria Regia* has been cultivated out-doors in Massachusetts, for an illustration of a successful result was shown in these pages some months ago. It was not until the past summer, however, that the experiment was made in Europe. Near the Mexican Pavilion, in the Exposition grounds at Paris, was a small tank where three plants flourished, and in the middle of August produced their immense flowers. They had been brought from their native home in boxes, and sunk, boxes and all, in the basin, which was warmed with water drawn from the elevator machines in the Eiffel Tower.

From 1,000 Prune trees, five years old, Captain Guy E. Grosse, of Santa Rosa, California, has this season dried five tons of fruit, which he is delivering at the Southern Pacific station for eastern shipment at four and a half cents a pound. The rapid maturing of a Prune orchard, after arriving at the fourth year, is shown by the increase in the crop of this year over that of last year, when the yield was but 1,200 pounds. Next year it is expected the crop will be trebled. At four and a half cents a pound, the proceeds from the 1,000 trees this year equals \$450. In two years more it should be nearly \$3,000.

One hundred and twenty-nine thousand eight hundred persons visited the Niagara Reservation during the months of July, August and September last. A new stairway to the Horseshoe Fall has been built; the old art gallery has been turned into a library; an iron railing, 200 feet in length, has been carried around on the steepest shore of Goat Island; the stone foundation of Prospect Park has been rebuilt, and many walks have been repaved or macadamized. Money has been appropriated for the establishment, at the "Old Garden," of a nursery, whence material for planting can be drawn in future years.

Floral decorations are taking their place among advertising expedients. At the recent opening of a large retail store in Washington, the interior of the seven-story building was almost covered with groups of Ferns and Palms and large "set pieces" of brilliant hue, and with wreaths of Asparagus and Smilax, while the great show-window was arranged as a sort of conservatory—banked with Ferns and filled with flowering plants surrounding a small glass lake in the centre, the firm's stock of furnishing goods being illustrated by an intermingling of lace curtains, rugs and ornamental seats. It seems doubtful whether the effect can have been very artistic, but one can well believe that it served its main purpose by "attracting great attention."

Mr. Peter Henderson exhibited in his windows in Cortlandt Street, last week, a selection of Chrysanthemum flowers, including a number of new importations from Japan. Besides the new pink one in the style of Mrs. Hardy (Louis Böhmer), there was also shown another numbered 22, with large tubular florets, with coarser glandular hairs. Mr. Henderson's new collection comprises a number of fancy kinds, quilled and tasseled. One of these, number eight, has very narrow florets, which are so tightly twisted that they look like long, slender tubes, the lower half of which are crimson and the upper half bright yellow. They are gathered in a cluster like a plume, the florets curving gracefully outward. There are three others of this type, a pure white, a crimson and white, and a pink. They are dwarf and bushy in habit, very floriferous, and quite distinct in character from any other Chrysanthemums that have come under our notice.

The color and texture of rocks, especially when they rise in almost perpendicular walls, form a noteworthy feature in many landscapes. The soft, mellow tints of the buttresses of the Natural Bridge in Virginia will occur to many persons as an illustration of this, and all who have traveled among the northern Rocky Mountains have observed the rich color-effects upon the cliffs of that region. Writing of Lower California, Mr. C. R. Orcutt, in the *West American Scientist*, says: "No small factor in producing a pleasing effect in the scenery here is the great variety of rock-lichens everywhere prevalent. Red, yellow, gray and white are the prevailing colors observable, and the whole side of a cliff is often covered by lichens of the same tint. How many valuable mines may be hid from the prospector's keen eye by these deceptive colorings? Quartz, however, is not a favorite rock with the lichens and consequently is seldom concealed, while the lichens also frequently imitate, in coloring, the natural color of the rocks on which they are found."

One of the most interesting and valuable results of recent French horticultural effort is found in the new race of dwarf Cannas, with large and brilliantly colored flowers, produced by M. Crozy, of Lyons. A large bed of these plants in the garden of the Trocadéro, in Paris, was surrounded all summer by crowds of people. Too much has not been said of the beauty of these plants and of their value for decorative purposes, whether planted in the open ground or grown in pots or tubs. The colors of the flowers of some of the varieties are surprisingly brilliant. There seems no good reason, however, for calling the plants "dwarf," except that they begin to flower when they are not more than twenty inches high, for they grow, especially in this country, when generously treated, to a height of six or eight feet. Seventeen of the new varieties exhibited at Paris for the first time, which, on the whole, are no better than those sent out by M. Crozy during the past two years, are described in a recent issue of the *Revue Horticole*. No one who has not seen a collection of M. Crozy's Cannas in good condition, can form the faintest idea even of the beauty and the brilliancy of the flowers of the plants.

A recent writer in the *New York Sun* says that the name of Maine should be changed from the Pine-tree to the Spruce-tree State. "In the early days of lumbering," he explains, "pine made up the greater part of the cut, and little else than pine and spruce was sought for. The pine was mostly sawn into boards, and a large part of it was shipped to the West Indies, where it was exchanged for Spanish gold, molasses and sugar. While this traffic lasted Bangor's foreign trade was lively. A big fleet of the old-fashioned brigs and schooners found employment in a trade which paid good freights. Cargo after cargo of the wide, clear, White Pine boards went out to Cuba, Porto Rico and the Windward Islands, and other cargoes of the sweets of the Antilles came back. Loggers and river-drivers earned great wages; the big pine was rapidly cut away and began to grow scarce. Then came a change, the decadence of the pine and the ascendancy of the spruce, the decline of the West India business and the opening of a new era in the lumber trade. In 1855 123,000,000 feet of pine were surveyed at Bangor, and only 78,000,000 of spruce. Ten years later things had changed about, for in 1865 the survey was: spruce, 107,505,867 feet; pine, 48,296,222 feet. In 1889, out of a probable survey of 150,000,000 feet, less than one-sixth of the amount will be pine, and that mostly second growth. There are lots of big Pine trees left in Maine, but they are far away to the north, and no great operations are now carried on for that kind of lumber. Some pine is cut to supply a limited demand, mostly local, but the large markets are now supplied from Canada and Michigan. This is the age of spruce in Maine."

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Trees in Winter.

TREES, to many persons, are attractive only when they are clothed with leaves, and many people whose interest in them is considerable do not notice those peculiarities which make it easy to recognize one tree from another after the leaves have fallen. But to the real lover of trees, they are equally beautiful and interesting at all seasons of the year; and no one can pretend to know trees well who cannot distinguish the different species as quickly and as easily in winter as in spring or summer. If trees are considered from an ornamental point of view only, almost every one of them has some special and peculiar beauty which is only displayed in winter. The fine spray of the Beech is seen only at this season of the year, and there is no more beautiful object in nature than the delicate ramifications of the American Beech seen against the clear blue sky of a brilliant winter day. The sturdiness of the Oak is only realized in winter, when the knotted strength of its limbs is not disguised under their covering of leaves. The Birch is a far more graceful and attractive object in winter than at any other season of the year; and what is there more stimulating to the imagination than to stand on a clear winter's day and look up into the marvelous structure of one of the great Elms which, here and there, still grow near some of our northern rivers? The bark of all trees appears, at least, more beautiful in winter than at other seasons, because the eye, undisturbed by the contemplation of masses of foliage, can then take in all the details of its varied texture and wonderful colors.

The artist and the mere lover of beauty will be well repaid by constant visits to the woods in winter; but for the student of trees—that is, for one in search of accurate knowledge concerning them—it is as important to study trees in winter as in summer. It is not easy to imagine that there are educated people in a community like this who can mistake a Birch-tree for an Oak in winter; and yet there are thousands of people who drive or walk in the parks every winter of their lives and never see the slightest difference between one mass of naked branches and another. And yet the differences between the various families of trees are clearly enough defined to make their recognition easy

and fairly certain. Nor is it difficult to determine the various species when once the characters peculiar to each are fixed in the mind of the observer; and such characters are often more constant and stable than characters derived from the shape of the leaf or from the size and shape of the fruit upon which people, who are not scientific botanists, depend generally to identify any given tree. Each species of tree has its peculiar habit, which may be seen at a glance in winter, and which it retains always, unless the individual has been subjected to some abnormal conditions. The character of the bark rarely changes on individuals of the same age, although the bark of old trees is often very different from the bark of young trees of the same species. The color of the branchlets and the character of the winter-buds often afford certain means of determining closely related trees. The winter-buds are quite distinct on each of the six or seven Magnolias which grow in the American forests, and no one who has studied these trees has any difficulty in distinguishing one species from the others by a glance at a winter-bud. The winter-buds of our Hickories are all different on the different species and always constant, and as individuals of the species vary greatly in their leaves and fruits, botanists are sometimes obliged to fall back on the winter-buds in order to be certain of their determinations. And in every tree there is, in addition to its general appearance, which is in itself sufficient to make its recognition easy with a little practice, some special character which will enable the lover of trees to confirm his first impression, and to distinguish a particular species of Oak, or Hickory, or Poplar from every other.

A knowledge of trees, the ability, at least, to recognize and identify them, adds vastly to the pleasure of every one who walks abroad where they grow. One meets and greets them like old friends. Every season invests them with a new charm, and the more we study them, the greater will be our admiration of the wonderful variety and beauty which they display in winter.

The handsome Silver Fir, *Abies Veitchii*, was discovered on Mt. Fusi Yama, in Japan, in 1860, by Mr. J. G. Veitch, and was described by Dr. Lindley in the *Gardeners' Chronicle* of January 12th, 1861. Mr. Veitch, who was instrumental in introducing at that time many Japanese plants into England, did not succeed in bringing home living specimens of the Fir which commemorates his services as a botanical explorer; and *A. Veitchii* remained unknown in English gardens until 1879, when Maries, a collector sent to Japan by the Veitches, succeeded in introducing it. Mr. Thomas Hogg sent, in 1876, a number of Japanese plants to the Parsons Nurseries in Flushing, New York, and among them was a Fir to which Mr. Parsons gave the name of *Picea Japonica*, under which name he has propagated and sold it. We are able now to identify Mr. Hogg's plant with the *Abies Veitchii* of Lindley, so that the irregular and unpublished nursery name may be disposed of finally. The interesting feature in this matter is, however, that this tree, which was particularly desired in England, and for the introduction of which special efforts were made, was cultivated in this country for three years before it reached Europe, and that no one knew anything about the Flushing plant, or took the least trouble, apparently, to find out what it was.

It is, of course, too early to speak of the value of this species as an ornamental tree in this country. Mr. Hogg's plant, still in the Flushing Nursery, is fifteen or sixteen feet high, with a spread of branches twelve feet across on the ground. The foliage is thin and poor, and the lower branches are failing. The ornamental value of the species, however, cannot be judged fairly by this specimen, as it is planted in poor soil, and has evidently been starved and neglected. The smaller specimens in Mr. Hunnewell's Pinetum at Wellesley, imported from England, and in Mr. Dana's garden on Long Island, are in excellent health, deeply colored, and promise to develop into handsome

specimens. As *A. Veitchii* is a species which grows only at high elevations on the mountains of central Japan and far north on the other islands, there is no question of its hardness. It is, according to Rein, distinguished by its red bark and by the brilliant bluish white color of the two bands of stomata on the under surface of the leaves, which give it a peculiar and striking appearance. It grows in its native forests sixty to ninety feet high, with a diameter of trunk which rarely exceeds two feet. The wood is described as moderately fibrous, splitting easily, and as being lighter and less elastic and firm than that of the Momi (*A. firma*), and therefore not as highly prized.

The result of a suit brought by the Government in the United States Circuit Court, against John R. Hite and John W. Snyder, shows the difficulty which exists in protecting the forests on the public domain of the United States, and the feelings of the people in western communities on subjects relating to forest preservation. The defendants in this suit are wealthy residents of Mariposa County, California, who had, it was claimed, been engaged in cutting timber unlawfully on Government land during the ten years between 1877 and 1887. The amount of damages claimed by the officers of the Government was \$91,000. The stolen timber was sawed in a mill owned by Hite, situated about fifteen miles from Mariposa. There seems to have been no great difference of opinion on the facts in the case, and the Government had little difficulty in establishing the existence of the depredation and the employment of the timber. The jury, after deliberating for five hours, returned a verdict in favor of the Government, fixing the damages, however, at only \$5,000. The letter of Mr. Shinn, on another page of this issue, should be read in the light thrown upon it by such incidents as this if we are to appreciate the full dangers to which our western forests are exposed.

"Ornamental Planting" in Paris.

SO frequent is the inappropriate use in our public and private pleasure-grounds of formal flower-beds, isolated exotic plants and bright-hued shrubs and trees, that the untraveled observer may be pardoned if he concludes that Americans must be exceptionally devoid of a feeling for true landscape-art. But, no matter where his landing-place on European soil may be, the American soon discovers that his countrymen are not alone in their sins. There, as well as here, he finds some parks, where the original "natural" scheme has been kept free from inharmonious details; but many others will be found where such a scheme is ruined by the tasteless devices of so-called "ornamental planting." Indeed, certain mistakes in treatment are common abroad, which have not been introduced here, and injudicious planting is more conspicuous to-day in the pleasure-grounds of France and England than in those of America. Perhaps the most striking instance in point is that of the Parc Monceau in Paris—the most striking because the park itself, if freed from its deforming details, would be the loveliest of the smaller urban parks of the world.

The Parc Monceau lies directly north of the Rond Point of the Champs Elysées. When first laid out in 1778 by the landscape-gardener, Carmontel, it was well outside of the city and was then considered one of the most beautiful "English gardens" in France. What remains of it to-day leads one to believe that its reputation was well deserved. A decree of the Convention in the first years of republican rule ordered the establishment, within its limits, of various buildings of public utility, but its distance and lack of easy communication with Paris preserved it from actual injury. After some changes of ownership, in 1852 it was constituted public property. In subsequent years the development of the now splendid quarter in which it lies necessitated the reduction of its area to about twenty-two acres, something less than one-half of its original size; but the reserved portion was carefully respected, and to it were transferred certain interesting architectural features that had stood elsewhere. The wide Boulevard de Courcelles now runs along its straight northern side, where a gateway, in its tall iron railing, opens between two porters' lodges. The other three sides are curved in outline, and the southern, where there are two smaller entrances, is encircled by a row of fine residences each having its small garden opening on

the outer alley of the park. But what gives especial beauty and character to the Parc Monceau is the design of the two chief approaches—on the east where it is entered from the Avenue Velasquez, and on the west where the Avenue Van Dyck leads out into the wide Avenue Hoche and thus directly to the Arc de Triomphe. Each of these short avenues is planted with double rows of fine Plane-trees, and flanked by sumptuous private houses, set back in large and shady gardens. They form, therefore, approaches of much stateliness, where the effect is semi-architectural, semi-verdurous, and make an admirable transition between the rigidity of the ordinary streets beyond and the "natural" design of the park itself. Where each avenue meets the park, moreover, there is an elaborate high barrier of wrought iron, profusely gilded, with great central gates—works of the forger's art, which have become famous as among the very best produced in modern times. Between these approaches runs the main roadway of the park, gracefully curved, yet not so sinuous as to render it inappropriate as a portion of one of the main routes taken by persons driving to and from the Bois de Boulogne. About midway of its length it is crossed by another driveway running between the northern and southern gates. Otherwise there is no provision for carriages, but a sufficient number of paths open up all parts of the domain to the pedestrian, for whose use it is primarily intended. These paths are most gracefully, yet simply, laid out, and, passing now by open lawns and again under groves of tall trees, offer a grateful alternation of sun and shade. It is no wonder that the nurses and babies of the neighborhood should crowd the park on pleasant days in winter as well as spring; and there is no spot where the lover of landscape-gardening would be better content to saunter, were it not for the superfluity of minor "decorative" features which the taste of recent years has seen fit to introduce. No area of its size could be more beautiful in the modeling of its surface, sinking here into wide sloping lawns, between which runs the main drive, and rising there in gentle banks crowned by thickly planted trees, among which Planes, Horse-Chestnuts and Maples are most conspicuous. No trees of remarkable size or conspicuous beauty, as individuals, can, perhaps, be found in the Parc Monceau; the planting seems to have been done with a view to the contrasting of broad, open stretches with masses of foliage, rather than to the development of fine individual specimens of tree-growth. But, given the area of the ground and its special purpose as an umbrageous retreat in the heart of the town, the scheme is a wise one; and here and there, where the lawns are largest, some isolated groups of three or four large trees of the same kind stand where they are most effective. Through the thickly planted part of the park runs a little stream, which, near a pretty grotto and rockery, feeds an oval pond partly encircled by a Corinthian colonnade. This once formed part of a rotunda begun by Catherine de Medici at St. Denis; and not far away from it is the fragment of a straight colonnade which once formed part of the old Hotel de Ville of Paris. These architectural relics do not injure the natural effect of the park, for, thickly shaded and draped with vines, they look like the remains of charming pavilions or covered walks designed for the repose of the pedestrian. They add, indeed, to the romantic effect of the scene and cannot be called inappropriate, since it is confessedly an urban and not a rural pleasure-ground.

But how the hand of the gardener has defaced this charming park! All along the borders of the roads and paths formal flower-beds of large size and crude color are thickly distributed; the rising banks are spotted over with little specimens evergreens, Palms and exotic flowering plants of many sorts; the bases of the trees which stand on these banks are smothered in big beds of Geraniums or tuberous Begonias; an immense bed of purple-leaved shrubs, surrounded by sickly white-leaved Negundos, lies on one side of the main drive, forming a discordant spot; the isolated trees on the lawns are encircled by flower-beds, and even the isolated exotic plants which are placed near them—as if they were not obtrusive and discordant enough in themselves—are surrounded in the same way. A tuft of Pampas grass, which would be far better away, is rendered doubly bad by its ring of Geraniums, or a wide-leaved Palm overshadows a circle of crimson Coleus.

But worst of all, perhaps, is the way in which the shrubberies are treated. Instead of the shrubs being allowed to droop naturally in a varied outline upon the grass, they are trimmed to allow a flower-bed about a foot wide to run in a straight line along their base, and this bed is filled with rigid rows of gaudily colored plants. Nothing could be more uncalled for than this intrusion of "ornamental" plants between the grass and the shrubs, which, if left to themselves, might effect a beautiful union; and nothing could be worse than the look of

he stiff line of color between the soft green masses above and the soft green expanse below. Not only on the path side of the shrubberies, however, but even on the lawn side this feature is constantly introduced; and we see the same thing to-day almost everywhere in France and England, and in private as well as in public gardens. Fortunately the fashion has not yet been taken up in America, and it is to be hoped that it will never cross the sea.

As the Parc Monceau was designed it was a spot of the utmost unity of effect, restfulness, gracefulness and charm. There are a score of spots within its borders from which might be obtained vistas of sloping greensward and feathery shrubbery and overarching tree-tops that could not be surpassed for harmony and loveliness in any park in the world; and the aspect of breadth and openness secured in so small an area, with so entire a concealment of the surrounding streets, must have seemed indeed a triumph of art. The practiced eye can still read these charms under the disfigurements of to-day; but it reads them with perpetual irritation and protest; for there is no standpoint whence the prospect in every direction is not marred by obtrusive spots, lines and solid masses of color, and by inharmonious plant forms; not a nook so rural that the spade of the potter-out has respected it; not a fair stretch of lawn which is not broken and speckled with "specimen" plants of a dozen sorts; not a shrubbery, and scarcely a conspicuous tree, which is allowed to spring naturally from the turf at its base. The most exacting landscape-painter might once have found many subjects for his pencil here in the heart of Paris; the least exacting could not paint a bit of the Parc Monceau to-day without omitting a hundred offensive details. The effect is all the worse because nothing needs to be planted, nothing permanent needs to be altered. The simple rooting out of a myriad ephemeral plants would at once restore the domain to perfect beauty.

The River Birch.

THE charm of the banks of many streams in the United States is due in large part to the presence of the River Birch, which graces them with its peculiar beauty, and which is not only one of the most beautiful trees of the American forest, but one of the most interesting. It is interesting because of all the Birches, a family of trees widely scattered over all the colder parts of the northern hemisphere, it is the only one which grows in a warm climate. There are Birches, perhaps, which grow nearer to the equator than our River Birch, like some of the East Indian species, but these are found at great elevations only on high mountains, and, therefore, in boreal climates, while the River Birch flourishes in the damp, semi-tropical lowlands of Florida, Louisiana and eastern Texas. It is peculiar, too, among Birches in the season of the year when its seeds ripen. The seeds of other Birches ripen in the autumn, fall to the ground, and do not germinate until the following spring. The seeds of the River Birch mature in June, or often earlier in the southern states, and germinate at once as soon as they reach the ground; and the young seedlings are often a foot or more high before the coming of cold weather stops their growth.

Several of our trees which grow in wet places naturally have acquired this habit of early ripening of the seed. It is the habit of nearly all the Elms, and of the Poplars, and of the Red and White Maples, although the other Maples, which grow naturally on dry ground, do not ripen their seed until late in the autumn. This early ripening of the seeds of certain species only of particular genera can be accounted for by the situation in which such trees grow. The River Birch is found on the borders of streams or swamps which are covered often with water to a depth of several feet during a part of every year. The Red Maple and the Silver Maple and the Poplars grow only in swamps or other wet places. If the seed of these trees ripened late in the autumn, when streams and swamps are full, they would fall into the water and would be washed away or destroyed, and this particular species of tree would have been exterminated gradually; but falling as they do in early summer, when the soil which receives them is neither covered by water nor dry and baked by the droughts

of the hot months, they are placed in the most favorable situation possible for germination; and the young plants are able to acquire sufficient height and strength before autumn to bear, with a good chance of survival, the effect of being flooded during their first winter.

There is an interesting fact, too, and one which is not easy to explain, connected with the geographical distribution of the River Birch. It is found on the banks of the Merrimack and of the Spicket Rivers in north-eastern Massachusetts. Here it grows luxuriantly and abundantly, but it grows nowhere else in New England, or anywhere else as far north as Massachusetts. It grows on the banks of one small stream on Long Island, but nowhere else in New York, and it only becomes common in the lower part of New Jersey; but from southern New Jersey to Iowa on the west, and to northern Florida and eastern Texas on the south, it occupies the banks of almost every stream, excepting those in the high Alleghany Mountains, which have a gravelly bed and banks which are not marshy. There is no tree so rare and local in New England and the northern states, and none in the particular situations it selects more common in the middle and southern states.

The River Birch is a tall tree, eighty or ninety feet high when it is at its best, with a ponderous trunk three or four feet in diameter. The bark on the trunks of old trees is thick, dark brown and deeply furrowed, while that on young trees, with a trunk diameter of not over ten or twelve inches, and on the branches, is light red or cinnamon colored, dividing readily into thin, transparent, papery layers. It is this color of the bark of the branches, peculiar to this species, which has caused it to be called also the Red Birch, although by a curious misapplication of names this tree is known to botanists as *Betula nigra*. The ultimate divisions of the branches, as is the case with all Birches, are slender, pendulous and graceful, giving to this tree in winter that light and feathery appearance which makes it such an attractive object at this season of the year, as it pushes its branches out over some deep, swift flowing stream. The leaves of the River Birch are large, sharply toothed and pointed; they are bright and lustrous on the upper surface and pale on the lower, and in autumn turn bright yellow before they fall from the branches.

The wood produced by the River Birch is light and strong; it is easy to work, of good color, and well suited for furniture of the best quality, which has of late years been made from it in large quantities in some parts of the country. As an ornamental tree for the decoration of parks, the River Birch has much to recommend it. It grows rapidly when removed from the banks of its native streams to drier soil, and may be depended on to develop in a short time into one of the most beautiful of deciduous trees. It is not a common tree, however, in cultivation, in spite of the fact that it was one of the first American trees cultivated in Europe, having been planted in England as early as 1736, and its value and beauty are not known or appreciated by the present generation of tree-planters. Large specimens may be seen occasionally in some of the old European parks, especially in those of northern Germany; but it is practically unknown in those of this country or of England; and yet there is no tree better suited to place on the borders of ornamental water, and there is none which, in such a position, is capable of adding more grace and beauty to the landscape.

The picture of the group of River Birches in Massachusetts in winter, which appears on page 593 of this issue, shows the beauty of this tree at this season of the year, and serves to illustrate the fact, already stated on another page of this issue, that trees are as beautiful in the eyes of the real lover of trees in winter as they are in summer, and that there is much to learn by studying them at this season of the year, when their whole anatomy is made clear by the absence of their leaves.

Our illustration is prepared from a photograph by Dr. William Herbert Rollins, of Boston, to whom we are indebted for permission to reproduce it. C. S. S.

New or Little Known Plants.

The Last Addition to the Shrubs of Eastern North America,

(*Croton Alabamensis*.)

THIS plant, the rarest and most beautiful of the *Crotons* found within the limits of the United States, was first brought to the notice of botanists by Professor Eugene A. Smith, who found it in the summer of 1877 near Pratt's Ferry, Bibb County, Alabama, not far from the eastern bank of the Little Cahaba River, the principal upper tributary of the Cahaba, where it forms dense and almost impenetrable thickets, many acres in extent, in the Oak forest covering the base and flanks of the old-silurian limestone hills which skirt the valley. The soil and the rocks, scattered widely over this valley, are covered under the deep shade of shrubs and trees with a cool, dark carpet of mosses, studded with numerous Ferns, the sombre green relieved in some exposed spots by the pale purple flowers of the delicate *Sedum Nevii*, the rare *Gatesia late-virens* and several shade-loving *Desmodiums*. When I first visited this locality in the fall of 1882, in a vain search for seeds of the Alabama *Croton*, I was repaid by the discovery, among the White and Chestnut Oaks overshadowing it, of the then little known *Quercus Durandii*, first observed in this state in 1840 by Mr. S. T. Buckley, who subsequently described it from specimens gathered by him in Texas. The exact habitat of this rare tree east of the Mississippi River had remained, however, unknown up to the time of my rediscovery of it in the valley of the Little Cahaba River.

There are only at this time a few of these thickets of the Alabama *Croton*, called by the inhabitants of the region "Privet brakes," known, and these are all found close together; and it is probable that it does not extend beyond a territory a few miles square.

Croton Alabamensis,* when fully grown, reaches a height of six to ten feet, with upright, or slightly bent, stems one and a half to two inches in diameter, covered with grayish white bark. The rigid, widely spread branches are rather naked, the foliage being confined to the terminal branchlets, which only appear at some distance from the ground. The stem and branches of young plants, however, are covered with leaves and flower-bearing lateral branchlets, and are then almost hidden with their dress of silvery white and brilliant green foliage. The leaves are destitute of glands and are subtended by small exceedingly deciduous stipules; they are oblong-lanceolate, obtuse, entire, deep green on the upper surface, the lower covered with a dense tomentum of shining silvery scales, as are the short petioles, young shoots and the inflorescence. The leaves are persistent, remaining on the branches through the winter, and are then gradually replaced during the succeeding season by a new crop produced from early spring to the end of autumn. The flower-buds begin to appear soon after the ripening of the fruit in early summer; they are placed in axillary racemes from an inch to an inch and a half long at the time they open, which is from early February to the middle of March. The small whitish flowers are short pediceled, with a calyx of five broad acute sepals, a little longer than the five narrow petals, and alternating with the oblong glands at their base. The deep yellow anthers of the fifteen or twenty stamens, arranged in alternate sets of five in the crowded male flowers, make the inflorescence somewhat conspicuous. The female flowers, fewer in number, occupy the lower part of the raceme, their hairy ovary bearing three small, flat, somewhat emarginate stigmas. The male flowers soon fall after pollination, when all parts of the female flowers increase rapidly in

size, the racemes growing to more than double their original length. The fruit ripens from the latter part of April to the end of May; the carpels, when fully mature, separating by the slightest touch, splitting dorsally and discharging their seeds with some force. This habit will account for the difficulty I have experienced in procuring a supply of seeds, for which I have made two fruitless excursions.

The Alabama *Croton* is not a rapid growing plant. According to Professor Smith's observations, seedlings of the second season, and about eighteen inches high, transplanted from the forest in 1880, have now attained a height of seven feet, having made a growth of about five feet and a half, the largest stems having a diameter of one and a half inches. These plants began to flower when they were two feet high, and at that time were covered with numerous lateral branches. During succeeding years the growth was principally upright, and the plants at present have no lateral branches on the lower part of the stem. No effort has been made to propagate this plant by layers or by cuttings.

The original forest-growth, which still covers the limited area upon which the Alabama *Croton* is found, is, in this day of rapid development of the timber and mineral resources stored up in this secluded part of the country, liable to early destruction, and the survival of this typical Alabama plant in its native home is, at best, uncertain, and will, in all probability, be of short duration. It is only by cultivation, therefore, that the continuation of this species can be secured; and to this it is entitled, not only as a rare production of the vegetable world, possessing many points of scientific interest, but also for its value as an ornament for the garden and the park. There is little doubt that its cultivation, with slight protection during the winter in higher latitudes, can be made successful, and that it will thrive in the Atlantic states as far north as New England.

Croton Alabamensis belongs to the sub-genus *Eluteria*, and its nearest relative in the United States is *Croton argyranthemum* of the south Atlantic states, and, as Dr. Chapman has pointed out to me, it is very closely related to an extra-tropical species of southern Brazil, which differs from it slightly in specific characters.

Mobile, Ala.

C. Mohr.

Chrysanthemum, Mrs. Andrew Carnegie.

THIS is a seedling raised from Duchess, with Cullingfordii as the pollen parent. Out of twenty-five seedlings from this same cross, several had distinct crimson flowers, but were not of sufficient merit to justify their distribution, while the one in question I consider the best crimson variety of the type known as Japanese. The Mrs. Carnegie requires particular treatment to bring out the true shape and coloring of the flower. It should never be forced into rapid growth, but should be grown slowly from the start. The plant should be exposed to the sun after the 1st of September and should not be removed to the green-house until freezing weather threatens, and after that it must not be subjected to more artificial heat than is necessary to protect it from frost. A dry atmosphere, too, is of the greatest importance, as the least moisture on the florets after they begin to unfold causes them to damp or mould.

Pearl River, N. Y.

John Thorpe.

Cultural Department.

The Shrub-Garden in November.

THE garden in November is not always destitute of interesting or beautiful objects, as is commonly supposed, and, under ordinary circumstances, there are many plants which well repay examination at this season, when nearly all vegetation seems to have lost activity and life. In the latter part of the month, or Thanksgiving week, in New England many a pretty bouquet can often be made from the flowers and fruit which may be found in the open garden or in sheltered corners.

It is at this time that the value of woody ornamental plants

* "C. ALABAMENSIS, E. A. Smith (ined.).—Stem tall, woody, much branched; leaves thin, short petioled, oblong-lanceolate, mostly obtuse, smooth or nearly so above, the lower surface, like the branchlets and racemes, coated with silvery scales; racemes often unisexual, few or many flowered; calyx-lobes five, acute; petals of both sexes scarcely shorter than the calyx, woolly-margined; stamens twenty or more; styles simple, truncate or emarginate; capsule much longer than the calyx; seeds glabrous. Central Alabama, flowering throughout the year. Stem, six to ten degrees high. Leaves, two to three inches long." Chapman, *Fl. S. States*, Suppl. 648.



Fig. 149.—The River Birch in Winter.—See page 591.

shows to advantage when compared with the annuals or perennials. It is true of our woody plants that the flowers which several species bear at this season are usually not due to appear before April or May, but a few blossoms are almost invariably produced at the time when the leaves are falling or after a succession of mild days in winter. An exception to this rule is the Witch-Hazel (*Hamamelis Virginica*), the normal blooming season of which is in October and November, the time varying greatly, according to situation and exposure, so that flowers may be found in winter or very early spring.

This plant, which should be in every shrub-garden, has

fragrantissima and *L. Standishii*, occasionally open before all the leaves have fallen, and they are just as fragrant as they would be if not developed until spring. These two species retain their leaves longer here than any others of the genus except *L. Japonica* and its varieties, which are almost evergreen. Among other spring blooming shrubs a few yellow flowers of the Forsythia can be found, and in the *Ericaceæ* open blossoms of *Andromeda floribunda* and *Erica carnea* may be discovered during the late autumn and under the snows of winter, while the last species is one of the first shrubby plants from which bees collect nectar in the spring. *Daphne Cneorum*



Fig. 150.—*Croton Alabamensis*.—See page 592.

1. Flowering Branch. 2. Fruiting Branch. 3. Male Flower, enlarged. 4. Female Flower, enlarged. 5. Pistil cut across, enlarged.
6. Fruit, enlarged. 7. Ventral view of a Coccus, enlarged. 8. Seed, enlarged.

an added interest from the fact that it well illustrates one of Nature's many beautiful ways of scattering seeds. The fruit ripens as the plant comes into bloom and the woody capsules open and disclose the oblong shining black seeds. As the capsule dries the lower edges contract and press against the sides of the tapering seed, which, suddenly breaking loose from its attachment at the base, is thrown with the velocity of a bullet for a distance of ten or twenty feet or more from the parent plant.

Against sheltering walls flowers in considerable numbers may still be found on Hall's variety of *Lonicera Japonica*, and a very few blossoms of the spring flowering bushy species, *L.*

bears a second crop of small clusters of blossoms during the autumn, and, if with *Vinca minor* it is somewhat protected from severe early frosts by sheltering trees or buildings, a bunch of the purple flowers of the *Vinca* and of its white variety, may be made fragrant by stray sprigs of the *Daphne*.

Spiraea Thunbergii is the last of its genus to lose its bright autumn foliage and its early spring flowering habit is often indicated by a profusion of small white blossoms during mild periods in November.

But it is those species of shrubs which, having lost their foliage, retain their fruit in its original plump and bright condition, that give the most satisfaction at this season.

Some of the bunches of fruit of *Lonicera Sullivantii* (commonly grown as *L. flava*) still retain much beauty, although many of them have become dry and shriveled. The Cranberry-bush (*Viburnum Opulus*) holds its fruit, which is somewhat duller than before frost; and the long, slender stems of

Among all the conspicuous fruit-bearing plants, the Japanese *Berberis Thunbergii* seems one of the handsomest and most satisfactory. The bright red fruit, thickly set along the branches of this Barberry, remains full and fresh-looking until spring, and well laden branches, if cut off and dried for in-door decoration,



Fig. 151.—Chrysanthemum, Mrs. Andrew Carnegie.—See page 592.

Lycium Chinense remain covered with bright scarlet ovate fruit.

The bright red fruit of our native Black Alder or Winterberry (*Ilex verticillata*) can hardly be surpassed in some respects, but in some districts it is liable to be eaten early by birds, while in other places it may remain on the plants all winter.

retain their beauty for a long time. The plant is now becoming well known and commonly advertised, and it is likely to be quite popular as a low hedge plant. The fruit of some other Asiatic species or varieties still retain a little beauty, but most of it has become much shriveled and lost its early brightness.

Crataegus pyracantha, the Evergreen Thorn of southern Europe, which is not very hardy in this latitude, still retains all of its shining green leaves, and the birds have not yet devoured the bright scarlet fruit, which is quite pleasant to the taste. The Washington Thorn (*C. cordata*) is almost the only other species whose fruit retains its brightness and is persistent through most of the winter. The fruit of the European Spindle tree (*Euonymus Europæus*) ripens late, and just now the orange colored arils are very showy, although the pods have dried and lost much color. This species is more showy at this time than the native Burning-Bush (*E. atropurpureus*). No list of bright fruiting plants is complete without the Waxwork or climbing Bitter-sweet (*Celastrus scandens*), with its bunches of bright scarlet fruit, which often take a conspicuous part in New England Thanksgiving and Christmas decorations. It should be propagated from plants which are known to fruit abundantly. *Celastrus punctatus*, a Japanese species, is also very ornamental, although the fruit is small and is borne in small, loose, scattered cymes, a character which gives it quite a different aspect from the close, raceme-like bunches of our native species.

The Rose family also contains many plants well known for their showy fruit of late autumn and early winter. Perhaps the most valued of these is the large-fruited Rowan-tree (*Pyrus aucuparia*) of Europe and our own Mountain Ash (*P. Americana*). A dwarf species of the same genus, *P. arbutifolia*, var. *erythrocarpa*, still holds its very dark red fruit in a firm and fresh state. Some of the native and foreign wild Roses still retain their fruit in an attractive condition, varying in color from red to brown or black. Several species of Cotoneaster are deserving of more general cultivation, either for their showy fruit or evergreen habit. The Snowberry (*Symphoricarpos racemosus*), so common in all old-fashioned gardens, is interesting for its large, white fruit, which is unique at this season. The Indian Currant (*Symphoricarpos vulgaris*) has considerable ornamental value, and its long, slender branches, covered with small, fresh, dark red and magenta colored berries, are in their best condition at this date.

The evergreen Bearberry (*Arctostaphylos Uva-ursi*), with its deep red fruit, and the Aromatic Wintergreen or Checkerberry (*Gaultheria procumbens*), have not yet become thoroughly domesticated, although the Bearberry grows and thrives very well in some situations under cultivation. The bright scarlet, spicy berries of the Checkerberry are commonly found in the market at this season.

Shrubs which have bright colored stems and branches also contribute greatly toward lighting up the landscape at this season, but mention of them has been omitted from this list because the colors of most of them become more intense after the snow falls and as the winter advances.

Arnold Arboretum.

J. G. Jack.

The Roses of the Year.

THE list of new Roses for 1888 and spring of 1889 was an unusually large one, about equally divided between the Hybrid Perpetuals and those known as Ever-bloomers in this country, including Teas, Polyanthas, Hybrid Teas, Noisettes, Bourbons and Chinas. It is impossible to determine the value or quality of a Hybrid Perpetual with a single summer's trial, but my notes made in England and on the Continent during August last may indicate varieties that will probably prove useful in this country. Oscar II., King of Sweden, was introduced by Soupert et Notting, of Luxembourg. Color is the remarkable feature about this Rose, it being a maroon-brown; or, to put it another way, a brown-crimson. A strong, vigorous grower, with large leathery foliage, it produces flowers quite double and of fair form. It has a rival in Sir Rowland Hill, an English introduction of the previous year. This is a fine, erect grower, and, if vigorous enough when grown on its roots, will be much sought after when known in America. It, too, is a maroon-crimson, with just enough lustre to light the flower up nicely. It is similar to Duke of Edinburgh in habit and form. Both the above Roses are decided departures in color, and from what I saw of them they appeared very free in the production of flowers. Caroline D'Arden, raised by Dixon, of Langport, Ireland, is a Rose of much promise from its sturdy habit and fine, open-faced flowers, which are produced in abundance when the size of the flowers is taken into account. It is of a bright cherry-rose, one of those appealing tints that one cannot help liking. Countess d'Eu (Verdier) is a fine globular flower of a bright cerise-rose color, flushed with vermillion. It is a Rose of excellent shape and a fascinating color. Marquis of Salisbury, raised by Levéque, is of a bright rose-crimson, shaded with silver. Its attractive color, with its fine shape and great masses of flowers, impressed me greatly.

Duchess of Albany and Duchess of Leeds, both English-raised Roses, are classed as Hybrid Perpetuals in Europe, but they are both bred like the well known La France. The first is a Rose of decided value. As seen growing with the originators, Messrs. William Paul & Son, it was all that could be wished for, being larger in size, deeper in color and stronger in growth than its parent, La France. Duchess of Leeds, at certain stages of its development, is finely colored, and has a bright, crisp appearance. Its weak point is its slaty or dead pink color when fully expanded. The outer or reverse side of the petals is always of good color. To my notion it is a good, useful Rose, but would not please the fastidious on account of its short petals and ashen color when fully open. The two sports from Lady Mary Fitzwilliam, White Lady (Paul) and Maid of the Mist (H. Bennett), are very fine as seen growing and flowering in the genial climate of England, but are of no use here on account of their inability to withstand the fungoid disease commonly termed Black Spot. One of the finest Roses in England is the parent of these two white sports, but it is valueless here on account of the disease mentioned. Cheshunt Scarlet (George Paul) is a brilliant crimson-scarlet, and the nearest approach to a pure scarlet of any Rose we know. It is from that splendid race of Roses beginning with Duke of Edinburgh and running through most of the seedlings raised at the Cheshunt Nurseries. It is semi-double, with broad petals, and will make up in color for deficiencies in other directions. Marchioness of Lorne, as grown at Waltham, is very nearly an ideal Rose; splendid in form, bright crimson-rose in color, sweet-scented, producing its buds and bloom with a lavishness unknown to most Roses of its class. Unfortunately, it does not maintain its perpetual flowering character when transplanted to American soil, as plants introduced last spring behave like all other Remontants. The Roses mentioned above are likely to prove valuable, and are distinct enough from existing kinds to warrant a trial on this side the water.

Count Henri Rignon is a fine, distinct Hybrid Tea, raised by Pernet, of Lyons—a grand Rose, as seen in the gardens in the south of France; and it gives much promise on this side of the Atlantic. It is equal to American Beauty in size, but of a light, silvery flesh tint, which is decidedly pleasing. Our growers might try forcing this variety in the way that American Beauty is grown. It would sell if well done. Ernest Metz, a large silvery pink flower, tinged with flesh color, of extra large size, and Madame Pierre Guillot, a rose of the Watteville type, are the two most promising Teas of the year; and for bedding purposes in the open ground they will please the fancy of critical rosarians. They are the product of that cautious and conscientious man, M. Pierre Guillot, of Lyons, who has done more, perhaps, than any other one man to enrich our gardens with good varieties.

We are expecting other varieties of Tea Roses, but the propagator's knife has despoiled them to such an extent that they must wait until we can judge them properly. I might mention The Queen, raised in this country, a sport from that old favorite, Souvenir d'Un Ami, and a fine Rose for bedding in the open ground; Clotilde Soupert, said to be a hybrid Polyantha, is, perhaps, the Rose of most value on this side, out of the many introductions of 1889. It is nearly the size of the fine Hybrid Noisette, Boule de Neige, but differs from that variety in being short-jointed and truly perpetual, as much so as any of the common Chinas. It also promises to be hardy in our northern climate, and if so it will be of great value. Whether it is a Polyantha or a Hybrid Noisette, matters little if it continues to do as it has done the past summer. It was raised by Soupert et Notting, Luxembourg, who declare it a true descendant of the Japanese Fairy or Polyantha Roses.

Richmond, Ind.

E. G. Hill.

Chrysanthemums in 1889.

THE record of the year, so far as the introduction of new varieties of great promise goes, has not been an encouraging one.

A larger number of new kinds than has ever before been offered appeared in the spring catalogues of growers in America and Europe; and, with very few exceptions, the experience of this season will probably strike from the list nine-tenths of them as not having sufficiently distinct qualities to justify their propagation. Some allowance should be made for the unfavorable influences of an exceptionally bad season for plants grown in the open ground. But the new flowers are not, in themselves, either in form, color or substance, marked improvements on those already in existence.

Mrs. A. Hardy, the principal novelty of the year, notwithstanding its apparently great vigor of growth, has not done

well; not a plant of it was shown at the Chrysanthemum Exhibition of the Massachusetts Horticultural Society. The flowers, however, were shown, and have the same attractive qualities that excited so much enthusiasm last year. There has also been exhibited this season, under the name of Louis Böhmer, a flower having the hairy petals peculiar to Mrs. Hardy; the color of the flowers, however, is a dull pink, not at all pleasing, at least in the specimen shown at Boston. Whether Louis Böhmer is a sport from Mrs. Hardy or an original seedling imported from Japan was not stated.

Messrs. Pitcher & Manda have received, in a recent importation from Japan, among some very promising Chrysanthemums, another specimen of Mrs. Hardy. Among the seedlings of this variety raised by Mr. Manda, and shown by him during the season, there has been no appearance of the hairs. One of the seedlings, named Bohemia, is a large, dark flower of decided promise. Strangely enough, there does not appear to have been any sport from Mrs. Hardy, though the unusually large numbers of that variety, which have been grown this season, would lead one to expect this not unusual occurrence.

Of the varieties of recent introduction the following may be noted: Alcyon, Délie, Superbe Flore, Madame Pépee, Val d'Andorre, Ed. Audiguier, W. H. Lincoln, L. B. Bird and John Thorpe, all Japanese, have done well; Mrs. G. Wright, Avalanche and Condor are three good whites of the reflexed Japanese type; Mrs. H. Cannell, white, incurved Japanese, has not done well, while Mr. H. Cannell, though not a very free flowerer, appears to be a real addition to the large yellows of the old Grandiflorum class; Mrs. N. Davis, a yellow sport from Princess of Teck, has all the good qualities of one of the best of the large incurved Chinese kinds; Marie Ouvray has not shown itself to be a valuable addition to the long list of early flowering varieties of more or less distinct violet shade; M. Garnier, a Japanese, with yellow ground, shaded and striped brown-red, is a fine variety; Souvenir d'Alfred Motte, reflexed Japanese of a peculiar color, magenta and buff, is worth adding to a large collection, and so too is Mrs. Falconer Jameson, one of Cannell's new varieties, a flower colored buff and red, with yellow points; La Tosca, Japanese, fiery crimson, striped brown, though a small flower, is good and distinct; Cythere, of the same class, purple-amaranth and shaded dull red, is also good; Magicienne, Japanese, color chamois with light rose tints, is a large and early flower; Vieil Or, though very rich in color, is too flimsy in substance to be useful; Etoile de Lyon, a deep lilac-rose, margined with silver, of large size, though it has not done well here, has succeeded so well on the other side of the ocean that it should be given a second trial.

The incurved Chinese flowers have fallen into undeserved neglect in later years here, and the few valuable additions to this class have not attracted the attention due them. One of the best of these new-comers is M. Roux, a seedling raised by Boucharlat and introduced in 1884. It has retained, even this year, its good qualities of a low habit of growth and well shaped, closely incurved flowers of a bright chamois yellow. Ralph Brocklebank, a yellow sport of the old variety Meg Merrilies, has the same serious defect, a dark centre.

The seedlings of the year, of American production, are not very numerous, nor are they, as a whole, very promising. They have generally been exhibited as single large flowers grown to the fullest size that high cultivation can give them. It is not easy, therefore, to say how valuable they will prove for general cultivation. It is, unfortunately, true that many of the best new seedlings have been plants of bad constitution, capable of yielding, in the hands of expert gardeners, wonderful results, but comparatively valueless for the average grower. Some most remarkable flowers, exhibited at the Boston show by Mr. Brydon, gardener to Mr. Simpkins, were largely of this class. Better flowers were never exhibited here, and, probably, better could not be seen on any exhibition table in the world; but if the ordinary grower should select these plants for his own collection he would inevitably be disappointed in the results of his cultivation.

Mrs. Andrew Carnegie, one of last year's seedlings, was shown by Mr. Brydon, in good form and bright color, but the same flower, as exhibited by other growers, was dull and unworthy of its reputation. Ada Spaulding is not attractive in color, at least was not so at the Boston exhibition, and is no better in size and form than many more highly colored flowers already in the market.

The other conspicuous seedlings of 1889, so far as they have been seen, must, in my opinion, await the results of another season's cultivation before they can be awarded a very high place on the list.

H. P. Walcott.

Cambridge, Mass.

Orchid Notes.

Trichosma suavis.—This is one of the most attractive Orchids in flower during the months of October and November. From a botanical point of view, it is allied to *Eria* and *Cœlogyne*, but more closely to the former genus than to the latter, and we find that it was formerly known under the names of *Eria suavis*, *E. coronaria* and *Cœlogyne coronaria*. It is a native of the Khasya Hills, where it was discovered, and from thence introduced, in 1837, by Gibson, who was traveling in that locality for the Duke of Devonshire, whose place at Chatsworth was interestingly described in this volume of GARDEN AND FOREST, on p. 506.

This species, which, by the way, is the only one yet known, grows vigorously and flowers freely. Its green and succulent terete stems are about two-thirds as thick as an ordinary lead pencil and about a foot high, with two oblong-elliptic, acute leathery leaves at the summit, whence emerges the peduncle, bearing from five to eight fragrant flowers, each borne on a pedicel about an inch long. The creamy white sepals and petals are about an inch long and broadly lanceolate in shape, the two lateral sepals being connate at the base, forming a kind of pouch. The white lip has three lobes, the lateral ones being erect and handsomely striped with dark reddish crimson, which circumstance reminds one of its relation to *Cœlogyne*. The middle lobe is recurved, bright yellow, with from five to eight narrow, undulating, elevated keels in front of two pure white raised crests, which run parallel to the base; and the column is greenish white behind, streaked with dark crimson in front. I have seen a so-called variety, *Bella*, in nurseries, which is supposed to have richer colored flowers than the type.

This plant is somewhat scarce, but it is well worth a place in every collection on account of its masses of dark green foliage, which form an excellent background for the trusses of creamy white flowers. It may be grown in the cool end of the Orchid-house, in a compost of fibrous peat and moss, and the pots must be well drained. When in active growth the plants may be liberally watered, and at other times require more or less attention in this respect, according to atmospheric conditions; but it will be found necessary never to let the plants get too dry at the roots, as they have no pseudo-bulbs to serve as a reservoir for moisture.

St. Albans, England.

John Weathers.

Dendrobium bigibbum is a very handsome species, much resembling *D. superbiens*, and certainly one of the handsomest of the Australian kinds. It is a rather dwarf growing plant, producing slender fusiform stems, about nine inches long, from which spring peduncles bearing racemes of rich, rosy purple and very broad-petaled flowers. They oftentimes continue to throw out these racemes from the same stems for several successive years. We grow this plant in *Cattleya Trianae* house, suspended from the roof, where it gets abundant light and sunshine. It does best here in small cribs, with a little sphagnum moss and charcoal and a good supply of water when growing. We never allow it to become dry enough to shrivel, as it is with difficulty restored; but it likes a period of rest, as it appears to grow much more freely afterward.

Staatsburg-on-Hudson.

F. Atkins.

Begonia octopetala hybrida Lemoinei.—This plant was introduced in the spring of 1889 by M. Lemoine, of Nancy, with the statement that it is the result of a cross made some years since between the white flowered *B. octopetala* and some of the best of the tuberous section. The corms do not differ materially from those of *B. octopetala*, and start into growth naturally in June, throwing up numerous rather coarse leaves of a character intermediate between the parents and nearly radical. The flowers, borne on rigid foot-stalks twelve to eighteen inches long, in clusters of four or five, on my plants are about two inches in diameter. Varieties sent out were pink, white and magenta. Each plant throws up five to eight flowering stems. The variety *Anemone* came into bloom in October, followed by *Fleur d'Automne* in November, but at the end of the month the variety *Ville de Nancy* shows no sign of blossom, though apparently as strong as the others. The flowers have all been males on my plants. As the leaves and flowers, thrown well above the foliage, have a distinct and pleasing port, this cross is likely to prove of some value in the fall when the hybrid tuberous kinds are about over, though one regrets the absence of female flowers, so that with the vigor of the *Octopetala* parent we might infuse more size and substance into the blooms. Such further crosses might also refine the foliage. *B. octopetala* is somewhat impatient of root confinement, and perhaps this hybrid could be successfully cultivated planted out on a green-house bench, though in such a position

it would occupy valuable room in return for a comparatively short season of bloom. If the varieties of new winter-blooming hybrids of *B. Socotrana* continue to improve and increase in variety, the Begonia season for large blooming tuberous kinds will be so extended that there will be little difficulty in securing a continuous display of these showy flowers during the entire year.

Elizabeth, N. J.

J. N. Gerard.

Forcing Asparagus.—I prefer roots three or four years old for forcing; but the age is immaterial, provided a vigorous growth has been made the previous season. The roots are originally planted out in rows five feet apart and a foot apart in the row, covered with three inches of soil, and cultivated as for an ordinary crop. When wanted for forcing the roots are plowed out, with as little damage to them as possible. In neighborhoods where Asparagus is grown for market, farmers will often plant as above, and then, in the third or fourth year, will plow out every other row to be used for forcing, leaving permanent rows ten feet apart. At this distance the ground can be thoroughly tilled, and abundant light, warmth and air will make strong crowns, so that an early crop of the first quality can be expected. Roots to be forced are placed in a pit under the benches and heated with hot water. They are placed on two inches of soil, and covered with four to five inches to blanch the shoots. Cutting will be in order about fifteen days after the roots are put in, and the same roots will produce profitable shoots for six weeks. Asparagus can be forced on greenhouse benches, in frames or in hot-beds, where the manure is not too fresh, so as to generate too much heat and steam. I have seen the best of "grass" grown in a common frame, with eighteen inches of leaves and manure, to ferment and give heat, and a covering thrown over the frame at night. It should be remembered that Asparagus starts with very little heat, forty-five degrees being sufficient to start it in the soil.

Jobstown, N. J.

J. G. Gardner.

The Forest.

Among the Siskiyou Forests.

I HAVE just returned to San Francisco from a visit to the Mount Shasta region, which, as I should explain, is north of Shasta County, in Siskiyou. Although it was the middle of November, there was no snow in Strawberry Valley at the foot of Shasta, the air was dry and warm, the roads were excellent, and the Indian summer was in its lovely prime.

I am told that the sales of timber land made this year are greater than for any previous three years. Three new saw-mills will begin operations next spring. A broad gauge railroad is being built from Anderson, Shasta County, about twenty miles north, to meet a thirty-mile flume, tapping the heart of the finest forest of *Pinus Lambertiana* in northern Shasta. It is said that the four or five San Francisco gentlemen who are pushing this enterprise own 30,000 acres of the best Pine-lands of the district lying between Mount Shasta and Mount Lassen. Four or five years ago it was considered perfectly inaccessible and worthless. Hardly a word of opposition would have been raised if it had then been withdrawn from sale. I was offered five thousand acres of Sugar Pine and Yellow Pine, in 1887, for two dollars an acre in this district. Now it could not be bought for ten times the sum.

Californians have had dreams of a great Mount Shasta Park, some fifty or sixty miles square, including the head waters of the Sacramento, McCloud, Trinity, Shasta and other great rivers. But it was merely a subject for table discussion, and was never taken up and made a living issue on which men had to take sides. And now, if not already too late, it soon will be. The Southern Pacific Railroad Company, whose Oregon line passes through these forests, has the greatest individual interest in their preservation. There is no forest district in California more interesting to the fisherman, the hunter, the botanist, and the lover of nature; no district of more importance to the city dwellers; no region more closely connected with the agricultural prosperity of the great central valleys; but no one in California is "making a fight" for the Shasta Park. Senator Stanford is reported as saying, recently, that he had not known how fine the Pines of Mount Shasta were, and that he had thought of buying 1,200 acres, and keeping axe and fire out of it; but the saw-mills were already in the tract he wanted, and nothing has yet been done in the matter.

In the forest near Sissons, the leading trees are *P. Lambertiana*, *P. ponderosa*, *Pseudotsuga taxifolia* and *Libocedrus decurrens*; of these the *P. ponderosa* is most numerous. Among the young trees springing up in the forest, the Douglas Spruce seems most abundant, the *Libocedrus* next, and the *P. ponderosa* third, while the *P. Lambertiana* is hardest to find. The

trees grow in little groups, no two alike, but all attractive in the highest degree. Where the sheep have been kept out, as in the largest tract I saw, there are millions of seedlings visible to a close observer, and their roots are so fibrous in this rich soil that I should believe in their easy removal. The proportion of Douglas Spruces is even greater among these yearlings than among those of five or ten years of age; when the Pines are destroyed, this will be chiefly a Spruce forest.

On the edges of the valley and on the lower mountain slopes, where the lumbermen are doing their heaviest work, the forests are largely of the Red Fir of California (*Abies nobilis*), with the *A. grandis*, and the great Pines before named. Pines, Firs, Spruces and all the magnificent conifers of the district must soon disappear. The groups of small *Cupressus McNabiana*, discovered by Jeffreys many years ago, some fifteen thousand feet above the valley; the alpine Pines, higher up to the snow line, *P. monticola*, *P. Balfouriana*, and the graceful *P. albicaulis*, dwarfed to a mere white-stemmed shrub, will probably escape destruction because of the comparatively small amount of actual timber they can furnish.

There are thousands of cords of two-foot wood piled up along the railroad track. It sells at two dollars and a quarter a cord, delivered at the siding. It is not from refuse, or stumpage, or Pine-tops; it is clean, straight pine from the best part of the trunks. The wood-chopper takes every large tree just as surely as the lumberman does. These immense piles of cordwood are all "No. 1" white and yellow pine. The stumps stand in the valleys and on the slopes, the trees having been cut off at a height of from five to ten feet above the ground, much valuable wood being wasted; the whole top of the tree is considered worthless.

A California saw-mill is always run on a large scale. Labor is high priced, transportation is difficult, owing to the size of the logs, and so the only way to make money is to rush things. Every two or three minutes a log comes in, is squared, sliced into planks, ripped into laths, turned into broom-handles, shaved into shingles or split into scantling. It is gigantic work from dawn to dark, and sadly, strangely impressive. I have visited many of the most famous saw-mills of the coast, from the Navarro Redwoods—a million-dollar estate in Mendocino, where I have seen logs fifteen feet in diameter turned into railroad ties—to the great mills of the Pine-belt of the Sierras, and I know of nothing more calculated to make an American citizen pause and ask himself where it will end. I asked a mill-owner about it the other day, and his answer was: "When we have cut it all off we will go to Alaska."

"But the people want these forests left."

"The people don't care. Every settler within ten miles of my mill wants to sell me trees at a dollar apiece. The state doesn't care or it would have been saved, at least the school sections. The country don't care or we should hear from it. There is money in the lumber business, and every tree has got to go. Sorry for the feelings of the fellows who didn't know enough to get timber-land when it was cheap."

In the Mount Shasta region there are twenty-two species of conifers, and an observer from the Smithsonian listed 103 species of birds. There are great glaciers, hot, cold and mineral springs, mountain lakes, extinct craters, and all that goes to make the region "the keystone mountain mass" which upholds the northern arch of coast range and Sierra. The "Shasta Park" idea was a fine conception, but no one has taken a step towards its fulfillment. Is it indeed true that "nobody cares," and that nothing can be done to save these forests until another generation has been educated by hard necessity to a knowledge of the issues involved?

Niles, Cal.

Charles H. Shinn.

Correspondence.

Trees in the James River Valley.

To the Editor of GARDEN AND FOREST:

Sir.—A recent visit to the James River region, in Virginia, afforded me the chance of seeing and measuring some of the most remarkable trees of the valley.

Dr. Mohr's interesting paper in a late number of GARDEN AND FOREST calls to mind a Pecan-tree I saw at Lower Brandon, on the south bank of the James. It measured, at four feet above the ground, sixteen feet and four inches in girth. For a station so far north and east this seemed unusual, especially when I remembered that there is a reasonable assurance that the tree grew from a nut planted but a little over a century ago by an ancestor of the present owners of the estate.

Towering above all its associates, it had ample room for expansion, and the result was a vast spreading mass of limbs and foliage instead of the narrower spire-like top seen in the forest

specimens. It bears well, and the nuts are regularly expected as one of the spontaneous products of the place. On the same ground were several smaller trees (by comparison), though considered in themselves they were large. These all came from the seed of the older tree. The soil is a rich sandy loam.

Ulmus alata is very common at the water's edge near Lower Brandon. So far as my observations there convinced me of anything concerning the corky wings on the branches of the tree, I thought that these excrescences were much more common on the specimens whose growth had in some way been interfered with. I sought in vain for them on the branches of two vigorous individuals which grew on good soil and in abundant sunlight; but, on the other hand, in the trees which grew in the thicket, or in places where they had been exposed to mutilation, corky wings were quite conspicuous.

Pinus Taeda, of course, grew commonly enough in suitable places. What most struck me was its vigorous growth and the size it attained so far north. Judging from the plant life, I should say that the valley of the James was disproportionately warm as compared with Philadelphia. Harvest is over there, and the grain under shelter, or in the bags, before we on the hill-sides of southern Pennsylvania have commenced to cut it. I am convinced this somewhat abrupt change to a more southern appearance of the trees is testimony in the same direction.

University of Pennsylvania, Philadelphia.

J. T. Rothrock.

Melothria pendula.

To the Editor of GARDEN AND FOREST:

Sir:—The article on *Melothria punctata* in GARDEN AND FOREST of November 20th reminds me that it may be interesting to some northern readers to learn that our native Wild Gherkin (*M. pendula*) is a very handsome climber bearing yellow flowers of small size, followed by a profusion of black fruits resembling tiny cucumbers. This plant is common in clearings, more especially in rich soil, where, in some cases, it entirely covers the ground with a dense mat, producing quantities of fruits, which are made into most delicate pickles. Although usually running on the ground, this plant will climb a trellis, or any object placed for its use. In rough land the vine covers small objects, hiding their unsightliness. The leaves are "cordate, with from three to five angular-toothed lobes," being as handsome as those of *M. punctata*, and, as seed is freely produced, they can be had in any desired quantity. The plant is an annual, and lasts throughout the summer.

Manatee, Fla.

E. N. Reasoner.

Recent Publications.

Scientific Papers of Asa Gray, selected by Charles Sprague Sargent. Vol. I., Reviews of works on Botany and related subjects, 1834-1887. Vol. II., Essays: Biographical Sketches, 1841-1886. Two volumes octavo. Vol. I., pp. viii, 397. Vol. II., pp. iv, 303. Boston and New York: Houghton, Mifflin & Company, 1889.

The writings of Dr. Gray may be roughly divided into three classes, viz.: Contributions to systematic botany, instruction books for students, and miscellaneous papers. By the first class of writings, principally, he won his place among the princes of that branch of learning which its votaries affectionately call "nostra scientia amabilis;" by the second he has educated a generation of botanists in a wider field than his own native land, and by the third he achieved high rank and wide reputation among literary people outside of the realm of natural history. The present volumes contain a large and judicious selection of these miscellaneous papers, beginning at a time when the Natural System, as illustrated by Lindley, was beginning to displace the purely arbitrary and artificial system of Linnaeus, and continued down to the day when the victory had been so long won that the strife was forgotten, and men were now seeking to know what system and structure may teach of vital truth, rather than to pit one system against another. For as the chemistry, the geology and the electrical science of half a century ago are remembered to-day only as leading up to what men now know and do, so the botany of that time is replaced by broader and more intensely interesting principles, facts, theories and researches.

This progressive change in the scope and aims of botanical science becomes very evident to any one who will read these volumes with even only careless haste, while the more careful reader will find more than enough to interest and instruct him in the arguments and facts presented, and will, moreover, be charmed with the clear and simple style of a master of English prose. Dr. Gray's "Reviews" were seldom confined to an account of the book under consideration; but he usually took up the subject presented, brought out new or forgotten

facts to illustrate or to confute the theories of the writer, and rarely failed to say a good deal which the author reviewed could read with profit. This is especially true of his reviews of the successive writings of Mr. Darwin, and of De Candolle's works on phytography and on the origin of cultivated plants.

The second volume of these selected papers contains fourteen "Essays" and thirty-eight biographical sketches. The first of these essays was published in 1841, and is an account of the chief European herbaria as they then existed, when the great herbarium at Kew was yet to be founded by the transfer of the collections of Sir William J. Hooker, at that time residing in Glasgow. Several of the later essays were addresses delivered on particular occasions, as that on "Sequoia and its History," which was the address of the retiring President of the American Association for the Advancement of Science, and was delivered at Dubuque, Iowa, in 1872. Among the subjects of the biographical sketches are the names of Robert Brown, Alexander Humboldt, William Jackson Hooker, Darwin, George Bentham, and our own Torrey, Sullivan, Agassiz, and Dr. Gray's intimate associate and neighbor, Jeffries Wyman.

We found but few typographical errors in reading these handsomely printed volumes and made no note of them at the time. Still they do exist, and the Riverside proof-readers ought not to have let such slips as *Helorageæ* and *Hibridization* escape their attention.

It is to be hoped that this series of "Selections" will be continued. Some of Dr. Gray's earlier papers descriptive of new plants are not now to be obtained, and to reprint them would be a great favor to working botanists.

Periodical Literature.

Mr. Bradford Torrey has never written a more charming essay than "December Out-of-Doors," published in the current number of the *Atlantic Monthly*. It begins with a word of praise for November mildness and sunshine, referring, naturally, to the November of 1888, not to the gloomy, pouring month of 1889. The December of 1888, which Mr. Torrey then chronicles more at length, was almost as favorable to out-door rambling, for at its end, he says, he found that, "omitting five days of greater or less inclemency, I had spent nearly the entire month in the open air. I could hardly have done better had I been in Florida." The greater number of the pages in which the charms and the *trouvailles* of the month are recorded tell us of birds and their ways. But a few at the end speak of the December flowers on the northern Massachusetts coast. We are not surprised to hear that their number was "limited." It is more unexpected to be told that so many as sixteen different sorts of plants were then and there found blooming in the open air. The hardiest of all local plants, Mr. Torrey thinks, is the common Chickweed (*Stellaria media*), and the next a Groundsel (*Senecio vulgaris*). Another kind of Groundsel (*Senecio viscosus*, a recent emigrant from Europe, very locally established) was likewise counted in bloom, and the thirteen remaining heroes were Shepherd's Purse, wild Pepper-grass, Pansy, Mouse-ear Chickweed (*Cerastium viscosum*), Knawel, common Mallow, Witch-Hazel, Cinquefoil, Many-flowered Aster, Cone-flower, Yarrow, Fall Dandelion and Jointweed. The Cinquefoil was *Potentilla Norvegica*, not *P. argentea*, as Mr. Torrey thinks might more reasonably have been expected. Knawel kept on flowering till the middle of January, and *Senecio vulgaris* "all through December and January, and I know not how much longer." One-half the sixteen were plants that have been introduced from Europe, and six were members of the Composite family. The author's description of his experience with the Witch-Hazel is too pretty not to be quoted entire: "Such Witch-Hazel blossoms as can be gathered in December are, of course, nothing but belated specimens. I remarked a few on the 2d, and again on the 4th; and on the afternoon of Christmas, happening to look into a Hamamelis-tree, I saw what looked like a flower near the top. The tree was too small for climbing, and almost too large for bending, but I managed to get it down; and, sure enough, the bit of yellow was a perfectly fresh blossom. How did it know I was to pass that way on Christmas afternoon, and by what sort of freemasonry did it attract my attention? I loved it, and left it on the stalk in the true Emersonian spirit, and here I do my little best to embalm its memory."

We should be glad if our readers in various parts of the country would follow Mr. Torrey's example and catalogue such plants as they may find in bloom in midwinter; and if the coming season should prove more inclement than the last, their lists, although shorter, would be even more interesting.

Notes.

The fourteenth annual meeting of the Iowa State Agricultural Society will be held at Glenwood on the 10th, 11th and 12th instant.

On one of the coldest days of last week we received from the gardens of Dr. George Thurber, of Passaic, New Jersey, some large and perfect flowers of *Helleborus niger altifolius*, which had grown out-of-doors with no protection.

It is a fact significant of the present tendency of horticultural fashion that the receipts from visitors at the Chrysanthemum exhibition held at Boston last month exceeded the receipts taken at all the other exhibitions combined held by the Massachusetts Society during the year.

The illustration of the Chrysanthemum Mrs. Carnegie, on another page of this issue, is taken from a photograph of one of a collection of remarkable flowers exhibited at the late Chrysanthemum show in Boston by James Brydon, gardener to Mr. Simpkins, of Yarmouth, Massachusetts.

According to specimens received from Professor Gerald McCarthey, of Raleigh, and from Mr. G. W. Lawrence, of Fayetteville, North Carolina, it appears that hogs of that state are fond of the fungus, *Clathrus columnatus*, Bosc, a species which has the repulsive odor found in nearly all the order *Phalloidea*. Several hogs have been killed by indulgence in this unæsthetic, and, to human taste, nauseating diet.

All foreign journals notice the fact that the taste for single flowers is rapidly growing. Single Dahlias, Chrysanthemums, China Asters, Cinerarias and Pyrethrums are now in demand, whereas a while ago only the double varieties were liked. So unfamiliar, indeed, was the single Dahlia a few years ago in Germany that florists who displayed it in their windows were constantly asked its name. Now it is one of the most popular of flowers.

Plants of *Croton Alabamensis*, described in another column, were sent last spring to the Arnold Arboretum by Professor Smith. They are now well established, but have not, of course, been tested yet in the open ground in winter. The contrast between the brilliant green on the upper surface of the leaves with the silver whiteness of the young branches and the under surface of the leaves makes the Alabama Croton an exceedingly attractive plant, and its cultivation desirable.

Work has been begun on the Memorial Arch, at the entrance of Prospect Park, which is to commemorate the citizens of Brooklyn who fell in the war of the rebellion. The design selected from the many competitive essays presented last winter is the work of Mr. John H. Duncan, architect, of this city. It is the same which was then pronounced in GARDEN AND FOREST to be not merely the best for the purpose, but so far above all its rivals that there was no room for discussion with regard to it. Who is to execute the groups of statuary which should adorn it we have not yet learned.

Those elegant Cape bulbs, the Freesias, deserve their growing popularity, both on account of their graceful growth and their delicious fragrance. There are some plants of remarkable vigor just now in the green-houses of Mr. John Thorpe. They are in five-inch pots, with five bulbs in each pot, and each plant is twenty inches high, with leaf-blades three-fourths of an inch wide and sheaths of the same width at the base. They were potted on the 6th of July in soil of sandy loam, with a quart of bone flour to each half bushel of soil, and there is little doubt but that the plant food in the bone did much to nourish them into their unusual growth.

One of the best forms of *Elæagnus umbellata* in cultivation is that introduced into this country from Japan by Mr. Thomas Hogg. The largest specimens of this plant in the Flushing Nursery, where it was first planted, are now twelve or fifteen feet high and form stout, wide spreading bushes. It is almost the last deciduous plant to lose its leaves in the autumn, and the fruit, which is freely produced at Flushing, is high colored and attractive in appearance, and possesses rather an agreeable sub-acid flavor. The Indian form of this widely distributed and variable species, known in gardens often as *E. angustifolia*, is a far less hardy and in every way a less desirable plant.

An interesting and attractive form of *Cattleya Bowringiana*, with pale mauve colored flowers, is now blooming for the first time in Mr. Ames' garden at North Easton. In the same collection two plants of *Vanda Kimballiana* are in bloom, and with them a plant of *Vanda Amesiana*. The flowers of the latter plant, although less showy in their contrast of colors than those of Mr. Kimball's *Vanda*, are deliciously fragrant, a single spike

of bloom perfuming a whole house. This delightful fragrance and the fact that this species blooms at a season of the year when comparatively few Orchid-flowers are seen, make *Vanda Amesiana* a most desirable plant.

The first of the twelfth course of the free Michaux Forestry lectures was delivered by Professor Rothrock, in the hall of the Philadelphia Academy of Natural Sciences, on the evening of the 4th instant. The subject was "Civilization as Related to Surroundings." The other lectures of this course will be given on the succeeding Wednesday evenings, and will treat of "Some Neglected Trees," of "Some Famous Trees," of "Trees Along Our Roadsides," of "Trees In Our Yards," of "Trees We Are Exterminating," and of "Practical Forestry." These lectures are given under the auspices of the American Philosophical Society, and are provided for from the income of the fund left to that Society by Francois André Michaux, the distinguished historian of American trees.

The new vegetable, *Stachys affinis* (or *S. tuberifera*), which is called "Crosnes" in France, seems to be winning its way in Germany. It was put to proof in the proverbial way at a recent meeting of the Society for the promotion of Horticulture in Berlin, being eaten both boiled and roasted. Some who tasted it pronounced roast potatoes much better, but the majority, says a German journal, declared that the *Stachys* tubers have a "fine, peculiar taste, and should be highly recommended to the epicure." An official of the Berlin Botanic Garden stated that a rumor to the effect that the new vegetable was being propagated there brought hundreds of requests for it, and that he was obliged to have hectographed circulars prepared explaining that the report was untrue.

We must listen to foreigners to learn about American manners and customs. Here is an example, quoted from a German horticultural journal of the most serious character: "The love for oranges in America has led to the introduction of picnics that are called 'Lemon Parties.' Each attendant at such a picnic brings a lemon or orange and gives it to the general 'squeezer.' This official cuts the fruit in two, collects and counts the seeds and then prepares a bowl of lemonade. Each person then guesses the total number of seeds collected, he who is nearest right receives a prize, usually a costly lemon, a goblet; he who is furthest wrong is called 'the Bubi' (booby?) and given a lemonade squeezer. Those whose lemons have contained the most and the fewest seeds likewise receive prizes, and the ladies present are always adorned with yellow Roses and ribbons."

The rare *Cypripedium Fairieanum* is now in flower in Mr. Ames' collection. This species, although it has been known for thirty years, is one of the rarest plants in cultivation. All that is known of its origin is that it was obtained at a sale at Stevens' auction rooms, in London, of a lot of East Indian Orchids sent from Assam. It has never been seen in its native country, although various efforts have been made to rediscover it, one enterprising English dealer having expended, it is claimed, no less than \$25,000 in a vain attempt to obtain a supply of native plants. The flowers are not large, but they are exquisitely colored and penciled, and are among the most attractive of the genus. *Cypripedium Fairieanum*, although it has been considered generally a delicate plant, and difficult to manage, has impressed itself on several hybrids, of which the best known is *C. vexillarium*, obtained by a cross with *C. barbatum*.

The English journals announce the death, in his ninetieth year, of Robert Marnock, the foremost landscape-gardener who has appeared in England during the second half of this century, and one of the best exponents of the 'natural style.' He served his apprenticeship as a gardener and found his first public employment in designing the Sheffield Botanic Garden, of which he became the first curator, not a bad training for a landscape-gardener, and one which led to his selection, in 1839, to lay out the garden of the Royal Botanic Society in Regent's Park in London. This established his reputation, and he has since been kept busy in the practice of his profession until his retirement a very few years ago. Marnock was strong in artistic feeling and in his practical knowledge of plants; and here was the secret of his success. The artist and the gardener worked together, and his creations were gardens gracefully and tastefully arranged, but gardens in which plants were always the principal and controlling feature. It never fell to his lot to make any great urban pleasure ground, or to design one of those broad landscapes which tax the highest creative skill of the artist, but in his particular field Robert Marnock was, in his day, without a rival. As a man he was singularly modest and attractive.

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Our Forest Interests.

WHEN forestry is first brought to their attention many persons think chiefly of tree-planting, of the effect of forests on rainfall, and other things which are not essential or of the greatest practical importance. Their first impressions are likely to be superficial and inadequate. The question of the effect of forests on rainfall has not been determined. It is a matter for accurate and continued scientific investigation, without which all opinions and theories regarding the subject are alike worthless, because they cannot be verified. The point of general practical interest here is the function of forests, especially of mountain forests, in the distribution of the water that falls upon them as rain or snow. The doctrine of rational and practical forestry regarding this matter is, that forests retain the water in the spongy mass of their floor, retarding its descent to the channels of streams, and thus prevent or modify both freshets and drought. This effect of the forests upon the streams which have their sources in them is of great practical value; it is not beyond the range of popular appreciation, but can be verified, without special scientific training, by any observing person who will go into the woods in a hill-country during a heavy rainfall. This is one of the essential facts or fundamental principles of forestry, and it should be urged upon popular attention until it is "in the air" everywhere, a part of the universal thought and established knowledge of the time.

Tree-planting on a small scale, if intelligently and carefully done, would be useful almost anywhere as an educational experiment. It would help to awaken and increase interest in subjects connected with the care and uses of trees, and it should everywhere be encouraged. But it is not forestry, is not necessarily any part or feature of it, and it is not best that people should take one thing for another without knowing it. In all the eastern part of our country the trees will come in again, and the forests reproduce themselves, if they are cut off in the right way, and the land is afterward guarded from fire and pasturage, and this natural perpetuation of the forest is of far greater importance here than planting trees.

Looking at forest interests in this country in a practical way, it is plain that the care of individual holdings of timber-lands, and the methods best adapted to perpetuate the growth and production of timber on the farms of the United States, are matters of great and increasing importance. The existing condition and practice are unsatisfactory, because there is, generally, very little system, plan or management. The future is largely left to chance, or to take care of itself. This branch of forestry is obviously a part of agriculture. It is chiefly an economical subject, and there is not much need or room for sentiment or mystery connected with it. It has not yet begun to receive adequate attention among the farmers of our country. The diffusion of knowledge and propagation of sound and practical ideas regarding the care of farm woodlands, and the value of timber as a permanent crop, should be a prominent feature of the work of the Granges and other organizations of farmers, as well as of local and state forestry associations.

The value of mountain forests, and the necessity of maintaining forest-conditions permanently on lands around the sources of mountain streams, are most vital and important features of scientific and practical forestry. They urgently require attention in this state, in Pennsylvania, New Hampshire and the other states intersected by our eastern mountain-system. The effects of the permanent destruction of forest-conditions over large areas of mountain country are so far-reaching and fatal that indifference and inattention constitute a crime against civilization and the nation's life. The fate of the mountain forests on the lands which still belong to the nation is one of the most momentous of all the problems now presented to the American people, and its decision will determine the future of vast areas in the western part of our country, whether they shall be fertile, populous and prosperous, or irreclaimably barren, and, in large degree, uninhabitable. The danger, and the necessity of prompt action in withdrawing the forest-lands of the public domain from sale, and of guarding them effectively from spoliation until a competent commission decides what portions should be kept permanently in forest, and presents a plan for national forest-management, should be urged upon Congress and the President by the people and press of the entire country in the most direct, clear and forcible manner.

The herbariums entered for the prize offered by Mr. Peter Henderson made one of the most interesting features of the exhibition at the last meeting of the Society of American Florists. The collection which won the first premium was the work of a young gardener, and it is described by a correspondent of *The American Florist* as consisting of good, typical specimens, carefully mounted, correctly named, neatly tied in folios marked with outside labels to indicate the natural orders, arranged in botanical sequence and with a full index, and placed in an attractive and serviceable cabinet. Now, herbariums in themselves are of little practical value unless they are large and are used systematically. But when a young man sets out in serious earnest to make a good collection of well-preserved plants, the training which he receives in cultivating habits of observation, order and accuracy, and in acquiring a general knowledge of plants, will be of immense value to him all the rest of his life. In some of the establishments of Europe the making of herbariums has been long considered a valuable aid in the education of gardeners. In the article referred to we are told that Mr. Henderson himself received two medals for similar work before he was eighteen years old, and he testifies that the interested and careful preparation of these specimens did much toward developing methodical habits and laying the foundation for business success. There are many indications of a growing belief that the prosperous gardener of the future will be a man who has made some progress in the sciences related to horticulture, and who has enjoyed some special training in the art. The collection and

care of dried specimens is not enough to make a good gardener; but it is one means of developing a love for plants, of increasing a knowledge of them, and of inculcating lessons of orderliness and accuracy which will prove of lasting value to every one who expects to be a gardener or florist.

There appears in the "Annals" of New York city for the year 1786, compiled from the newspapers of the day, joined to the reprint of the New York Directory for 1786, recently issued by the Trow Directory Co., the following item:

April 14th, 1786.

"Mr. Michaux, botanist to his most Christian Majesty, having purchased a lot of ground at Wehocken, near the Three Pigeons, is erecting a garden there which for magnificence, etc., will exceed anything of the kind in America. In it will be introduced many exotic and domestic botanical curiosities."

This Mr. Michaux is the distinguished French botanist, André Michaux, who resided in America from 1785 to 1796 as an agent of the French Government for exploring the natural resources of this country, and for the introduction of useful trees and other plants into France. An account of this garden, from the pen of Mr. H. H. Rusby, was published in the *Bulletin of the Torrey Botanical Club*, in August, 1884, from which it appears that when Michaux finally left America it was transferred to a Mr. Saunier, and later to a son of the latter, who continued to send plants to France for many years. Michaux's garden now forms a part of the Hoboken Cemetery, and all traces of the plants brought here by Michaux from his long journeys in remote parts of the country have now entirely disappeared.

Abraham's Oak.

THE old Oak at Mamre in Syria, or, as it is known everywhere, "Abraham's Oak," is one of the most famous and venerable trees in the world. It is revered alike by Jew, Christian and Mahomedan, for it is supposed to mark the spot where the patriarch pitched his tent in the desert. There is a superstition in Jerusalem, and in all the country about, that whoever shall cut or injure this tree will lose his first-born son. So for centuries it has been allowed to toss its gnarled and contorted limbs in the gales which sweep from the Mediterranean over the Syrian plains.

This tree was visited by Sir Joseph Hooker in the autumn of 1860; and in his paper upon Syrian Oaks, read the following year before the Linnæan Society (*Transactions*, xxiii.), he gave a description of it and a portrait drawn by his own hand.

Abraham's Oak was found to belong to *Quercus pseudo-coccifera*, which, to quote from Sir Joseph's paper, "is by far the most abundant tree throughout Syria, covering the rocky hills, of Palestine especially, with a dense brushwood of trees eight to twelve feet high, branching from the base, thickly covered with small evergreen rigid leaves, and bearing acorns copiously. On Mt. Carmel it forms nine-tenths of the shrubby vegetation, and it is almost equally abundant on the west flanks of the Antilebanon and many slopes and valleys of Lebanon. Owing to the indiscriminate destruction of the forests in Syria, this oak rarely attains its full size." The circumference of the trunk of "Abraham's Oak" is given as twenty-three feet, and the diameter of the spread of the branches as ninety feet.

Quercus pseudo-coccifera is an evergreen species with the general appearance of the Ilex of southern Europe, and closely related, botanically, to *Q. coccifera*, a common and widely distributed scrub Oak of southern Europe, and of Algeria; indeed, Hooker was of the opinion that the two plants were merely geographical varieties of the same species.

Our illustration of "Abraham's Oak," upon page 607, represents the tree with much less foliage than appeared in Hooker's picture taken nearly thirty years ago, when it was apparently in a more vigorous condition than at the time

when the recent photograph from which our illustration is made was taken. We are indebted for this photograph to Mr. Francis Skinner, of Boston.

The Art of Gardening—An Historical Sketch.

XV.—Rome.

(Concluded.)

IN his catalogue of trees, the elder Pliny names many varieties—eighteen kinds of Chestnut, for instance, eleven kinds of Myrtle, thirteen Laurels, four Elms, three kinds of Box, twenty-nine Figs and forty-one Pears. But even if such numbers represent garden varieties which we should now call distinct, they are not, in most cases, very imposing compared with the riches of to-day; indeed when we consider the number of distinct kinds, it is very apparent that in trees and shrubs as well as in flowers the wealthiest Romans could not command a hundredth part of the material that is easily procured to-day. Yet many of them were passionate horticulturists and such exotic plants as could be procured were highly prized. The Plane, according to Pliny, was among the first trees to be introduced, simply, as he is careful to explain, for its ornamental value. It came from the Levant by way of Sicily, and the Cypress and Cedar were likewise foreigners, though they now grow apparently wild in many parts of Italy. The Balsamum, "a plant that has been bestowed by Nature only upon the land of Judea," where "in former times it was cultivated in two gardens only, both of which belonged to the kings of that country," was "exhibited in Rome" by Vespasian and Titus; and its cuttings were so valuable that "the fifth year after the conquest of Judea these cuttings, with their suckers, sold for the price of 800,000 sesterces." The Balsamum got this extraordinary value as the source of a favorite kind of incense,* but many other shrubs "were introduced for ornamental gardening," and after the time of Pompey it was the custom to carry foreign trees in the triumphal processions. On the walls of the villa of Livia, the Laurel, the Pomegranate, the Stone Pine, the Ilex, the Plane, the Myrtle, the Cypress, a species of Cherry and three different kinds of Firs are accurately portrayed. Ivy and other evergreen vines, as well as the Acanthus and the Grape, were everywhere trained upon walls and trees in the most ingenious ways, and Grapes, Gherkins and Watermelons are named among the fruits forced under glass. Olive-trees, of course, were everywhere, and Plums and Apples, as well as Pears, were cultivated in manifold varieties. Pliny asks us to believe that there stood at Tibur a tree which bore every known kind of fruit, and it is certain that grafting was constantly and skillfully practiced. The Peach had been introduced from Persia, as is shown by its name—*Persicum*. Vitellius, who had been legate in Syria, introduced many Syrian varieties of the Fig into his country-seat at Alba. The Ash, the Oak, the Mulberry, the Quince, the Walnut and the Almond were other familiar trees, and the Palm was planted here and there, but as a rule seems to have been imported from Syria and Egypt and grown in pots. I may say again that neither in Greece nor in Italy was a distinction made between ornamental and useful trees. Any tree of pleasing aspect was thought appropriate to the pleasure-ground, and was but the more highly valued if it served utility as well as beauty.

An amusing anecdote told by Pliny the Elder shows the estimation in which exceptionally fine trees were held. Cneius Domitius publicly rebuked Crassus for living in a house so magnificent that he himself would be willing to pay ten million sesterces for it. Crassus replied that, deducting six trees only, he would accept the offer. Domitius declared that on those terms he would not give a single denarius, whereupon Crassus exclaimed: "Well, then, which of us sets a bad example and deserves the reproof of the censors—I, who live like a plain man in a house which has come to me by inheritance, or you, who estimate six trees at a value of ten million sesterces?"

These trees, adds Pliny, "were of a Lotus kind, and by the exuberance of their branches afforded a most delightful shade."† They must have stood in an urban garden, for "they were in all the freshness of youth when Nero burned them."

* Unguents, says Pliny, were not known in the West until Alexander captured the perfume chest of Darius. But in imperial times their use was so common that a score of spots on the Mediterranean coast and islands were famous for their manufacture, and the love for them gave a great impulse in Italy to the cultivation of plants with sweet-scented leaves.

† It was this Lotus-tree and not the aquatic plant called by the same name which furnished the *lotophagi* with the food which obliterated memory. Some writers have thought it the Celtis, but modern authorities identify it with the *Rhamnus Lotus* of Linnæus, now known as *Zizyphus Lotus*.

In the most distant northern countries conquered by the Romans—all along the Rhine, all through France, and in many parts of England—lie the remains of great villas, the architectural magnificence of which must have been supported by pleasure-grounds of corresponding beauty. No excavations can help us to recover, in the art of gardening, a single relic of the designs of days so long gone by. We can easily imagine, however, how the Roman horticulturist consoled himself in his exile, now by forcing the products of an alien clime into a likeness with the garden effects that he had loved at home, and now in devising new effects which should display these products in a characteristic way, appropriate to the more northern climate and the wilder landscape. And a sign of his labors everywhere persists in the presence of many trees, now apparently native to the soil, which history or tradition tells us he was the first to introduce.*

In the history of the eastern and southern provinces the work of the Roman gardener is constantly recorded. Of course it was often modified by those ideas of Greek or Persian origin which he found already prevalent, but there can have been no town in the civilized world during the first three centuries of our era which the combined influence of Persia and Rome had not richly ornamented. Ephesus, Smyrna, Miletus and Antioch were especially famous for their gardens, and at Pergamon, where the ruins of the magnificent temple commemorating victories over the invading Gauls have recently been unearthed, the main structure was encircled by vast pleasure-grounds, where stood the library and other public buildings. Even the bitterest enemies of Rome in Asia felt the common impulse. Strabo mentions at Cabeira "the palace of Mithridates, the water-mill, the park for keeping wild animals and the hunting-ground in the neighborhood;" and Pliny tells us that the great Parthian king and his people used their utmost efforts to grow the Myrtle and the Laurel, plants everywhere desired for use in religious ceremonies.

The fullest description of an Oriental pleasure-ground of this period which I have been able to find is the one which Diodorus gives of Panara, in the island of Panchæa, off the coast of Arabia Felix, where, of course, Persian influence had been at work. I quote it as an interesting contrast to the younger Pliny's account of his Tuscan villa:

"The fields round about the temple are planted with all sorts of trees, not only for fruit, but for pleasure and delight, for they abound with tall Cypresses and Plane-trees, Laurels and Myrtles. . . . Near the temple there's such a mighty spring of sweet water rushing out of the earth that it becomes a narrow river; thence it divides itself into several currents and streams, and waters all the fields thereabouts, and produces thick groves of tall and shady trees, amongst which, in summer, abundance of people spend their time. . . . Here are many gardens, sweet and pleasant meadows decked with all sorts of herbs and flowers, and so glorious is the prospect that it seems to be a paradise worthy of the gods themselves. . . . Here are likewise large and fine Palms and abundance of Walnut-trees, . . . and a multitude of vines of all sorts spiring up on high, and so curiously interwoven one amongst another that they are exceedingly pleasant to the view and greatly advance the delights of the place."† The temple stood in the middle of this park, with the dwellings of the priests around it. The spot was evidently one which nature had especially marked out for man's delight; yet it must have been carefully arranged and tended to fit it for permanent habitation by the priests, and a certain measure of formality is indicated by Diodorus' mention of a great fountain which was "lined on both sides and flagged at the bottom with stone at vast expense."

New York.

M. G. Van Rensselaer.

"In making islands we must follow nature very carefully. It is noticeable, generally speaking, how very seldom this is done; I hardly remember to have seen anywhere a made island, whose artificiality was not obvious at the first glance. This I found to be the case even in the small royal garden at Buckingham House, where the island looked more like a pudding in its sauce than like any nature ever produced."—*Pückler-Muskau*, 1834.

* "Cæsar found, in Britain, apples of indifferent quality and a very poor catalogue of other fruits, such as the Hazel, Bullace, wild Raspberry, Sloe, Elder and Blackberry. The generals who succeeded him left us, at quitting, the Pear, Peach, Cherry, Vine, Fig, Mulberry, Damson, Medlar and Walnut, with many ornamental shrubs. They were men of taste and luxury, and some of those who resided long in this country sent to Rome for any novelty suited to the climate, planted, probably, the first orchards—at least of superior fruits—the earliest Rose-gardens, and, among other trees, the Bay, the English Elm and the Plane, which had passed from Asia into Italy, and had reached the northern shores of Gaul, as Pliny states, about A.D. 79."—"The Migrations of Plants," *Edinburgh Review*, April, 1889.

† Blake's translation.

Holiday Notes in Southern France and Northern Italy.—VIII.

MENTONE must be a dreary spot to the ordinary tourist, except during the winter and spring months, when the place is crowded with visitors, attracted by its mild climate and natural beauties. Full details about the climatology of the district are to be found in Dr. Henry Bennett's charming book, "Winter and Spring on the Mediterranean," a work which has run through several editions and is pretty well known in the United States. Without studying the climate it is impossible to understand such a wonderful array of vegetable forms, such a strange mixture of tropical, sub-tropical and temperate plants growing side by side as are seen here. Nowhere in Europe have experiments on the hardness of tropical plants been conducted on so large a scale as on the Riviera, and consequently the northern gardener finds much to learn from both the failures and successes of his brethren in the south.

On steep slopes near the station at Mentone are groups of such very fine Agaves (or Aloes, as they are called in Italy and elsewhere) that they attract the attention of every passer-by of a horticultural turn of mind. *Schinus Molle*, the Pepper tree or *Poirrier* of the French, is a favorite street tree here, as well as elsewhere along the Riviera; it is of very graceful habit, when not too much cut in, the long, slender branches—clothed with dark green, pinnate leaves, and bearing panicles of red fruits about the size of pepper corns, and about as hot to the tongue—droop much in the manner of those of our common Weeping Willow.

A short avenue, going at right angles to the Avenue du Careï, is planted with Date Palms and *Washingtonia filifera* (at the present moment probably the most popular Fan Palm along the Riviera) in alternate pairs. The bed of the Careï—at the time of our visit quite dry and dotted here and there with annual weeds of a southern and unfamiliar type—is flanked by roads, along the sides of which are planted such trees, etc., as Oleander, big Ligustrums, *Photinia serrulata*, *Senecio Petasites* and *Myoporum latum*. In one garden a bush of *Wigandia Caracassana* some fifteen or twenty feet high, with enormous panicles of fruit, was a very conspicuous object from the foot-path.

The public garden of Mentone is unworthy of the place; it is small, and the flowering shrubs are simply clipped with shears, and are neither pruned nor cultivated in any rational way.

As a weed on roadsides leading from Mentone to Grimaldi we noticed the Squirting Cucumber (*Ecballium Elaterium*), a plant which in some parts of England is cultivated for medicinal purposes. On dry, sunny banks Rosemary seemed quite happy, and here and there the Caper (*Capparis spinosa*), with its long, slender branches, hung down the face of the hot rocks. Fine groves of Olives and Lemons flank the highway, from which beautiful views of the sea and coast line are constantly appearing. Sometimes Wild Pines (*Pinus Halepensis*) and the so-called Umbrella Pine (*P. Pinea*) clothe the face of rocky, barren slopes almost down to the water, and add not a little to the beauty of the scenery. Part of the side of a hill before Grimaldi is reached is the site of the garden of Dr. Bennett, whose name has already been mentioned at the beginning of these notes. What can be done, even under very adverse circumstances, by the enthusiastic gardener is obvious here, for a considerable collection of plants has been gathered together, and is cultivated on a site where previously few even native plants could find a living. Magnificent views are obtained from Dr. Bennett's garden, particularly from the top of the Saracen tower on the height behind the house—a building in the Florentine style of the fifteenth century. Among flowering plants noticed was a fine specimen of *Brunsvigia Josephina*, with its red flowers arranged in an umbel more than forty inches across and surmounting a scape nearly two feet high. Amongst the South African farmers who are familiar enough with *Brunsvigia* in a wild state it is known as the Candelabra-flower. Several, however, to whom I had given the dimensions above mentioned had never seen in the native habitats of the plant any inflorescences nearly so fine as that I have described in the gardens of Torre di Grimaldi.

In a small piece of water on one of the terraces, high up the side of the hill, is a colony of the White Water Lilies (*Nymphæa alba*); this affords abundance of cut flowers until December, when the Cape Pond Weed (*Aponogeton distachyum*), which has been at rest during the hottest part of the year, gets into vigorous growth and continues the supply throughout the winter and spring.

LA MORTOLA.—Across the Italian frontier, about an hour's walk from Mentone by the famous Corniche road—and at about the highest point of the road between San Remo and

Monaco—brings us to La Mortola, a small village in the midst of Olive-groves. Here Palazzo Orengo, the residence of Mr. T. Hanbury, is finely situated, and is surrounded by a beautiful garden containing an extraordinary collection of plants. Just twenty-two years ago its present owner found it covered with Olive and Lemon-trees, some of which still remain; the area of the garden is about fifty acres, and there is a difference of level of considerably more than six hundred feet between the lower portion and the highest part. Some fifteen years ago a couple of illustrations, representing views in the gardens of Mr. Hanbury, appeared in the *Gardeners' Chronicle*, but these fail altogether to do justice to the exquisite beauty of the place and its surroundings; the letter-press, however, accompanying the illustrations in question, recalls vividly to my mind the impressions received at La Mortola. A few sentences covering some of the points I find recorded in my note-book. I herewith copy from the *Gardeners' Chronicle* for July 11th, 1874: "Our business lies not so much with the village as with the grounds round the Palazzo Orengo, now occupied by Mr. Thomas Hanbury. Placed in a situation very similar in character to the projecting cape on which Monaco is situated, and almost equally lovely in its surroundings, this garden is one of the most interesting, from the richness and variety of its contents, that can be seen in any country. It occupies the slope of a hill trending toward the sea, is protected in part by the mountains which rise behind it, but must be exposed to certain winds which rush from the north down a deep gorge on the western side of the garden. This gorge, from the side of which our illustration is taken, descends from the top of the mountains to the sea, and its sides are planted with Olives and Pines. This ravine adds greatly to the picturesqueness of the garden, and, together with the rocks in its vicinity, furnishes a perfect treasure-house of wild plants. Fancy the delight of gathering Wild Myrtle with one's own hand, and Wild Oleander, and yet in Europe! *Coriaria myrtifolia* is also a characteristic plant, and so is the pretty *Smilax aspera*, whose spotted leaves and zigzag clusters of pink berries are of a very ornamental character. Lavender, Rosemary and Thyme grow abundantly on the rocks. *Convolvulus althæoides* is one of their greatest ornaments. The Caper flourishes on the walls. A species of *Moricandia* comes up everywhere in the neighborhood as a weed, but is one of those plants whose distribution is entirely confined to a narrow area on this coast, it not being found elsewhere. A species of *Asparagus* (*A. acutifolius*) is by no means inelegant; *Daphne Gnidium* grows here in some profusion; the *Alaternus*, so familiar to us at home, fruits abundantly; *Globularias* abound on the rocks; *Euphorbias* are very characteristic, in particular a little spiny species, *E. spinosa*, and a really grand shrubby species, *E. dendroides*, which forms large bushes, not only under the Olives, but also springing from the clefts of the rock close to the sea, where little else will grow. An admirable selection from these native plants—admirable not only from the judgment with which they have been selected, but also for the faithfulness with which they have been represented, and the interest that has been thrown around them—is given in (the late) Mr. J. Traherne Moggridge's "Flora of Mentone." An account of some of the more remarkable exotic plants in Mr. Hanbury's garden will be given in my next series of notes.

Kew.

George Nicholson.

Entomological.

A Tulip Tree Leaf Destroyer.

(*Cecidomyia liriiodendri*.)

IN the *Monograph of the Diptera of North America*, Part I, (1862), p. 202, Baron R. Osten-Sacken gives the following brief account of the insect to which this notice and the accompanying illustration (see page 605) refers.

"*Cecidomyia liriiodendri*, n. sp., Brown spots with yellow or greenish aureole on the leaves of the Tulip tree (*Liriiodendron tulipifera*). These spots, about two-tenths or three-tenths of an inch in diameter, indicate the presence, inside of the leaf, of a leaf-mining larva of *Cecidomyia*. It is about one line long, orange, the exserted portion of the breast bone is truncated heart shaped; the tip of the body has two short, horny points, directed upward. (Similar spots on the same tree are produced by a lepidopterous larva.)"

No further observation is made. Baron Osten-Sacken had evidently not seen the imago, and I have not been able to find any other record or account of the insect or its injuries. During the past two years, at least, the beauty of the foliage of many large Tulip trees about Boston has been destroyed by

the work of these little leaf-miners, or, more properly, spot-makers, belonging to the large genus *Cecidomyia*, which includes the destructive Hessian fly. Many people who have always counted upon their Tulip-trees as belonging to one of the few species free from serious insect-attacks, have, by midsummer, been disgusted to find the leaves filled with large brown and yellow blotches. In some instances the foliage, by the end of August, has become so brown and twisted from the effects of numerous spots in every leaf that it has had the appearance of having been scorched by fire, and many of the leaves having thus become dead and dry fall to the ground.

There are several (three or more) broods of the insect during the season, and the broods so overlap each other that some larvæ may almost always be found. The first eggs are probably laid on the young leaves as they unfold in the spring, and the last lot of larvæ reach full growth about the end of September, when they make a slit on the under side at the edge of their mine, and escape to the ground to pupate and remain through the winter. The pupa skin is very thin and transparent. The species of *Cecidomyia* are so numerous, and so similar in most of their characters, that it is generally not easy to identify the flies without a knowledge of their early stages and habits. In the present case the body of the small, delicate fly is light brown in color and sparingly covered with hair. The length of the female is about eight-hundredths of an inch (two m. m.), and of the male considerably less. The head is black; the antennæ are dark brown and in the female apparently thirteen-jointed. The joints of the antennæ of the female are on short pedicels, and they are cylindrical and of even length. The basal joint is thicker and much shorter than the others. Each joint has a whorl of hairs around it near the base, and a few near the other end, and some of the basal hairs are longer than the joint.

The antennæ of the male are much longer and apparently twenty-four-jointed, with two additional very short and indistinct joints at the base. The pedicels between the joints are long; the joints are simple, short, and bulb-like, every alternate joint being slightly smaller; and the connecting pedicel is somewhat thicker and shorter than the next, which is slender and cylindrical. Each joint is provided with a whorl of very long hairs, thus giving the male antennæ a feathered appearance.

The legs are long, with femora and tibiae of equal length, and tarsi much longer. They are banded by light yellow and brown, and are dark or black at the joints.

Like most of the genus, the surface and margins of the wings of this species are hairy, the hairs being longer and more numerous toward the base. The wings of the largest specimens (females) expand about two-tenths of an inch (five m. m.).

The poisons appear light brown.

The dark spot in the leaf is the part occupied by the larva, and the "yellow or greenish aureole," which is represented within the light outer lines in the figure, is probably caused by the disturbance of the tissues, or more likely by the absorption of the nutritive sap by the larva. As these larvæ cannot devour the tissue, but simply live upon the sap, the diameter of the spots occupied by them is usually little greater than the length of the inmates. In addition to the brief description of the larva given by Baron Osten-Sacken, it may be noted that when removed from its mine and placed upon a flat surface it has the power of springing an inch or two into the air. This is done by doubling up the body and suddenly extending it again, and probably the large spines on the last segment are made use of for this purpose. Some other species are known to possess the same power of springing, and in the monograph referred to (p. 183) it is remarked that "all such larvæ belong to the sub-genus *Diplosis*." The venation of the wings corresponds with the venation given for the sub-genus *Diplosis*, and the number of joints of the antennæ also agree with the characters as drawn up by the late Dr. H. Lœw. But without referring to Dr. Lœw's arrangement, I should have been inclined to describe the antennæ of the male as thirteen-jointed, each joint being very deeply and widely constricted in the middle and forming two bulb-like divisions.

No thorough, cheap, and easily applied remedy can be given for this pest, because the larva, living between the epidermal layers of the leaf, is safe from the action of poisons. Showering the trees with a very fine spray of kerosene emulsion or whale-oil soap when the flies are active or ovipositing might destroy many of them; but, where the trees are large, this would be difficult and expensive, and would have to be repeated, and the result then could only be a partial success. As the larvæ fall to the ground and probably pupate directly beneath the trees on which they live, they might be best and

most easily destroyed by thoroughly turning over and rolling the soil in the late autumn or very early spring. Thus buried deeply and with the earth pressed firmly about them, the delicate flies would either be crushed in the pupa state or would not be able to push their way to the surface. This might destroy a large proportion of them. These remedies are merely suggested; they have not been tried, and may not be practicable or efficient. Very injurious attacks are often quite local, and on some estates about Boston the trees have been comparatively free from damage by the insect, although its presence may be everywhere detected.

Foreign Correspondence.

London Letter.

THE end of November may be termed a kind of close season for horticulture. There are Chrysanthemums, of course, and they are everywhere, crowding exhibitions, filling the papers, and occupying the attention of almost every horticulturist. In the houses we have little except Chrysanthemums. Hope of better things soon is encouraged, however, by the development of the Poinsettia, Euphorbia, Linum, Luculia, winter-flowering Acanthads and the Ericas; but they

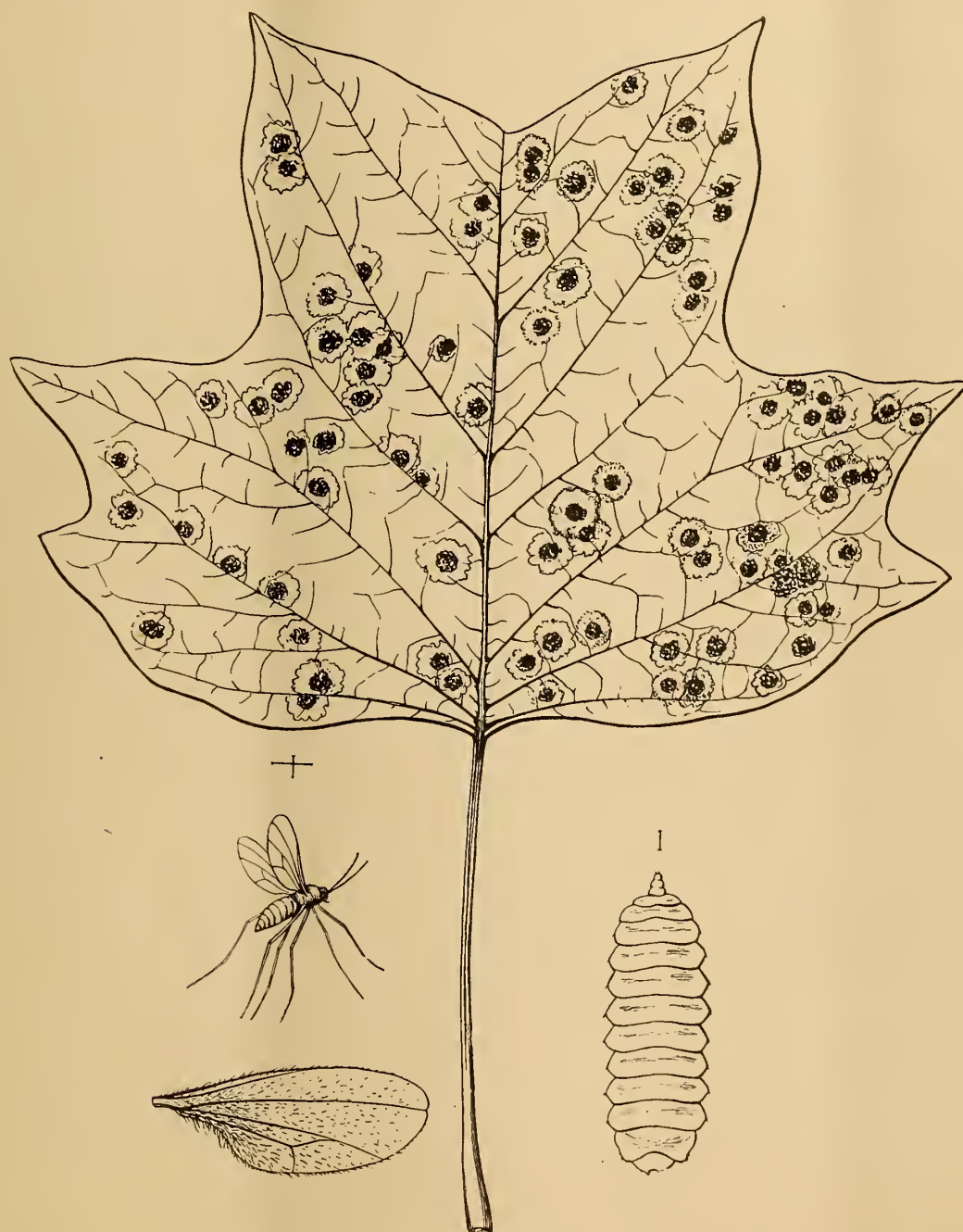


Fig. 152.—*Cecidomyia liriodendri*.—See page 604.

It is quite possible that on account of unfavorable seasons or other causes, there may be years when its disfigurement of the foliage will not be noticed, and it will only occur in injurious numbers at irregular intervals.

The accompanying illustration, from a drawing by Mr. C. E. Faxon, shows a leaf well filled with spots, although there are frequently two or three times as many in a single leaf. It may be added that the "similar spots" made by a "lepidopterous larva," mentioned by Baron Osten-Sacken, have so far not been detected here; but leaves with long, irregular, winding mines are not uncommon.

Arnold Arboretum.

John G. Jack.

are only coming. Out-of-doors the near approach of Christmas is heralded by the beautiful white cups of the Hellebores, and there are still left the spikes of Schizostyles, notwithstanding three successive nights of about nine degrees of frost and a slight fall of snow. The Sea-buckthorn (*Hippophae rhamnoides*) is heavily laden with its bright orange berries, and the yellow Jasmine is beautifully in flower on a sunny wall. Until the frost came our trees and shrubs were richer in autumn colors than they have been for many years. All of those mentioned by Mr. Jack in his interesting notes on the autumn colors of leaves in American gardens were brilliant here, besides many others not mentioned by him. Indeed, so

favorable to the development of autumn tints has the past season been that scarcely a tree or shrub out-of-doors was lacking in attractiveness of this kind. Here we require a mild, moist, sunny autumn to make the leaves of deciduous trees and shrubs assume beautiful colors before falling. If we could be ensured of this, then English landscapes might be made as glorious as the best in America by the use of those trees which in a favorable season put on these glowing colors. But next year and the next may be as unfavorable as this has been favorable. Some plants never fail even here, as, for instance, some of the Maples, the Oaks and Ampelopsis; but it is only rarely that we get such pictures as hardy vegetation generally presented this year.

GYMNOGRAMMAS.—The illustration of *G. schizophylla*, var. *gloriosa*, published in GARDEN AND FOREST for November 6th (p. 533), is a beautiful representation of a Fern which must be extremely difficult to represent on paper. The species is popular with Fern-growers in England, as indeed are a considerable number of the hundred or so species at present known. Forty of them are represented at Kew, and of this number about two-thirds are sufficiently ornamental to rank among the choicest of garden Ferns. *G. schizophylla* was known in Jamaica a long time before it was successfully introduced into England, although many attempts were made to get it to Kew. The plant is so very delicate that it soon perished when subjected to the adverse conditions of a long sea voyage in a Wardian case. It came at last in surprising condition, luck having favored it all the way, and we had the pleasure of opening the Wardian case, which contained about a score of beautiful plants in fair health. It arrived about the same time at the nurseries of Messrs. Veitch, who soon afterward distributed it. The variety *gloriosa* was distributed in 1885. It is not of garden origin, as stated in GARDEN AND FOREST, but is an exceptionally strong form which was imported from Jamaica. The species is somewhat variable in the size, form and substance of the fronds, some of the forms being as weak and attenuated as that named *gloriosa* is strong and full. The cultivation of Gymnogrammas is not difficult, if their liking for direct sunlight is remembered. I know from experience that a position which is shaded is much less agreeable to these plants than one which is not shaded at all. The Kew collection is placed on a side stage with a south exposure, and when all the rest of the house is shaded with the blind this is left unshaded. The difference in the vigor and health of the plants thus treated and those grown in a shaded house is most marked. Of course the atmosphere is kept saturated and the plants are freely watered at the root, except in winter, when the soil is kept moist only.

Amongst the rarer species, which are sufficiently ornamental to rank with the most select garden Ferns, the following are noteworthy, viz.: *G. Mulleri*, fronds erect, pinnate, about a foot long on well grown plants; pinnæ roundish or oblong, an inch long, rather leathery in texture, and covered on both sides with silvery scales. It is a native of Australia. *G. vestita*, something like the last, but with more flaccid fronds and stalked pinnæ. It is a native of the Himalayas, and thrives in an ordinary green-house. *G. rufa* is another of the same section as the two already named. It is distinct, covered with soft, silky hairs rather than scales; the fronds, too, are longer and more herbaceous. *G. Pearcei*, var. *robusta*, is an exceptionally strong and attractive variety which we owe to the Messrs. Veitch, who distributed it last year. The type, also introduced by Messrs. Veitch in 1864, is an elegant Fern, but too delicate to find much favor; whereas this new form of it develops into a strong, well furnished plant under ordinary treatment. All the forms of *G. calomelanos*, including several new ones, are first-class decorative Ferns. *G. trifoliata* may be called a climbing species, the fronds sometimes attaining a length of five feet by six inches in width, and requiring to be supported. Except as a very extraordinary species of Gymnogramma, it has little to recommend it.

Ferns do not receive as much attention in England now as they did a few years ago. It is only rarely that anything like a collection of them is formed, a few of the most useful for decorative purposes being grown in great numbers. The example set by Kew about seventy years ago, when the then curator, Mr. John Smith, commenced to form a collection by means of spores taken from specimens of Ferns sent to Kew by collectors, was followed in all large gardens in England, and Fern-collections were almost as fashionable as Orchid-collections are now. Although not in fashion, yet the whole order is one of the most delightful among garden plants, and few occupations could be more fascinating than the cultivation of a good collection of Ferns, beginning with spore-sowing and ending at big specimens.

ORCHIDS.—At this time of year the Orchid-houses are much gayer with flowers than the rest of the in-door department. Already *Odontoglossum crispum* is well in flower. A very fine variety, not yet named, is in bloom at St. Alban's, in Mr. Sander's nursery. It is remarkable for the size of its flowers and for a large chestnut colored blotch on each of the segments. Another new *Odontoglossum*, probably a natural hybrid, and of which *O. luteopurpureum* may be one of the parents, is also in flower with Mr. Sander. Its most striking character is in the labellum, which is rather long and narrow, crisped, white, with blotches of rosy violet, and the raised lines in the throat terminating in a thin filament. *Vanda Amesiana* is flowering freely in the nursery of Messrs. Low & Co., of Clapton. The principal fact now to be recorded in connection with this fine *Vanda*, noted by me last year, is that it appears to thrive better in a cool house than in a tropical one. Such, at all events, is the result of experiments made in the Clapton Nursery, where there are some thousands of it in cultivation. Its near ally, *V. Kimballiana*, is also coming into flower. A plant at Kew has a spike two feet high, but the fogs have proved fatal to most of the buds. It is remarkable that fog proves to be more injurious to *Vandas*, *Saccolabiums* and *Angræcums* than to other Orchids. *Lælia autumnalis* is in flower, as also is *Cattleya Bowringiana* and *C. bulbosa*. Several species of *Platyclinis* (*Dendrochilum*) are flowering in the cool house. It appears from a note which accompanied the picture of *P. filiforme*, recently published in GARDEN AND FOREST, that these plants are successfully grown in a tropical house, such as suits *Phalænopsis*. But here they are grown in a cool house along with the cooler *Cattleyas*, and they are in perfect health. Some Orchids thrive in a wide range of temperature, and, apparently, *Platyclinis* should be numbered amongst them.

MASDEVALLIAS.—The publication of Messrs. Veitch's beautifully executed monograph of Garden Masdevallias occurs at a time when it is likely to do some good by rousing Orchid-fanciers to the merits of many of the species as ornamental flowering-plants, and to the interesting nature of the genus as a whole. For it has to be admitted that in England at all events the Masdevallias have fallen out of favor, or, adopting the expression in the Orchid market with regard to them, there is nothing like the money in the majority of the species that there was a short time ago. This is a sordid view; but when one observes a glut in the market of established healthy plants, it is a safe conclusion that they are not much in demand. Next year may bring a revival of the love for Masdevallias. Certainly there is no genus in the whole Orchid-family which is so peculiarly suited to the ordinary cultivator, as well as to the specialist, as this; and for the following reasons: they are, as a rule, easily procured; they may be kept in health much more easily than most Orchids; they flower freely, many of them being rarely out of flower, and their flowers are extremely varied in size, in color and in form. If fantastic flowers are wanted they are abundant among Masdevallias, while richly colored, elegantly formed or "microscopically beautiful" flowers are equally well represented. Possibly the fact that these plants are not difficult to keep in gardens accounts for their depreciation in value here. But in your country I suspect they are not so abundant, nor so cheap, and to any one in search of an interesting and delightful specialty, the Masdevallias may be recommended. "Calypso" has called attention to the botanical and artistic merits of Messrs. Veitch's manual; permit me to add that the cultural directions are equally excellent, and that for any one wishing for directions as to what is best worth growing and how best to grow it, this book contains everything that is necessary.

FICUS ELASTICA VARIEGATA is a handsome stove plant which was introduced into English gardens about five years ago and is now popular. It is simply the well known "India rubber plant" with the outer half of the leaves colored clear shining cream-yellow—not a smudge-like variegation, nor yet a sickly pallor such as one sees in many new variegated plants, but a healthy, attractive yellow. Plants at Kew three feet high have leaves down to the pot and every leaf has the variegation well developed. It is much admired and will certainly become a general favorite. The plant was not received at first with much favor, and this was owing to there being two forms of it, one much inferior to the other. It is just as easy to multiply and cultivate as the green form. Possibly, however, the variegation would not be so marked if the plant were grown in a green-house; I am only able to speak of it from its behavior when treated as a stove-plant.

LILIUM AURATUM.—The number of bulbs of this *Lilium* which are imported, sold and killed in the gardens of this country is incredible. Weekly sales, commencing long before Christmas and ending about March, are conducted in London,

and every week from ten to twenty thousand bulbs are disposed of in this way alone. In addition there are the thousands of bulbs which the nurserymen import direct from Japan and distribute. Apparently the Japanese are as successful in the multiplication of this Lily as the Dutch are in that of Hyacinths and Tulips, otherwise the annual supply would not increase as it has done. The treatment to which the large majority of the bulbs of *L. auratum* are subjected in England must be very wide of what is right, for when properly treated no Lily is more easy to cultivate nor increases in the ground more rapidly. It should be planted six inches deep in beds in which Rhododendrons, Azaleas, Kalmias, or other peat-loving plants are grown, protected from severe frosts by a cone of ashes or cocoa-nut fibre about six inches high, and otherwise let alone. Treated thus at Kew a single bulb has in three years multiplied so as to produce eleven stems with an aggregate of one hundred and twenty blooms.

• London.

W. Watson.

in cultivation, all would be well; but instead of this, one receives amongst a mass of almost worthless varieties only a few with distinct characters, and a whole year, perhaps two, will be lost before they can all be determined. If seeds from selected varieties be sown at the same time, many of them will bloom the second year, and the raiser will be able to make his selection not later than the third year after sowing if the seedlings have been well treated. This means of procuring new forms is certainly the best, especially when we take into account the fact that one, at least, of the old varieties is well known to grow and flower freely on heavy, clayey soil where the other varieties totally refuse to grow at all. By means of seedlings the number of varieties for heavy soils may be increased and the characters made more pronounced. We are not at all sure that the best treatment for the Christmas Rose, whether in heavy or light soils, is fully understood, for a really fine plant can rarely be found in any of our nurseries, but this in a measure may be owing to the practice of



Fig. 153.—Abraham's Oak.—See page 602.

Cultural Department.

Christmas Roses.

BESIDES the annual importations from the native countries of *Helleborus niger* and its varieties, much is being done in a quiet way at home in raising seedlings from the best of the old established forms, and many of these are already showing characteristics which give the raisers every encouragement to redouble their energies in this good work of improvement. Although it is quite true that from these native habitats, chiefly Italy, the Tyrol and other parts of Austria, we occasionally get a really handsome form, it becomes a very doubtful question if the expenses of collecting, freight and other dues can be realized in the face of the many good forms raised at home. If one was always sure of procuring, in quantity, some form not already

breaking up the clumps for propagation. The prevalent idea seems to be that the Christmas Rose loves an unmanured soil, whereas our experience points rather to the most liberal treatment. Their first requirement is a deep, rich, well drained, but moist, soil. Then they need liberal top-dressing early in autumn, with stable manure, leaf soil and soot, if procurable; this given early in autumn feeds the plants at a time when they most need it—when the buds are being formed. The dressing may be lightly forked in late in spring. The last requirement is complete shelter from cold, drying winds. The same treatment for this handsome group of winter flowers will, no doubt, be applicable in the United States.

These Hellebores are sure to attain a high perfection in the United States. This is especially true of *H. niger altifolius*, which does exceedingly well in Scotland, where it perhaps attains its greatest perfection in the United Kingdom. Hellebores also do

well in Ireland, especially the pure white, *H. niger angustifolius* and the St. Brigid form, both of which are largely grown there. To-day, November 16th, we gathered the beautiful *H. niger maximus* or *altifolius*, the first to remind us of the approach of Christmas, and lasting in full beauty until the snowy white forms above named greet us early in the new year. *H. niger altifolius* is always the first with us here, beginning toward the latter end of October and continuing until January. Excepting, perhaps, the Riverston variety, which is a truly handsome flower, *H. niger altifolius* is the tallest and largest flowered of all known varieties. When grown under shelter the flowers come almost pure white, but when in the open air they have a warm, rosy tint, very attractive when grouped. The leaves grow from twelve to twenty inches high, of a fine dark green, and when liberally treated remain in perfection all through the flowering season. This is probably the only form amongst the old ones that flourishes in a cold, clayey soil, which is found fatal to most others; and it will prove a boon to those living in low-lying or cold districts. *H. niger angustifolius* comes next in order, and of this variety there are at least three distinct forms: The Wardie Lodge form, which is an exceedingly valuable one; St. Brigid, which is also a free, handsome kind, and the Riverston form, which is one of the best kinds we possess. The Brockhurst form, which we take as being nearly the type, is not the least valuable of the four, and is an exceedingly free and easily grown plant. The leaves are bright green, the segments very narrow, and the flowers, which are pure white, form a pretty, snowy nest in the centre of the plant. These plants are not so liable to damage, owing to the protection afforded by the foliage, both at the sides and above them, as when full open they are still well below the leaves. Of the variety Major there are also several forms, the Irish one being, perhaps, finer than the Bath one, but both are certainly exceptional; indeed it is from this class we get some of our best Christmas Roses. The very large, snowy white flowers are produced with almost certainty about Christmas-time. There is also a fine Continental form, probably selected from Austrian plants, called Madame Fourcade. The flowers are cup-shaped, snowy white; the leaf-stalks bronzy, with a tinge of the same running through the pale green leaves. It has a neat though spreading habit and is an excellent plant for pots. An almost intermediate form called Caucasicus is one of the most useful for rockeries; the flowers out-of-doors being slightly tinged with rose, but when grown under glass, snow white, of beautiful form. It has a most vigorous constitution and stands severe weather well, the flowers being protected like those of *Angustifolius* and its forms. Most of these varieties and forms stand slight forcing very well, but if too hard driven they will certainly take a rest the following season.

Kew.

D. Dewar.

Helleborus niger and its varieties are just now supplying many beautiful flowers in the open ground, which would otherwise be destitute of anything in the way of flowers, owing to the several severe frosts that have been experienced recently. Frost seems to have no injurious influence on these beautiful flowers, whose popular name, Christmas Roses, is, in this instance, a happy one, for with us they often last until the festive season has come and gone. The cultural needs of these plants are so few, and, in most cases, easily supplied, that no one with a garden need be without flowers even at this dull season; but these wants, though few, are imperative.

The first of them is a soil of a naturally retentive nature, so that they may at no time suffer from lack of moisture at the roots, especially during their season of growth, when this is most likely to occur. Another essential to their successful culture is shade from the scorching rays of a midsummer sun. To obviate this we plant them under deciduous trees, where they get the benefit of the shade in summer, while the fallen leaves of autumn provide an acceptable protection to the crowns of the plants in winter. Hellebores like a rich soil, and, as their thick, fleshy roots penetrate deeply, plenty of manure should be added when planting them, for, when once planted, they should not be disturbed again until the soil has become impoverished; this is best done in spring as soon as the frost disappears, as these plants commence leaf-growth very early, and if shifted after this has fairly commenced it seriously affects the development of the large, shining foliage, itself an ornament at all times. *H. niger* is best known, but cannot be compared with the varieties of it now in commerce. Of these, we find the one called *H. niger altifolius* to be the best; its flowers are three inches across, pure white inside and pink on the outside of the sepals, and borne two and

sometimes three on stems twelve inches in length. *H. niger major* and *H. niger maximus*, with us, are identical, and rank next in beauty, while *H. niger angustifolius* is another desirable form, with leaves the segments of which are narrower than the type, and the plant produces more flowers, and these are almost pure white. The beauty of the blossoms is often marred by heavy rain-storms bespattering them with soil. This can easily be avoided by placing a sash or handlight over the plants while in bloom, or they may be carefully lifted, potted and placed in a cool house or frame and planted out again in spring. So far we have noticed only *H. niger* and its varieties; the cultural remarks apply equally well to the whole genus, and there are many other species, but they all flower in spring, the flowers being produced with the young leaves. *H. orientalis*, *H. Caucasicus*, *H. Abchasicus* and others belong to this section, and are the parents of the many fine named hybrids now offered in trade-lists.

Passaic, N. J.

O.

Leading American Apples.

THOUGH we received the Apple from Europe (the improvement of our native American Apples never having been attempted), yet it must be noted that on this continent a large number of the best varieties have appeared as seedlings from the original stock. American apples take the lead in every market where they have appeared; and they stand at the head of the list, with very few local exceptions, wherever this fruit is sold. Each section of the Union (except, perhaps, the Pacific Coast and Rocky Mountain regions) has produced its own varieties, having merits and adaptation which give them more or less preference near the place of their origin. To the older sections, where fruit-growing, as a business, has been longest pursued, belong the best known varieties for the general market; yet the south and south-west have many Apples of all seasons, native to the soil, the commercial merits of which have only to be made known in order to be acknowledged. It is only among the summer and fall Apples that any foreign sorts find acceptance with our fruit-growers, and the list of these hardly extends beyond five named varieties—Yellow Transparent, Red Astrachan, Oldenburgh, Alexander and Gravenstein. The Astrachan is a most remarkable fruit, in the fact that it is equally at home, valued and productive in Canada and Louisiana, and from the Atlantic to the Pacific.

In the north-eastern and middle Atlantic states the four leading native early market Apples of American origin are Sweet Bough, Early Harvest, Williams' Favorite and Summer Pippin. Some persons would replace the Williams' Favorite with American Summer Pearmain, which is popular also southward along the Atlantic Slope, with the Early Harvest, the Summer Queen and Summer Rose. Farther south, Carolina Red June comes into this list. For home use, Primate and Early Joe must be added; while, south and westward, Early Red Margaret is popular. It is not certain, however, that this is an American variety.

The fall Apples are extremely numerous; and, as the latitude varies, many sorts among them will rank as summer fruit. In the north and east, Fall Pippin, Porter, Munson Sweet and Maiden's Blush are most commonly seen. Westward, and in Canada, St. Lawrence is added; while, as we go south we note in addition, Buckingham, Fallawater and Rambo. In the north-west Fall Wine, Haas and Saxton appear.

The early winter Apples of the north-east are very numerous. Fameuse (in southern New England a late fall Apple), Jewett's Red, Bellflower and Hubbardston are abundant. Southward the Baldwin falls into this list, with the Striped Winter Pearmain, Smokehouse and Smith's Cider. In the north-west the Wealthy is now becoming the leading early winter Apple. Northern Spy is not a long keeper in the Ohio Valley. Wagener is popular in the milder parts of the north-west.

Late winter Apples in the north-east include Baldwin, Rhode Island Greening, Northern Spy and Roxbury Russet among the most prominent and profitable; but there is a long list of others well known and salable, especially in the smaller local markets. The King of Tompkins must be included for New York, while westward Limber Twig and Golden Russet, of western New York, are very prominent, though Ben Davis leads all of this class in the Mississippi Valley from Iowa and Illinois southward. Of winter sweet Apples, Talman easily leads in market value. In the south and south-west, aside from Ben Davis, Pryor's Red, McAfee and Nickajack are probably the most widely known.

Newport, Vt.

T. H. Hoskins,

Orchid Notes.

Cypripedium Spicerianum.—This lovely species may be looked upon as a harbinger of autumn, for as the months of October and November approach the flowers of *Cypripedium Spicerianum* appear, and last until the beginning of the New Year. Native of India and Assam, it was first introduced to cultivation in 1878 by Mr. Herbert Spicer, of the Woodlands, Godalming, England, among a mixed collection of Orchids. Since that time it has gradually gained on the popular favor, and is now to be found in almost every collection, so much admired are its flowers, which present a unique appearance. The upper sepal is very large and slightly arching forward, of the purest waxy white, with a broad, deep crimson-purple band running from apex to base, the latter portion being stained with green and covered with minute reddish spots. The lower sepal is much smaller and greenish white, being ovate-acute in shape. The ligulate petals, which are bent a little forward and slightly depressed, have crinkled margins and a yellowish green surface, thickly covered with small, dull red spots on each side of the crimson mid-line, while the helmet-shaped lip is purple brown, often suffused with crimson. The staminode is very conspicuous in this species; its margins are wavy and pure white, inside of which the remaining surface is crimson-purple. The leaves are oblong, six to twelve inches long, dark green above and spotted with dull purple underneath, toward the base; from their centre springs the slender, dark purplish hairy scapes, each of which bear, as a rule, only a solitary flower, although instances have been recorded where two flowers were borne on a scape.

C. Leeanum is now also in flower. It is a most popular hybrid, being the result of crossing *C. insigne* and *C. Spicerianum*, between which it is intermediate, although the characteristics of the latter species are more predominating. The upper sepal is very large, pure white, with a bright grass-green blotch at the base, which is traversed by lines of dark purple-brown, while on the white portion are a few mauve-purple spotted lines, on each side of the broader median line which runs to the apex. The lower sepal is pale green, and the petals, which resemble those of *C. Spicerianum*, have an undulated upper margin and a yellowish green surface, with a dull purple mid-line running from base to tip and traversed by spotted veins of purple-brown. The lip is pale green behind, and glossy purple-brown, of a more or less intense hue, in front, while the staminode partakes of the shape of that of *C. Spicerianum*, but is devoid of its rich color, except for a very dull tinge of mauve, which encircles the green and yellow tooth so conspicuous in *C. insigne*. The variety known as *Superbum* is recognized by its larger upper sepal having brighter purple spots.

C. Leeanum was raised in the collection of Sir Trevor Lawrence, Burford Lodge, Dorking, and the variety *Superbum* in Messrs. Veitch's establishment, about the year 1885.

Both of these Lady's Slippers grow freely, and may be treated in the same way. *C. Spicerianum* has been found in its native habitat growing on steep and perpendicular rocks in rich loam and in moist places. The former fact is well authenticated, for when imported plants arrive they are often smeared with mud. Under culture they may be grown in a compost of loam and peat, and as the roots grow quickly and vigorously, pots large enough to enable them to develop should be chosen, and these should be well drained for about two-thirds of their depth with clean crocks. The plants may also be grown with equal success in fibrous peat and sphagnum. A warm, moist atmosphere is best, and care should be taken never to let the roots become dry; but the amount of water to be given must be regulated according to the growth of the plants and the time of year, and during the hot summer days it will also be found best to shade them.

St. Albans, England.

John Weathers.

Cattleya Percivaliana.—Large quantities of this beautiful Orchid are now in full beauty with us. The many hundred flowers, as well as an immense number of *Lælia anceps*, now also in full bloom, will furnish a perfect blaze of bloom until the coming of larger flowers of *C. Triana*. *C. Percivaliana*, though possessing the smallest flowers of the Labiata group, is a very valuable species, both for cutting and decorative purposes, as its season of flower is fully a month earlier than the winter kinds and it fills the gap between these and the autumn blooming kinds. In addition to this, it proves to be one of the easiest of this extensive genus to cultivate and flower. It was introduced about six years ago from the Cordillera of Venezuela, at an elevation of about 4,000 feet, where

it is said to grow on rocks in very wet places and where there is a full exposure to the sun. That this does not apply to all is shown by the great disparity in the size and shape of the imported bulbs and leaves. Some of these are of immense size, the bulbs ten inches in length and proportionately thick, and would easily pass for *C. gigas*. In the other extreme the bulbs are only three inches long and almost globular in the centre, denoting a slow, cool growth without much water or with considerable exposure. Between these two extremes almost any variety of growth may be seen. The coloring of the growths also varies from a deep green to a reddish brown. Almost as much variety may be seen in the coloring and size of the flowers. In the type these are four to five inches across, with deep rose sepals and petals. The lip is convolute and of the same color externally. The front lobe is of a deep crimson purple, with a pale lilac-frilled margin, the throat being of a rich, tawny yellow. Some of the larger varieties measure seven to eight inches across, and cannot be distinguished from the old *C. Mossia*, of which this may only be a geographical form. As with almost every Orchid there is an albino form, which is called *Alba*, but this is at present very rare. One great drawback to *C. Percivaliana* is a somewhat disagreeable odor, similar to that of *Lælia autumnalis*, but, happily, this defect is not constant in the species, but is noticed more especially in the small flowered type. To grow this species successfully, it should be given plenty of heat and water during growth. Use fibrous peat and moss, well drained pots, and let these be as small as possible. As soon as the flowers are over the plants should be rested by withholding water, except sufficient to keep the bulbs plump.

Kenwood, N. Y.

F. Goldring.

Heating Green-houses.

THIS is a subject to which much study and experiment has been devoted, and yet reliable data for general practice are very hard to find, and this is mainly because in each instance special conditions of latitude, exposure and so on must be taken into account. Attention, however, is not now invited to any particular method of heating, but a few suggestions are proposed which refer to the heating of houses in a general way. In the case of brick-set boilers, an examination should be made at proper intervals to ascertain the condition of the flues, that they may be kept thoroughly clean and free from cracks, as a small accident may do much damage by permitting the escape of gases injurious to plant life. With all such boilers any portions of the flue that are near the fire or exposed to strong heat should be thoroughly lined with good fire-brick, a precaution sometimes omitted through a mistaken idea of economy. Another point in the construction of smoke flues is to have soot doors and dampers as well, conveniently arranged. Fuel can always be economized by the convenient arrangement of the regulating apparatus. In plant-houses one of the most important points to be observed is regularity in temperature; the careless method of permitting a high temperature one night and a low one the next is too often responsible for the sickly appearance of plants which may have been properly treated in other respects. In extremely cold weather it is better to allow the temperature of a plant-house to fall a few degrees below the usual standard. This will be less enervating than a forcing temperature, with its rapid evaporation. For instance, a Palm-house that is usually kept between sixty and sixty-five degrees at night, may be allowed to fall to fifty-six or fifty-eight degrees without any appreciable injury, and a Rose-house that is generally run at a night temperature of fifty-six degrees, may drop to fifty degrees in very severe weather without materially affecting the Roses. During sharp weather, when hard firing is necessary, it will be beneficial to damp down warm houses by sprinkling the walks, and the surface under the benches, especially in the morning and evening; but this operation is not so often required in houses in which there are vapor pans of some description placed on the pipes.

In regard to fuel, the location of the green-house has much to do with it, though it is probably hard to find a better material for this purpose than good anthracite coal. In some localities coke is used profitably, but, naturally, does not last so long, without attention, as a good solid fire of coal, though the coke produces a very strong heat for a short time. As to the proper size of coal, much depends on the style of boiler. A stronger draught and a shallower grate is necessary to burn small sized coal to advantage, and, though cheaper, it requires more attention in using. For a lasting fire, in a majority of boilers, coal of egg-size, or the next larger size, known as "broken," usually gives entire satisfaction.

Holmesburg, Pa.

W. H. Taplin.

Propagating.—More or less work of this character is to be done during the winter months, and therefore it is well to make preparation for it by laying in such supplies as may be needed. Attention given to such details now will save much labor and inconvenience later in the season. For instance, a good supply of clean, sharp sand should be put under cover, so that the weather may not interfere with future operations. Some Cocoa-fibre, or sphagnum, should be secured, in which to plunge cutting-pots. The Cocoa-fibre is preferable, because more lasting. Potsherds or cinders for drainage should also be provided, and if cinders are used they should be sifted out as clean as possible. A little charcoal will also be found useful, particularly where the cuttings require a considerable time in the cutting-pots or pans, for the soil in such cases often becomes sour.

Among these slow-rooting plants may be classed the *Terminalias*, *Theophrasa imperialis*, some of the *Aralias*, and *Rondeletia gratissima*, all of which and many more take a long time to develop roots.

The cut flower supply of the next season must also be provided for, and, with this in view, the first crop of Rose-cuttings may soon be put in. To secure satisfactory plants, the cuttings should be taken from healthy shoots of medium size, such as rather weak blooming shoots, these being usually of firm wood which will root quickly. Between blind wood and flowering shoots for Rose cuttings I have found no material difference, although the question is still discussed. I saw, this autumn, two houses of American Beauty, the plants in one having been raised from cuttings of flowering shoots, while a second house of the same size and under exactly the same treatment was planted with Roses raised strictly from blind wood. When I saw them I was unable to discern any appreciable difference, either in strength of growth or floriferousness of the plants in the two houses, both being in first-class condition.

Carnation-cuttings should soon be put in, for early-struck cuttings usually make the best plants. A good method with these plants is to prick them off from the cutting-bench into flats filled with soil, in which they may remain until the time for planting out. The advantage of this plan is that the plants so treated seldom become starved and root-bound, and they may be readily separated with a trowel, so that each plant, when planted out in the spring, has a good ball of earth attached to it. Bouvardias should also be put in about the beginning of the year, as the root-cuttings generally used take several weeks to make growth enough to fit them for potting off.

Holmesburg, Pa.

W. H. Taplin.

Chrysanthemums for Stock.—I find from experience that it is quite as important to give close attention to stock-plants after blooming as before. Last year I took care to have my plants in as cool a place as I could give them, free from frost. I kept them in the Violet-house. They were kept free from insects, and watered moderately. Not one of my own stock failed me, but many of the new varieties, or others obtained outside, did poorly. Another experience was that a foul cutting produced the only infested plant I had. Late struck cuttings did as well as early ones. Next season, therefore, I shall not take cuttings until the end of February. Cuttings will strike if the temperature of the propagating bed is not above fifty degrees. The bed is better kept moderately dry so long as the cuttings do not wilt.

Wellesley, Mass.

T. D. H.

Carnations.—Now that Chrysanthemums are nearly over, there is nothing more interesting to the amateur than a collection of Carnations, and if in a light and airy, cool greenhouse, they do equally well in pots or planted out. If allowed to become waterlogged or are subjected to too much heat they are injuriously affected. A temperature of fifty-five degrees is about right during the night-time. Occasional waterings with liquid manure and tobacco fumigation against the green fly seem to be all the special attention they demand. There has been a steady improvement in American seedlings, so that we not only have varieties of many hues and large, finely scented flowers, but the flowers are borne on long stems, and the calyx does not split and give the ragged look which was so often seen among the sorts grown a few years ago. There are now so many good kinds that it is hardly worth while to make a list of them. First rate kinds can be selected from the catalogues of any of the leading florists.

Pearl River, N. Y.

John Thorpe.

Kalanchoe carnea is a new introduction from South Africa. It was received in England in 1886, and seeds have been offered for the first time this season by Messrs. Veitch & Co. Plants are now in bloom here from early sown seeds, and

prove to be very attractive. The plants are fleshy, nearly resembling the scarlet *Kalosanthus* in size and form of flowers and character of inflorescence. The flowers are four-petaled, delicate pink, shading to deeper pink on the margins, and appear in corymbose cymes. They are slightly fragrant, with a honey-like odor. The leaves are light brownish green, fleshy and smooth. The plant flowers from the termination of the main stem, also from the axils of the leaves. It is now pushing new growths from the base, and, no doubt, it will continue in bloom for a long season. As this is an attractive dwarf-growing succulent of the easiest possible culture, rapidly propagated by seeds or cuttings, and giving handsome bloom in early winter, it seems a desirable addition to the green-house and probably will prove a good window plant. Aside from needing little pot-room and requiring a mixture of sandy loam and brick rubbish or similar material, it seems to require no special treatment or extra care.

Elizabeth, N. J.

J. N. Gerard.

Correspondence. December in California.

To the Editor of GARDEN AND FOREST:

Sir.—Owing to the heavy rains in October, and the warm weather, with showers, ever since, the gardens and orchards show some interesting freaks. The double *Spiraea prunifolia* usually sheds its leaves, in this locality, about November 1st, and blooms, on the bare branches, in spring. It is in full bloom now, December 1st, while the beautiful leaves, red and yellow, are all on the branches, and show no tendency to fall! A neighbor has Lilacs in bloom now—not large clusters, but small bunches of flowers. They never bloom from any other buds. The crimson Japanese Quince hedge shows a great many blooms at present, fully two months before the usual season. The beautiful *Magnolia stellata*, which is a great favorite here, is blooming freely in the midst of its leaves, a thing which I never saw before in fifteen years of watching its fragrant blush pink flowers. They do not usually show until New Year's or later, and then on leafless stems.

The Persian Walnut-trees, the "Kaghazi," imported from Cashmere, still retain all their leaves as if it were August. The English Walnuts have lost their leaves. The foliage of the Cherry-trees in the orchard is, for the most part, as green as it was three months ago. The *Paulownia imperialis*, forty feet high, shows, as yet, no sign of dropping a leaf. The Italian Chestnuts have lost only a few leaves from the upper branches, but many are still green and closely adherent. The general aspect of over 100 acres of orchard and ornamental grounds is that of late summer, except for the leafless Apple, Pear and Peach-trees.

Judge Blackwood, of Haywards, eight miles from here, told me to-day that he had an Apple-tree in full bloom, and that his Cherry-trees would be in blossom in a week. Professor E. W. Hilgard, of the State University, told me that several Apple and Pear-trees are in bloom in the grounds there. Some Apricot and Almond-flowers are reported from other districts. Here, at Niles, the Cherry-buds appear almost ready to come out, but other fruit trees are more backward than in the cases mentioned. The opinion among fruit-growers is that all the orchards will be in bloom two months earlier than usual.

The brilliant orange *Eschscholtzias* are in full bloom in a field near by—hundreds of them. February is their usual season here. The California wild Mustard is also in bloom by the roadsides. The grass on the hills and in the pastures is as tall and thick as it is in ordinary seasons by the end of March.

Niles, Cal.

Charles H. Shinn.

Trees and Telegraph Wires.

To the Editor of GARDEN AND FOREST:

Sir.—In passing along one of our streets the other day I was shocked to find that a row of fine shade trees had been used for telegraph or telephone attachments, and that the linemen had ascended them as they do the poles, by means of sharp spikes in the heels of their boots, mutilating the bark, of course, and inviting attack from the rot fungus. Two well known citizens who were passing said in reply to some questions that nobody seemed to have any power to stop such outrages.

Are we, then, wholly at the mercy of any corporation who cares to peril our lives, or destroy our shade trees, or drive us crazy by wires vibrating against the tin roofs of our houses? I am growing callous to many things, but for the trees there is "a corner of my heart that is sorry still." What we are going to do I do not know, but I send this growl where I think it may meet with sympathy.

Brown University, Providence.

W. Whitman Bailey.

To the Editor of GARDEN AND FOREST:

Sir.—During a recent visit to the Island of Santa Cruz, one of the islands forming the southerly wall of the Santa Barbara Channel, on the coast of California, I found *Polypodium Scouleri*, H. & G., growing on the basaltic rocks of which the island is largely composed.

This Fern, so far as I know, has not been heretofore noted from any locality within a distance of perhaps 200 miles north, and not at all from the south, except by Dr. Palmer, who reported it from Guadeloupe Island, off the coast of Mexico.

Santa Barbara, Cal.

Lorenzo G. Yates.

To the Editor of GARDEN AND FOREST:

Sir.—Allow me to call your attention to the desirability of *Baccharis halmifolia* for cultivation as an autumn-blooming plant in shrubberies. It occurs somewhat abundantly on Buzzard's Bay, along the west shore of the Town of Dartmouth, and the fertile plants are very attractive in September. I do not remember to have ever noticed this shrub in cultivation, although we have few more attractive ones in its season. From its habit it would appear better if planted among other shrubs than strictly alone. Although a plant of the lands adjoining the sea, yet I have seen occasional specimens along the roadsides several miles inland.

South Framingham, Mass.

E. Lewis Sturtevant.

Periodical Literature.

In a recent number of the *Cornhill Magazine* is an article on "Weeds" so amusingly written that it is a delight to receive the information it imparts. "As dirt," says the author, "is matter in the wrong place, so, I take it, a weed is simply an herb or flower which grows where the agriculturist does not want it." Humble ugliness does not make a weed, nor does beauty prevent the name from being deserved. An instance in point is cited: the blue Ageratum, which is a cherished border flower in England, but which, transported to Ceylon by an English lady, has there become, in truth, a weed, so rapidly running wild in the island that it now costs over a million and a quarter dollars annually to keep it down in the Coffee plantations. Again, Clover "is a 'crop' where it is deliberately sown; but when it comes up lawlessly of its own mere motion in a flower-bed on the lawn," then it is a weed. "Hence, it also results that a weed, wherever it shows its weedy nature, belongs to what Darwin used to call 'a dominant species'—that is to say, one that then and there can take care of itself and live down or kill out all feeble constitutions. It is this vivacious peculiarity that constitutes the original sin of all weeds; they are plants that you don't want to grow, but that, nevertheless, possess qualities and attributes which enable them to oust and overshadow those that you do. . . . Therefore, cultivation . . . consists essentially in the suppression of weeds, or, in other words, the restriction of free and natural competition." But, as the author goes on to explain, this refers merely to competition in "free, open situations." A forest or woodland herb is not a weed, because it does not compete with our crops or garden plantations. Such plants may be "weeds at heart"—that is, pushing monopolists—but they are not weeds in fact. "Man tills only the plain; and, therefore, it is only the wild herbs which naturally grow in the full eye of day that can compete at an advantage with his Corn, his Turnips, his Beet-root or his Sugar-cane. Hence arises a curious and very interesting fact, that the greater part of the common weeds of western Europe and America are neither west European nor American at all, but Asiatic, or, at least, Mediterranean in type or origin. . . . The reason is obvious. Western Europe and eastern America, in their native condition, were forest-clad regions. . . . Now, the wild flowers and plants that grow beneath the shades of the forest primeval must bear the open heat of the noonday sun. The consequence is, that whenever the forest primeval is cleared, a new vegetation usurps the soil, a vegetation which necessarily comes from elsewhere." Any one who has even glanced through Gray's "Manual" knows how true this is of our eastern states; but it is a less familiar fact that, in recent years, certain American plants are running wild as weeds in Europe. "A return wave," as our author expresses it, "from west to east is actually in progress; and . . . promises in the end to assume gigantic proportions. Many years ago the great Boston botanist, Asa Gray, prophesied its advent, and his prophecy has since gone on fulfilling itself at the usual rapid rate of all American phenomena, social or natural." This new class of emigrants, be it noted, come chiefly from the far west—from those parts of our continent which have always been a vast stretch of treeless prairie land,

clothed with plants habituated to the open sky. From the western they have begun to pass to the eastern states, and thence across the Atlantic. Our author believes that they will soon, "in virtue of their sturdier and stringier prairie constitution, habituated to long drought or broiling sunshine, live down those damp-loving and dainty cis-Atlantic weeds" which now occupy the soil of eastern America, and, once on the other side of the ocean, "will, in many cases, almost entirely swamp our native vegetation. In fact, I think there can be little doubt that, with the increase of intercourse all over the world, a few hardy cosmopolitan weeds must tend in the long run to divide the empire of life and map out the cultivable plains of the globe between them. . . . I don't doubt that in time these picked weeds of all the open lowland regions, but more especially of the pampas, the steppes and the veldt, will overrun the greater part of the habitable globe. They are the fittest for their own particular purpose, and fitness is all that nature cares about. We shall thus lose a great deal in picturesque variety between country and country. . . . *Toujours perdrix* is bad enough, but *toujours lait-d'âne*—always Sow-thistle—is surely something too horrible to contemplate."

Three American weeds are then cited as having already made good their hold in England. "One of them, the latest comer, is spreading visibly every year under my own eyes in my own part of Surrey. Thirty years ago Mr. Brewer, of Reigate, noted with interest in his garden at that town the appearance of a small exotic Veronica; the 'interesting' little plant is now by far a commoner pest in all the fields of southern England than almost any of our native Knot-weeds, Thistles or Charlocks. The Peruvian Galinsoga . . . has spread immensely in Italy and the Riviera and now grows quite commonly wild on the road-sides about Kew, whence it will sweep in time with devouring effect upon the surrounding countries." Of course, man can almost always succeed in the fight against weeds, "but his commercial and agricultural success will be but a small consolation, after all, to the lover of nature for that general vulgarization and equalization of the world's flora, which universal culture and increased intercourse must almost of necessity bring in their train to every quarter of the habitable globe."

It is interesting also to note that many plants which spread with a new rapidity in a new soil likewise develop as individuals in an unprecedented way. For example, the "petty English Knot-grass, which at home is but an insignificant roadside trailer, thrives in the unencumbered soil of New Zealand so hugely that single weeds sometimes cover a space five feet in diameter and send their roots four feet deep into the rich ground." And the Water-cress of our breakfast-tables, "in Europe a mere casual brook-side plant, chokes the New Zealand rivers with stems twelve feet long, and costs the colonists of Christ Church alone £300 a year in dredging their Avon free from it." As a proof that the battle is not always to the seemingly strong, we may quote the instance of the White Clover, which "has completely strangled its immense antagonist, the New Zealand Flax, a huge Iris-like Aloe, with leaves as tall as a British grenadier and fibres powerful enough to make cords and ropes fit to hang a sheep stealer."

Journal of the Royal Horticultural Society, edited by G. D. Morris and the Reverend W. Wilkes.

The high standard of the recent numbers of this journal show how real and successful the efforts of the friends of horticulture in England have been in restoring to this Society the character it enjoyed, and the usefulness it exerted fifty years ago. The best work such societies can perform in the present stage of horticulture is in promoting investigations and discussions on subjects of practical importance; and then in making the results of such discussions available to the world by publication in cheap and convenient form. That the Royal Horticultural Society is now doing this, a mere glance at the list of papers, and the names of their authors, published in this last part which has reached us, will make abundantly apparent.

There are three papers on Saxifrage, which are treated both from a scientific point of view by Mr. J. G. Baker, of the Kew herbarium, and culturally by Mr. George Paul and Mr. G. Reuthe. These are followed by three papers on the Hyacinth; Mr. Burbidge contributes a paper on the Narcissus, which is followed by a discussion of seedling Daffodils by the Rev. G. H. Engleheart, and by observations on Portuguese Narcissi by Mr. Alfred W. Tait. The Rev. Mr. Horner discusses the Auricula; and the number concludes with Mr. Veitch's admirable paper on Orchids, past and present, to which reference has already been made in these columns.

Notes.

Good hot-house grapes are retailing in New York at two dollars a pound.

On several plants of *Clematis paniculata*, observed near this city, the foliage remained green through the hard frosts of autumn and well into December.

The business of forcing bulbs for the market was so much overdone in this country last year that florists have bought more cautiously this fall. On the other hand, a combination of growers in southern Europe compelled importers to pay high prices for these bulbs, and as a consequence many Roman Hyacinths and other bulbs have been sold at less than cost.

At a ball given lately in Providence the three débutantes, in whose honor it was made, received from their friends 110 hand-bouquets. The money value of these flowers must have been, at current retail prices, not far from \$1,800. The fact is worth noting, as an indication of the lavish use and tremendous demand for flowers in this community.

In the *Bulletin de la Société Botanique de France*, M. Doumet Adanson describes a Fir which he considers a hybrid between *Abies Pinsapo* and *A. pectinata* as the pollen parent. The plant shows the distichous arrangement of leaves which characterizes *A. pectinata*, while the leaves themselves resemble those of *A. Pinsapo*.

William H. Moffett, United States Consul at Athens, reports the impossibility of making any official statement as to the agriculture of Greece, because "agriculture is here in the most undeveloped condition. Even in the immediate neighborhood of Athens it is common to find the wooden plow and the rude mattock which were in use 2,000 years ago. Fields are plowed up or scratched over, and crops replanted season after season, until the exhausted soil will bear no more. Fertilizers are not used to any appreciable extent, and the farm implements are of the very rudest description. Irrigation is in use in some districts, and, as far as I can ascertain, the methods in use can be readily learned by a study of the practices of the ancient Egyptians. Greece has olives and grapes in abundance, and of quality not excelled; but Greek olive oil and Greek wine will not bear transportation."

The northern suburbs of London will shortly be enriched by a fine park, presented by Sir Sydney H. Waterlow. In a letter addressed to the London City Council, the donor writes: "On the southern slope of Highgate Hill, in the parish of St. Pancras, I own an estate of nearly twenty-nine acres in extent, which was for many years my own home. This property, if judiciously laid out, would, I think, make an excellent public park for the north of London. The grounds are undulating, well timbered with Oaks, old Cedars of Lebanon, and many other well grown trees and shrubs. There is also one and a half acres of ornamental water, supplied from natural springs. The land is freehold, with the exception of two and three-quarters acres held on a long lease, of which thirty-five and a half years are unexpired. It is bounded almost entirely by public roads and a public foot-path."

A Cotoneaster, which has not flowered there yet, received at the Arnold Arboretum some time ago from the Veitchian nursery, under the name of *C. bacillaris floribunda*, is a remarkable and interesting plant at this season of the year. The foliage on the 1st of December was fresh and bright green, and on the 6th of the month, when all the deciduous leaved plants in the collection, with the exception of *Elæagnus umbellata* and two or three others, on all of which they were already much wilted and disfigured, had lost their leaves, those of this Cotoneaster, although they had been subjected to a temperature as low as ten degrees above zero, were just turning to a deep, rich wine color. This shrub, whatever its name and origin may be, is certainly worth growing for its late autumn and early winter foliage. It is vigorous and very hardy, of good habit, with large, acuminate, membranaceous leaves, and slender, spreading branches, covered with bright green bark, which at this season of the year turns claret color on the side toward the sun. It has the appearance of growing to a large size.

Professor Comstock, in a late Bulletin of the Cornell University station, gives an interesting account of a saw-fly borer which attacked the Wheat on the station ground in great numbers this year. The insect (*Cephus pygmaeus*) is well known in Europe, where it has been considered a serious pest. This is the first time, however, that it has ever been observed in this country. European entomologists describe parasites which infest this insect, but Professor Comstock found no trace of any among those in the station Wheat field. Artificial means for checking the spread of this species must,

therefore, be depended on. The burning over of the stubble or plowing it under after harvest would destroy the larvæ, but either remedy would also destroy the Grass or Clover usually sown with Wheat. It seems probable, therefore, that if the insect becomes a serious pest it will be necessary in badly infested regions either to sow Grass seed with Oats and burn or plow all Wheat stubble, or to suspend the raising of Wheat for one year, in order to destroy the insects by starvation.

A correspondent sends us the following note upon *Magnolia glauca* in its isolated northern station in Essex County, Massachusetts: "Magnolia Swamp contains several hundred acres, and it is one and a half miles in length and from ten to over 100 rods in width. I am of opinion that this swamp has furnished the shrub to all the others. In regard to three of the smaller swamps I know that this is a fact, the Magnolia shrubs having been transplanted by men. The inhabitants of Gloucester are firm in the belief that *Magnolia glauca* is a native shrub, but I cannot think so. I believe it was introduced by the old settlers, some of whom may have lived in and removed from a more southern state. 'The old Salem road,' deserted by the traveling public for over 100 years, skirts the eastern side of Magnolia Swamp. Along the line of this road are the ruins of old cellars, and in the swamp opposite one of the cellars, near a spring, may be found Magnolias which appear the oldest in the region. The root-crowns below the moss are often found to be two feet in diameter. In no other place can I find such a growth, and it is here, I think, that the shrub first started. It must be evident to any careful observer that *Magnolia glauca* is struggling here in an unnatural climate. The primary roots grow straight down into the muck, and in the fall are thickly covered with rootlets, snowy white in color. In the spring these rootlets are mostly dead, and a greater part of young shoots die down to the moss, and a certain per cent. of the old plants are winter-killed, which indicates that there is no harmony between shrub and climate."

The fruit of the Japanese Persimmon or Kaki can still be found in the markets of this city in great abundance, and of extraordinary beauty and excellence. It is raised in Florida and Georgia, where the Kaki has been planted in large quantities. It is by far the handsomest dessert fruit which the market affords at this season of the year; but it is a question whether the kaki really possesses as good a flavor as one of our thoroughly ripened and frosted native persimmons from Georgia or Virginia, a fruit which some people consider about the best that grows. A cross between the American and Japanese species might be expected to produce a fruit of larger size and finer color than that of the former, and with a richer flavor than any of the cultivated forms of Kaki. The Asiatic Persimmon, according to Rein, is "undeniably the most widely distributed, most important and most beautiful fruit tree in Japan, Corea and northern China. In Japan it endures night frosts at a temperature of from twelve to sixteen degrees C. It can be cultivated high up in the valleys and far beyond the limit of the Bamboo cane. It is a stately tree, after the fashion of a Pear-tree, with beautiful deciduous leaves, almost as large as those of some Magnolias, but of bright green color and resembling those of the Pear in shape only. The new leaves come in May; it blossoms in June; the season of ripe fruit is late in autumn, from the middle of September to the end of November. There are many kinds of Kaki, ranging in size from a small hen's egg to a big apple. Some are nearly spherical, others oblong, others heart-shaped. In color of the outer skin they run from light orange-yellow to deep orange-red. They are distinguished also by their taste, which is pleasant in its way and reminds one of tomatoes, as does the color also. They are eaten not only in a soft, doughy condition, in which those of the Migako-no-djô, in the province Hiuga, are prized most highly, but the fruit is gathered while still hard, to ripen afterward. The best in Japanese estimation are *Tarugaki*, that is, 'Tub Persimmons,' which have been converted from astringent into sweet fruit by being kept in an old saké tub. The bitter, astringent taste of all green kaki remains, even in the ripe fruit, in the case of most varieties, and it is from these that, during the summer, an astringent fluid, rich in tannin, is prepared (called Shibu), an acid of considerable importance in several industries. When over-ripe and dried in the sun, pressed somewhat flat, and then put away in boxes, the sweet kaki get to look and taste, in a few months, when skinned, like dried figs, and are used like them. The white powder which covers these dried persimmons in boxes is natural sugar that has exuded from the fruit. "In September the Kaki tree, laden with large, orange colored fruit, is a great ornament to the landscape. This beauty it preserves till it loses its leaves in October."

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Christmas.

ALL through western Europe, even before it had been Christianized, the winter solstice was regarded as the beginning of renewed life in nature, and was celebrated with joyful observances, and the origin of almost all the secular features of our modern Christmas festival may be traced to one ancient people or another. From the Romans, for instance, we get our practice of making Christmas gifts, such gifts being a feature of their Saturnalia, celebrated at the winter solstice. As conspicuous as the Saturnalia in Rome were the Yule-tide festivities of the ancient Teutons. Between the 25th of December and the 6th of January, they believed, their great gods walked the earth, and their footsteps might be traced by those wise enough to see. The memory of these dates still survives in England, even though the time has passed when the "Lord of Misrule" reigned from All-Hallow Eve till Candlemas, and the land gave itself up to the eager pursuit of jollity. Many plants are mentioned by old writers as figuring in these Christmas celebrations. Chief of all was the Mistletoe, excluded from the church edifice, as its Druidic significance was too clearly remembered, but used profusely elsewhere, and the great joy of mischievous youths when pretty maidens were about.* Almost as high in favor stood the Holly, which to the ancient Germans had been "a sign of the life which preserved nature through the desolation of winter, and was gathered into pagan temples to comfort the sylvan spirits during the general death." Holly was used as a dream-plant on Christmas Eve as well as at certain other anniversaries. The same idea which consecrated the Holly as an emblem of persistent life sanctified other evergreens too, and from time immemorial many sorts were used for the Christmas decoration of church and home.

* In Irving's "Christmas Day" he speaks of "the parson rebuking the sexton for having used Mistletoe among the greens with which the church was decorated. It was, he observed, an unholy plant, profaned by having been used by the Druids in their mystic ceremonies; and though it might be innocently employed in the festive ornamenting of halls and kitchens, yet it had been deemed by the Fathers of the Church as unhalloed, and totally unfit for sacred purposes. So tenacious was he on this point, that the poor sexton was obliged to strip down a great part of the humble trophies of his taste before the parson would consent to enter upon the service of the day."

But the great feature of the old-English Christmas was the Yule-log, often called the "Yule-clog," and described as a block rather than a log. This, too, was an inheritance from paganism, having been considered to sanctify the roof-tree and protect it against evil spirits. It was a sign of ill-luck if the "clog" went out during the festivities; and a brand from it was always preserved to light its successor at the next year's celebration. Tall "Christmas candles," wreathed in evergreens, were another feature of the English Christmas.

It seems a singular fact that amid the variety of entertainments provided and rites observed in England, the Christmas-tree should not have figured, for it is the heart and soul of Christmas in modern Germany and is a legacy of ancient Teutonic paganism. However, the main idea which inspired most of these rites seems to have been the use of evergreen plants and of lights in some shape as symbols of the renewal of life; and while the English Teuton retained the Yule-log, the tall, green-wreathed candle, and the evergreen decoration of the wall, his continental cousin clung to the evergreen tree with its myriad sparks of light. In "Round About our Coal Fire," an amusing little book on Christmas customs published in 1740, no mention is made of the Christmas-tree, although in the middle of the eighteenth century many German customs had been imported into England through the advent of her Hanoverian rulers. And even to-day, although occasionally seen in England, it cannot be called at home there.

In all parts of Germany, on the other hand, Christmas would not be Christmas without the tree—one could as soon fancy our Independence Day without powder and noise. The festival is strictly a family one, and Christmas Eve, not Christmas Day, is its culminating point. Where the modern Englishman thinks of his Christmas dinner, the modern German thinks of his tree instead. He likes it as tall as his ceiling will permit when it is placed on a table. He does not hang gifts upon it—nothing but lights and pretty ornaments and a little figure of the Christ-child at the top; but the gifts should lie beneath its sanctifying shade, so he rarely sets it on the floor. But if he cannot have it large and stately he must have what he can, no matter how poor he be—at least a tiny shrub lit with two or three cheap candles. Cheaper even than this is the artificial tree which can be preserved from year to year, made of a central stick with radiating wires, all covered with fluffy green paper, the candles being stuck on the upturned ends of the wire. As an example of the affection in which the Christmas-tree is held by all Germans, high and low, young and old, we may recall that when in 1870 King William and his army were beleaguering Paris, a vast evergreen was set up in the great salon of the palace at Versailles. The gifts which had come from home for the officers invited to make merry with their king were kept until it had been lighted, and the military decorations they had deserved were taken from its branches to be pinned on their breasts.

When Washington Irving describes an English Christmas he mentions no Christmas-trees; but he does not comment upon their absence, as an American would to-day. Popular as they now are, it is only of late years that Americans have known them. Indeed, the first Americans, at least in the northern states, gave up the observance of Christmas as a rite savoring too much of that ecclesiastical tyranny which they had crossed the ocean to escape. William Bradford wrote of the first Christmas the Plymouth Pilgrims spent in the New World "Ye 25th day began to erect ye first house for comone use to receive them and their goods." And of the succeeding year he wrote "One ye day called Christmas-day, ye Gov'r caled them out to worke (as was used.)" Thanksgiving Day took the place in New England which Christmas had held in Old England; and in the Dutch settlement at New York, New Year's Day was the chief festival of the year. But gradually the claim of the great December festival reasserted itself, until it has been

recognized by all denominations. The English Christmas dinner, the Roman custom of gifts and the German Christmas-tree have become familiar facts in every part of our land. We, too, decorate church and home with evergreens. Our chief dependence, next to the boughs of Spruce, of Fir and of our beautiful indigenous Hemlock, are plants which seem to have been made for the purpose and which Europe does not know—the so-called Ground Pine and other Club Mosses, which are easily woven into garlands. Our Holly is not so handsome as the English, but it is rapidly growing in favor, and of recent years Mistletoe has been brought from New Jersey and the south to our northern towns. The scarlet fruit of the Black Alder, Mosses of several kinds and colors, the evergreen foliage of the Kalmia and the Rhododendron, the bluish gray berries of the Juniper, dried grasses, and the handsome, parti-colored fruit of the Bittersweet—all these are now lavishly used at Christmas, although it is not half a century since the first “Christmas green” was sold in New York.

From the vast numbers of Germans who within this period have landed on our shores we have learned to know and love the Christmas-tree. Middle-aged Americans can remember a time when they had never seen one, and the trade in them began in New York in 1851, when two sled loads of young Balsams were brought from the Catskills and sold at the corner of Vesey and Greenwich Streets. At least 150,000 trees have been sold in this city this year, about half of them coming from Maine, and the rest from the Berkshire Hills, the Adirondacks and the Catskills. The Balsam Fir is the favorite, and the Black Spruce is next in demand. The great west naturally gets its supply at home, and there the Blue Spruce is the chief dependence, the trees being sold at wholesale at prices which vary from \$10 a hundred for specimens from four to six feet in height to \$60 a hundred for those which reach twelve to fourteen feet. Sold at retail in the large towns such sums are more than quadrupled, and particularly fine specimens, perfectly symmetrical, tapered to a single leader, full in foliage, and fresh in color, may bring any price within the means of the buyer.

The Petit Trianon at Versailles.

THE palace called the Petit Trianon in the park at Versailles was built for Louis XV. in 1766 (nearly a century later than the Grand Trianon which Louis XIV. built for Madame de Montespan), but is most intimately connected with the memory of Marie Antoinette, who created its famous “English garden” and Swiss chalets. These lie on one side of the building, while its main façade, shown in our picture on p. 619, has always looked out on a “French garden” connected with the grounds of the Grand Trianon. Although the details of this garden have been altered in recent times, it expresses as clearly as in its first estate typical French ideas with regard to the arrangement of grounds in the vicinity of a stately building.

There are avenues of clipped trees, straight paths and long rectangular flower-beds to harmonize with the lines of the architectural mass, to lead the eye directly toward it, and to show it, above the wide central lawn, as though set in a dignified and appropriate frame, while the curve of the great basin agreeably relieves the prevalence of right angles. It is evident that such an arrangement is far better in keeping with a building of this character than a “natural” landscape design would be. But it may be pointed out that its whole effect would be ruined had flower-beds or “ornamental” plants been allowed to intrude on the lawn. It is the simplicity of this that throws the bright-colored beds and the masses of foliage, as well as the building itself, into effective relief, and that gives breadth, repose and unity to the scene as a whole.

The Great Sequoia.

THE first white man who set eyes on the *Sequoia gigantea* was probably General John Bidwell, now one of the best known of the California pioneers. He has told me in a very simple and careful way the incident in his journey across the continent in 1841. He was a mere boy in years then, but a man in experience. The adventures of the party would fill

a volume. All that concerns the Sequoias is to this effect. The explorers were on the summit of the Sierras, worn out and anxious to descend into the valley. They were in an Indian country; the game was very scarce, and Bidwell went ahead to hunt and explore the region. Late in the afternoon, while in the midst of the deep cañons of Calaveras, and hastening to reach the river gorge to rejoin his companions, young Bidwell passed through the Calaveras grove of Sequoias. He was in such haste that he only noticed the immense size of the trees as he stood a moment beside one of the fallen giants. He said nothing of his discovery; but afterward, when in the employ of General Sutter at New Helvetia, he planned an exploring party to find the great trees he had seen at dusk that afternoon in 1841. Other business delayed the expedition. Then came the war, the conquest of California and the discovery of gold. Bidwell went first to the mines, and then was busy in securing his great Rancho Chico, and had no time to look for his big trees.

At last, in the spring of 1852, A. T. Dowd, a hunter of Murphy's Camp, Calaveras, while following a wounded grizzly, passed through the forests of *Pinus Lambertiana* and *Pinus ponderosa*, and came upon the Giant Sequoia-grove, since so famous. He was laughed at when he told his story; but the next Sunday he rushed wildly down the hill and called to “the boys” that he had “shot an enormous grizzly.” They went with him to the base of the largest tree in the grove: “There, boys,” he said, “is my grizzly!” When General Bidwell heard the story of the discovery he said at once: “Those are my big trees; I am very glad they have been found.”

The California Academy of Sciences received specimens of foliage, bark and cones of the Sequoia from the Calaveras grove before June, 1852. The late Dr. Kellogg forwarded specimens to Professor Asa Gray and to Dr. John Torrey, who at once recognized a second species of Sequoia. Veitch had some time before sent William Lobb, as a collector of plants, to the Pacific Coast. He was then at Monterey, I think, with Dr. C. C. Parry. Dr. Kellogg told him about the Sequoias, and he procured specimens for Dr. Lindley, who, failing to understand its true relationship, described the tree in the *Gardeners' Chronicle* of December 24th, 1853, as *Wellingtonia*—the name by which it is still almost universally known in English gardens.

When I was in Fresno, two years ago, I was told by the proprietor of the leading newspaper of the county that he had just returned from the Redwood-forests in the Sierras, and that there were thousands of acres of timber waiting to be taken up. “It is better timber than the Redwood of the Coast Range,” he said, “and constitutes one of the great resources of Fresno and Tulare Counties. There are several mills at work in the forests, and we shall have a narrow gauge railroad there in a few years.” I looked further into the matter, and discovered that the Redwood referred to was the largest and finest forest of *Sequoia gigantea* in California, and that it was rapidly passing into private ownership and was being cut into lumber and split into fence posts. During the past two years the destruction of these forests has gone on with accelerated speed, owing to the rapid settlement of the foot-hills by farmers, who are far removed from the railroad, and find it cheaper to get *Sequoia gigantea* Redwood from the mountains than *Sequoia sempervirens* Redwood from the coast.

There are ten groups of *Sequoia gigantea* in the Sierra Nevada Mountains, and the descriptions of most of them are found in the writings of Muir, Whitney and Clarence King. Beginning at the north, these groups are named as follows: The Calaveras grove, the South Calaveras grove, the Tuolumne grove, the Merced grove, the Mariposa grove, the Fresno grove, the Dinky grove, the King's River grove, the new King's River grove and the large Kaweah groves. The latter consists of a number of small Sequoia-forests extending over a belt of country five miles wide and fifty miles long. It is in this region that the Kaweah colony of Socialists have secured most of the timber lands,

and are now building large mills. It is not probable that in ten years any of these ten forest groups will remain except the Calaveras groves, and perhaps one or two other small groups, now used as summer resorts, unless immediate steps are taken to prevent the further filings of timber claims. The records at the Land Office show that in the past twenty-two months 131,680 acres of heavily timbered land have been bought from the Government, much of it obtained by a systematic evasion of the laws. Four-fifths of this land has been taken up along the western slope of the Sierra Nevada, and includes most of the *Sequoia gigantea* districts.

The Calaveras grove covers fifty acres, and contains ninety-three large trees. One tree in 1854 was stripped of its bark to a height of 116 feet, by a man who thought he could make a fortune exhibiting it. The speculation, fortunately, failed, or the grove would have been ruined by similar enterprises. This tree is estimated to contain 537,000 feet of marketable lumber, and stands 325 feet in height, girthing eighty-four feet without the bark. A fallen tree was about 400 feet in height, and the circumference of the trunk near the base is 110 feet. The south grove contains 380 Sequoias of good size—some very large. One of the largest of the standing trees in the Calaveras groves is the "Grizzly Giant," thirty-three feet in diameter near the ground. There is a tree in the Kaweah region that is thirty-six feet in diameter, and there may be even larger ones.

The Giant Sequoia yields seeds in such abundance (Mr. Bradley counting 324 seeds in a small cone) and the vitality of fresh seed is so uniform that millions of trees could be grown and planted on the mountain slopes of California. In the Sacramento, San Joaquin, Sonoma, Santa Clara and other large valleys the tree thrives without especial care. In most places it has grown faster than the *S. sempervirens*. If the state were to undertake to reforest the waste lands, the Giant Sequoia would offer one of the best trees for that purpose. The reason why it now grows only in such isolated and small groups, instead of in extensive forests, is because its small, light seeds cannot easily root themselves on the dry, leaf-covered soil of the region. The climate has changed; the tree is slowly disappearing. Wherever mountain fires, or cloud-bursts, have swept away the thick layer of coniferous leaves and scales from the ground, young Sequoias have sprung up. This tree, like the Monterey Cypress, has every element of vitality but one—its light, thin seeds are not adapted to survive under the present climatic conditions. The successful type of tree-seed is that of the *Pinus Sabiniana*, which holds its own so well on the hot foot-hills of California. The Great Sequoia lacks the capacity of *S. sempervirens* to reproduce itself from suckers from the roots, and if it is ever to become an important factor in the timber supply of California, its seeds must be planted under favoring conditions. None of the Pacific Coast conifers are more easily grown when the seeds are sown in moist soil.

Another illustration of the dangers to which some tree-seeds are subjected may be found in the case of *Eucalyptus globulus*. Groves of this tree were planted on the dry California hill-sides twenty years ago. They now perfect millions of seeds, but the seeds never grow; they never reach the surface of the dry, leaf-covered soil, or insects carry them off. But many pounds of this seed are gathered by the nurserymen, and sown with better results than with imported seeds. In the moist valleys the *Eucalyptus* grows from self-sown seeds, but never on the hill-sides. Yet, seedlings three months old are fit to plant anywhere. Without replanting, the *Eucalyptus* forests of California will mostly disappear in the course of time, just as the Sequoias are disappearing.

The guide books to the Calaveras and other groves still place the age of the Sequoia trees at between three and four thousand years. Professor Whitney's count, it may be remembered, gave a result of 1,255 years. Mr. Bradley made a careful study of the same tree, counting the

two ends of the lowest section of the trunk, eighteen feet apart. His results were 1,240 and 1,226. This is a mature tree, fifteen feet in diameter. A large specimen of *Sequoia sempervirens*, 1,200 years old, measured eleven feet in diameter.

Mr. Bradley takes the Pavilion Tree, which Whitney first measured, divides the cross-section into annular zones of one hundred rings, and computes the area of each zone. In this way he arrives at the wood growth for each century. He assumes that 300 years brought the tree to its full height. His ratio of volumes of growth for twelve centuries, the maximum being 1,000, then becomes as follows: 77, 308, 557, 963, 1,000, 794, 841, 908, 828, 817, 907 and 958. The fourth and fifth centuries may be supposed to mark the period of expansion of the head, after the tree had reached light and air above the surrounding forests.

San Francisco.

Charles Howard Shinn.

Notes upon Some North American Trees.—XV.

I. *MAGNOLIA GRANDIFLORA*.—Linnæus, in the first edition of his "Species Plantarum," grouped provisionally all the species of *Magnolia* known to him under one comprehensive name, *Magnolia Virginiana*, distinguishing the different forms under varietal names. That he was not sure that these trees all belonged to the same species, and that his name was a provisional one only, is made clear by his remark that "only eye-witnesses of these trees in their native country can determine whether these (α , β , γ , δ , ϵ) are distinct."* Now what becomes of the name *M. Virginiana*, the oldest Linnæan name for any of our *Magnolias*? If these varieties had turned out after further investigation to be merely forms of one polymorphous species, then the Linnæan collective name would have held of course; but being provisional only, it was to be dropped if the provisional species had to be broken up. That this was Linnæus' intention seems clearly enough shown by the fact that having discovered before the publication of the second edition of the "Species" that his varieties were really distinct species, he gave them specific names, using, in every case but one, the varietal names of the first edition.

The exception was the variety β . *fetida*, which, in the second edition, became *Magnolia grandiflora*. There was confusion, evidently, with regard to this tree at the time of the publication of the "Species," for Linnæus quotes under his variety β . *fetida* after Ehret's figure of *M. grandiflora* in Catesby's "Natural History of Carolina," t. 61, Clayton's description of the Umbrella-tree, "*Magnolia flore maximo albo foetidio, foliis deciduis amplis, florum ad ramulorum seriem sphaerice cingentibus, fructu majori*" (*Flora Virginica*, 61). This confusion may account for Linnæus' considering that the flowers of the evergreen *Magnolia* had a disagreeable odor, a mistake which he very likely discovered before the publication of his second edition, the discovery inducing him to select a more appropriate name in place of the varietal name of the first edition. But if the oldest specific or varietal name is to be adopted, *Magnolia grandiflora* must give way to *Magnolia fetida*. The change is a most unfortunate one in every way and I have hesitated a long time before making it. In nomenclature, however, one principle or the other must be strictly adhered to, and nothing can safely be left to the judgment or the taste of the individual author. If an author believes that the oldest specific or varietal name given to a plant on or after 1753 (the date of the publication of the first edition of the "Species Plantarum") is the right one to use, the rule must be applied absolutely, or it is better to make no changes at all, and to allow the names which have come into common use to stand, whether they are the oldest names or not. Ornithologists invariably adopt the oldest specific name. Botanists, however, are still divided in their opinion on this subject. Those who agree with me that under all circumstances the oldest specific name is the

*1.—"Utrum bre: α , β , γ , δ , ϵ , sint distinctæ, determinant antoptæ in folo naturali?" Linnæus, "Species Plantarum," 536.

proper one to use, will regret the change, but accept *Magnolia foetida* in spite of its inappropriateness and the common use in all countries of *M. grandiflora*, which, by the way, is not itself a very appropriate name, as many *Magnolias* have larger flowers.

Linnæus' *Magnolia γ grisea* is probably only a *Magnolia* in part. It was based on a description in Ray ("Hist. Pl." II, 1798, not 1718, as quoted by Linnæus), of a plant cultivated in Bishop Compton's garden in Fulham. Ray's description of the fruit, "fructus hujus non conus est ut præcedentium (referring to the Tulip-tree) sed bacca calyculata," might refer to Persea; but the "florem autem speciosum tulipæ æmulum" seems to indicate that two distinct plants were confused in this description.

X. *ANONA LAURIFOLIA*, Dunal.—Our Florida *Anona* was first made known by Catesby, who published in his "Natural History of Carolina" two admirable figures of the fruit and foliage with a flower in the second figure (II, t. 64-67). Upon the first of these figures Linnæus founded his *Anona glabra* ("Species Plantarum," I, 537), giving Carolina as the habitat. But Catesby does not say where he got his plant, which grows both in Florida and in the Bahamas, but not in Carolina, so that the habitat given by Linnæus was supposition. The fact of the wrong habitat and the absence of flowers from Catesby's first plate led Griesbach ("Fl. British West Indies," 5) to suppress the Linnæan name entirely and to refer this plant to the *A. laurifolia* of Dunal ("Mon. Anon.," 65). But *A. laurifolia*, to which Dunal refers Catesby's second figure (t. 67), is the same plant as the *A. glabra* of Linnæus, so there can be no question of the propriety of restoring the Linnæan name, and our Florida tree becomes *A. glabra*, Linnæus, to which it was long ago rightly referred in Chapman's "Flora of the S. States."

XV. *GORDONIA PUBESCENS*.—This name was published by L'Heritier in 1785 in the sixth Fasciculus of the "Stirpes Novæ." The "Arbustum Americanum," in which Marshall published this plant as *Franklinia Altamaha*, bears the same date, 1785; but as Marshall's name is quoted by L'Heritier as a synonym, it is clearly the older name and *Gordonia pubescens* must become *G. Altamaha*.

XXIV. *XANTHOXYLUM CARIBEUM*, Lamarck.—I had an opportunity a few months ago to examine in Paris the Lamarckian herbarium now preserved in the Muséum d'Histoire Naturelle, and to see the specimen upon which Lamarck founded his *X. Caribeum*. There are leaves only; but these have membranaceous, acuminate and sharply serrate leaflets, with occasional spines on the petiole, and are quite distinct from the leaves of our Florida tree, for which, therefore, another name must be found. *X. Floridanum* of Nuttall, published in his "Sylva" in 1841 and based on the Florida plant itself, would be the name if there was not an older one. I came across in the Kew herbarium this year a specimen, collected in 1886 in Porto Rico, identical with our Florida plant, which Dr. Urban had named *X. cribrorum*, Sprengel, whose short description of his species is fairly descriptive of the Florida plant.* Specimens of our Florida tree have been sent since to the Berlin herbarium, and are pronounced to be identical with the original specimens of *X. cribrorum*, which, as this name was published in 1825, takes precedence of Nuttall's *X. Floridana* published in 1841, and our species becomes *X. cribrorum*, Sprengel.

XXXVI. *ILEX DAHOON*.—There has long been confusion in the names of the two Hollies of the southern states vernacularly known as the "Dahoon" and the "Cassina." The confusion started with Linnæus in the first edition of the "Species Plantarum." These two plants were there joined under the name of *Ilex Cassine*, the second or real *Cassina* being considered a variety of the first, the Dahoon. That Linnæus intended the Dahoon as the type of the species is shown by his reference to it of Catesby's figure in the "Natural History of Carolina" (I, t. 31), where the

Dahoon is well represented and the vernacular name "Dahoon" is quoted; while to his variety he refers Catesby's figure of the true *Cassina* (II, t. 57). Walter ("Flora Caroliniana" 241, published in 1788) thought to set the matter straight by reversing the names so as to bring them into accord with the vernacular nomenclature, transferring the specific name *Cassine* to the Linnæan variety properly made a species, and making a new name, *Ilex Dahoon*, for the Dahoon Holly. The Linnæan name, *I. Cassine*, should be restored to the plant upon which Linnæus bestowed it, making *I. Dahoon I. Cassine*, and the two published varieties become *Ilex Cassine* var. *angustifolia*, and var. *myrtifolia*. It remains to find the oldest name for the *Cassina*. It was described by Marshall in the "Arbustum Americanum," published in 1785, as *Cassine Paraguay*; but *Cassine Paraguay* is the name ("Mantissa," II, 220) to which Linnæus refers the figure in Miller's "Icones" (t. 83, f. 1), which has opposite leaves, and is not clearly referable to a North American plant, so that Marshall's name cannot be used.* The next name is *Cassine Caroliniana* of Lamarck, but as *Ilex Caroliniana* is Miller's name ("Dict.," ed. 8) for the Dahoon, it cannot, being a synonym of another species, be taken up for the *Cassina*. The next name and the one which should be adopted is *Ilex vomitoria* of Aiton ("Hort. Kew," i., 170), a good name as descriptive of the peculiar properties of this species. *Ilex Dahoon* thus becomes *Ilex Cassine* and *Ilex Cassine* becomes *Ilex vomitoria*.
C. S. Sargent.

New or Little Known Plants.

Philadelphus Lemoinei ×.

M. LEMOINE favors us with the following note of this hybrid *Philadelphus*, of which a figure appears upon page 617 of this issue. "The new *Philadelphus* is the result of a cross made in 1884 between *Philadelphus microphyllus* and one of the garden varieties of *P. coronarius*, the latter being the pollen-parent. The seedling flowered in 1886, when it formed a compact, nearly spherical, mass of foliage as wide as it was high. The leaves, which are narrowly oval, are about one-quarter the size of those of *P. coronarius* and nearly five times as large as those of *P. microphyllus*. The flowers, which are ranged along the branches, are large, with spreading petals. These are oval, somewhat cut at their edges and pure white. When the plant is in flower it produces a wonderful effect by the profusion and elegance of its fragrant flowers, which exhale an odor as agreeable as that of Orange-blossoms, reminding one of the odor of wild Strawberries. This new shrub is absolutely hardy here, and resists, without any protection whatever, the cold of our most severe winters.

"The cross which has produced *P. Lemoinei* has yielded a number of other plants, differing in habit, in size and in the arrangement of the flowers. We have succeeded also in crossing *P. Lemoinei* with some of the large-flowered garden varieties."

Philadelphus Lemoinei has not flowered yet in the United States and our illustration is from a sketch made last summer in M. Lemoine's garden in Nancy.

Foreign Correspondence.

London Letter.

A WEEK'S steady freezing, the thermometer registering nightly from eight to eighteen degrees of frost, has put an end to almost all out-door planting, and killed down what few flowers still remained out-of-doors. At Kew, where the amount of transplanting and planting annually done is enormous, it is usual to begin about the end of September and continue all through the winter until the beginning of May, or even later. Frost does not often interfere with this work before Christmas, and it is many years since the ground was

*1. "*Zanthoxylum cribrorum*, foliolis 3-jugis, oblongis obtusis, coriaceis crenatis, pellucido-punctatis, petiolis asperis."—"Systema," I., 946.

*It is evident that the second figure on Miller's plate, the "*Cassine foliis lanceolatis alternis sempervirentibus floribus axillaribus*," refers to the *Cassina*, which is well described in the early editions of Miller's Dictionary. Linnæus, however, quotes figure 2, and his description was intended, apparently, to cover this, a very doubtful plant, and the *Cassina*.

rendered too hard for planting so early as the beginning of December. Already the enormous collection of *Berberis* here has been lifted and replanted so as to afford more space to each plant. Many of these plants are very impatient of disturbance at the root, so that unless lifted with a good ball of soil they are almost certain to suffer severely. What a number of garden names there are in the genus *Berberis*! And that it is not easy to reduce the names to botanical order is shown by the fact that those best qualified to do it fight shy of the work. Probably a considerable number of these garden forms are really hybrids or accidental crosses of some kind, and their parentage cannot be traced. In the autumn, when clothed with their bright scarlet, orange, yellow, purple or black berries, a collection of large plants of *Berberis*, such as these at Kew or in the Botanic Garden at Cambridge, presents a most beautiful picture. The birds, however, soon rob the plants of their charm, and at Kew, where the birds are protected, they clear the bushes of all fruits in an incredibly short time. A large group of bamboos, which has just been planted on the side of one of the lakes, promises to be a magnificent feature next year. For purposes of this kind no plants are better suited than the hardy kinds of Bamboo. In the gardens on the Riviera they form a feature at least as striking in beauty and elegance as the Palms, also largely used there.

PALMS for in-door decoration (see p. 559) are almost uni-

too rare in gardens, while seeds of them are not yet procurable. In the four hundred and odd species of Palms represented at Kew there are many which are greatly admired on account of their elegance and other attractions, but they are not in the trade. In tropical countries, as, for instance, in Ceylon, Calcutta, Brazil, Brisbane, etc., collections of Palms are being gathered and planted with a view to the supply of seeds for the European market, and the seeds of many Palms which are now rare will soon be plentiful. Evidently popular taste runs just now on Palms, many of the growers for the London market devoting themselves almost exclusively to these plants.

A PERFECT PLANT LABEL is still a desideratum, here, as well as in America. Mr. R. T. Jackson's paper on "Methods of Labeling Trees and Plants," read before the Massachusetts Horticultural Society last year, is interesting and suggestive. In it Mr. Jackson appears to have come near to what we have found the most useful label at Kew, both for in-door and out-door plants. For temporary labels, such as are used for annuals and small nursery stock, there is nothing better than wood; but for permanent labels intended for collection plants, something more durable than wood is required, and the best material appears to be zinc. Iron, tin, slate, porcelain and teak have been and are still in use at Kew, but on the whole they are not as satisfactory as zinc. As Mr. Jackson says,



Fig. 154.—*Philadelphus Lemoinei* X—See page 616.

versally preferred before everything else. In England there are scores of nurseries where these plants are grown by tens and even by hundreds of thousands and disposed of to market dealers. Mr. Taplin omitted to mention the several kinds of *Kentia* (so called), which, in England, are very largely grown; one nurseryman alone sells about ten thousand of them annually. *K. Fosteriana*, *K. Balmoreana* and *K. Canterburyana* are the three which are most used, the last named being less popular than the other two. These plants bear the exposure and hard treatment incidental to decorative uses better than any other Palm, not even excepting the *Livistona* (*Latania Borbonica*). They are raised from seeds imported from Australia, Java, Brazil, etc., and grown in tropical houses until large enough for use, when they are hardened by exposure to a lower temperature. Their elegant, bright green, pinnate foliage and their graceful habit are just what is most desired for the decoration of tables, side-boards, window recesses, etc. Other Palms grown largely here are *Cocos flexuosa* or *plumosa*, *Geonoma gracilis*, *Phoenix rupicola*, a most elegant Palm, *Seaforthia elegans*, *Thrinax graminifolia* and *Hyophorbe Verschaffeltii*. These are all popular and abundant. It would be easy to add the names of a great number of Palms which would prove quite as serviceable as these, which every one knows and grows, but unfortunately many of them are

zinc "is reasonably imperishable, cheap and very easily handled." The chemical ink recommended for writing upon polished zinc, namely, a solution of chloride of platinum, or chloride of copper, or other patent mixtures of a similar nature, have not, however, proved a success, no matter how applied. Varnish rubbed over the face of the label after the ink has dried, preserves it from oxidation for a year or so, but as a rule the names are almost unreadable after a year's exposure outside. An improvement on this ink is the use of enamel paint, applied as follows: The labels are cleaned with emery paper and then coated on the face with white enamel paint. This is allowed to get quite dry, and then over it is painted a coat of the black enamel paint. The writing must be done while the black paint is wet, using for the purpose a pointed stick, such as a bit of bamboo shaped like a pen. In writing, the black paint is simply removed by the point of the stick. With a little practice the letters are as easily and clearly formed as if with pencil on white paint. The label should be thoroughly dried before being exposed to moisture. For trees and shrubs such as the labels can hang upon, the form preferred is a piece of zinc from three to four inches square, half an inch at the top to be bent over at an acute angle to afford protection from the weather; one or two holes should be made near the top, for wire or nails. For pots and herbaceous plants

strips six or eight inches long, and shaped like the ordinary "tally," are best. These are easily cut out of a sheet of zinc with a pair of strong scissors. Labels thus prepared have been in use at Kew two years and they are as perfect now as when they were first written. In the tropical houses, where the atmosphere is saturated all the year round, these labels are quite as good as in a dry house or out-of-doors. The first experiment with them was made with the Filmy Ferns, for which durable and neat labels were much wanted. They have stood this test. In appearance these labels are all that need be desired. They are not too conspicuous and therefore do not offend the eye as white labels do; on the other hand, they are easily read. In public gardens, such as Kew, labels are of considerable importance, as also they are wherever valuable collections of plants are grown. So far as our experience goes, this zinc label, when prepared as here directed, comes nearest to what is wanted.

THE DISEASES OF PLANTS are many and mysterious. Every gardener has had experience of their ravages in some form or other, and probably, also, has been disheartened by his failure to check the enemy by any means known to him. Canker, club, mould, rust, scab, spot; these are familiar terms in horticulture, but few, if any, horticulturists have a clear knowledge of what these diseases spring from, much less how they can be cured. It is only recently that one of our most eminent amateur horticulturists expressed to me his conviction that "spot" in Orchids was due to the attacks of some parasitic fungus, and that he always took the precaution to remove any leaf which showed signs of the disease. Had he been right in attributing the disease to a fungus, this action would be commendable. But it has been decided by one of our most eminent physiological botanists that Orchid "spot" is certainly not fungoid in its nature. This case is noteworthy as showing how much we are in ignorance of the real nature of the numerous diseases to which plants under cultivation are subject. The publication, therefore, of a trustworthy book dealing with some of the diseases of plants, may be hailed with pleasure by gardeners. Professor Marshall Ward, who is one of the most eminent of the modern school of botanists, and who has paid special attention to vegetable pathology, has written a delightfully readable book on this very subject. It is published by the Society for Promoting Christian Knowledge, and is one of a series of publications called "Romance of Science." The diseases treated upon by Mr. Ward are the commonest and best known, such as potato disease, smut, rust, hop disease and lily disease. These are diagnosed and prescribed for in a manner easy to understand, and at the same time thoroughly. One is surprised to read in the introductory chapter that "between 1866 and 1889 the amount of research in this department has been enormous, and the literature of the subject has become overwhelming." I once had occasion to collect information on this very subject, but could find exceedingly little, in English at any rate. Mr. Ward has made a beginning, and we may hope that he will extend his investigations to other of the diseases of plants besides those treated upon in his book. A really comprehensive, reliable book on the whole subject of plant diseases, and written for horticulturists and farmers, would be of great service. Mr. Ward himself says: "The time is rapidly approaching when a farmer or a gardener will as little dare to neglect the study of the physiology and pathology of plants as a surgeon dare practice without a knowledge of anatomy, or a sailor hope to become a captain without studying navigation. Moreover, these are not studies which will bear trifling with, and he who hopes to understand them must take the necessary trouble to learn how to trace the connection between cause and effect, and scientifically reason from the simple to the complex. In this department the days of empiricism are indeed numbered." Mr. Ward's book is precisely what is wanted as a beginning. It is published in New York by Young & Co. The price here is two shillings and sixpence.

ANTHRACITE COAL.—The fitness of this as a substitute for coke has been the subject of discussion here for some time, as the result of a rise in the price of the latter. It is stated by some who have used anthracite for years that a considerable saving is effected as compared with the cost of coke. But it does not appear to be satisfactory in all cases. An eminent American nurseryman when at Kew a little while ago informed me that anthracite is universally preferred to coke in America. It would be interesting to English readers of GARDEN AND FOREST if some one acquainted with the peculiarities of coke and anthracite, when used for horticultural heating, would relate his experience. We find a difficulty in using the anthracite for furnaces originally intended for the consumption of coke.

London.

W. Watson.

Cultural Department.

Some Wild Flowers of California.

Phacelia Parryi is one of the loveliest of the annuals of southern California and a universal favorite among those who have made its acquaintance. Every one who sees it face to face feels an instant admiration for its beauty, and a kind of friendship for it such as we experience in our intercourse with the Pansy and other flowers which confront us with something akin to a human expression.

The plant delights in warm, sunny exposures, on the banks of cañons, among the foot-hills, in fertile valleys and on the hill-sides. It extends in San Diego County from the seashore to the confines of the Colorado Desert, southward to near San Quintin Bay, Lower California, and perhaps beyond. It has an open, rotate corolla of a rich and brilliant royal purple, well set off by the dark green foliage. Occasionally a flower may be found of a paler color, sometimes nearly white. With nearly all of our native flowers that are normally purple in color, I find albinism a common occurrence, though rarer in some species than in others. This rule, if such it may be called, is also true of purplish pink flowers, like *Erythraea*.

In the spring of 1884 there was an unusually abundant rainfall, which played havoc with our roads, but the botanist who was driven to little used thoroughfares found himself repaid by the wealth of luxuriant vegetation which followed. A new grade had been built the previous season from San Diego City, leading into the old mission valley, and along the freshly cut embankment I found this beautiful plant growing in the greatest abundance. Since then it has been almost totally absent from this locality, not more than a score of plants growing on this road during the spring-time of 1889. Why this sudden disappearance? is the question which naturally arises and remains unanswered. The existing conditions seem equally as favorable as in other localities where it still thrives—and often in close proximity to well traveled roads.

For cultivation I should call this one of the most desirable of the many pretty annuals which California affords to the horticulturist. It is capable of most effective display, and under favorable conditions will produce a profusion of flowers for months.

Dodecatheon Clevelandi shows itself, generally, in early spring over the hills, mesas and valleys of southern and Lower California, especially near the coast. The flowers pass from clear pearly white through lovely shades of pink and rose-red into a brilliant purple, and a large field thickly dotted with their nodding heads is a vision of loveliness familiar to Californians. For many years this and numerous other forms throughout the western states have been known to botanists as the *Dodecatheon Meadia* of Linnæus. Within recent years Mr. E. L. Greene has studied our Californian forms, describing several as new species, and naming this in honor of the earliest resident botanist in San Diego, Mr. Daniel Cleveland, whose early collections brought many new plants to light. It is scarcely worthy of specific rank, but for cultural purposes may be allowed that honor. Every child is sure to gather large handfuls of the fragrant flowers when spring comes, and each has some pretty name for them, such as Rabbit-ears, Shooting-stars, Johnny-jump-ups or Mad Violets.

This flower should become as general a favorite as the Cyclamen. The perennial roots are easily transplanted, and no difficulty should be experienced in making it thrive in eastern houses and gardens. In California they may be planted as borders to beds, or grouped in masses, or dotted thickly over a garden as if they were wild. The broad leaves form a pretty rosette before the one or more spikes of flowers appear. The flowers are admirably adapted for bouquets and the use of florists, and their good qualities are already recognized away from their native home.

Gilia dianthoides bears a flower which in size and beauty is out of all proportion to the plant itself, which consists only of a slender, wiry stalk, half an inch or so in height, with narrow, inconspicuous leaves; but from this stalk appears one or several rotate, rosy pink flowers, half an inch across. The flower is of such a delicate texture and is borne so near the ground that it is scarcely available for any decorative purpose; but a field carpeted with them as they shine in the morning sunlight, cannot fail to kindle admiration. Under favorable conditions the plant attains a larger size and forms a dense mat spreading out over the ground. In cultivated fields I have found a single plant spreading in this way more than a foot across—completely hidden by the numerous wide-awake flowers. It is not rare to find a plant with pure white flowers, especially among the foot-hills. A similar species (*Gilia Orcuttii*), with white

flowers slightly variegated with purplish red, was collected in 1883 on a mountain in Lower California, but has not since been seen. Another equally beautiful species (*Gilia bella*) was discovered on the high table lands of northern Lower California among the Pinyon Pines, and I have since seen it abundantly on the mountains bordering the Colorado Desert. It has the same characteristics as the last, but more brilliant and darker flowers of smaller size.

San Diego, Cal.

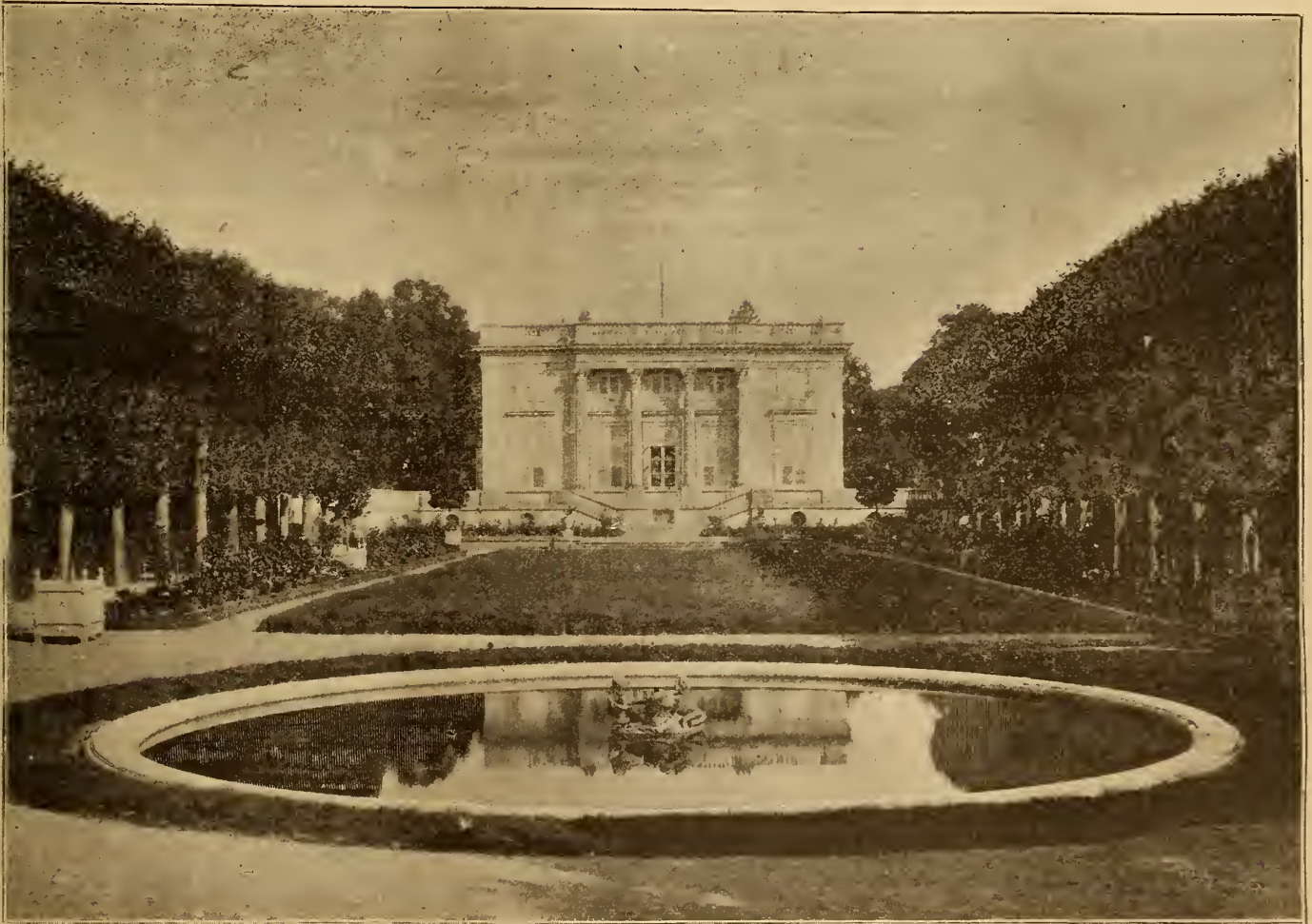
C. R. Orcutt.

Large Glass in Green-houses.

MY first green-house was a small one, twelve by thirty-three feet in dimensions, with benches against the sides and a path down the centre. It was covered with a span-roof made of hot-bed sash of three by six feet dimensions, which were set with six by eight inch glass; it had a ridge made of boards two feet wide, which cast a shadow always, and the

growth was most marked. In the new house the Lettuce grew steadily and rapidly in the almost unobstructed sunlight, and made good heads for market, much better than had been obtained from the old house. The plants were free from the green fly and were grown without fumigation or artificial heat from September to December, while that in the span-roof house—a few plants put in as an experiment to test the comparative merits of the two houses—was as poor as usual. Although the house has been occasionally fumigated and supplied with some artificial heat, the Lettuce is still too small for market and is also troubled with the green fly.

This is an object lesson that is very convincing to all who have seen the contrast in growth and vigor in the tree houses. The chances were all in favor of the Lettuce in the old house, if care and attention could avail, but when simply left alone to grow in the free sunlight, that in the new house was altogether superior.



The Petit-Trianon at Versailles.—See page 614.

wood of the sash-bars and heavy rafters caused more shade still. Standing north and south, the shade, as the sun passed across the sky, was shifted from west to east, and in dark days and cloudy weather, with the sun low in the sky, the house was still more in the shade than in the fuller sunlight of the spring months, when the sun was higher.

This house is now used for growing Geraniums, Fuchsias, Verbenas, Petunias, Pansies, Callas, and other vigorous flowering plants; also for Dandelion, Radish, Cress and the like, among vegetables. I knew the lack of sunlight affected the growth and vigor of the plants to a considerable extent, but did not realize how much till the past season.

Last September I completed a structure, thirteen by twenty-five feet in dimensions, the south front covered with glass, and the back kept dark for storing things that did not need light, like Celery, Endive, Spinach and Salsify.

The front, five by twenty-five feet on the south side, was covered with double thick glass, sixteen by twenty-four inches in size, on slender rafters six feet long. I never had success with Lettuce in the span-roof house, but the other things mentioned always did well. In September last I set Lettuce in the new house, directly under the glass, and the contrast in

Lettuce has always been considered to be specially difficult to grow under glass, from its tendency to damp off and rot. Slow growth and the green fly have also been great hindrances, but in the light of this experience, sunlight seems more essential than any special care.

Houses twenty-two by two hundred feet, covered with sixteen by twenty-four-inch glass, on rafters three by four inches, facing the south or south-west, ten feet high on the back and three on the front, with sunken paths, and arranged to be aired across the beds, make the best houses so far devised for Lettuce-growing; and the same principles applied to a smaller house should produce similar results.

West Springfield, Mass.

W. H. Bull.

Orchid Notes.

Vanda cœrulea.—Taking a survey of the hundreds of Orchids known, one cannot fail to be struck with the remarkable scarcity of blue flowers among them. Such colors as red, orange, scarlet, yellow and their intermediate shades are well represented; various hues of crimson and purple (which, artificially, cannot be obtained without the assistance of blue) are frequently met with; and white—although artists

say such a color does not exist—forms the ground color of many flowers, but is very rarely seen absolutely pure. But blue—real blue—is conspicuous by its absence. The number of Orchids whose flowers are of this tint would not take long to enumerate. It is chiefly noticeable among such South African plants as *Herschelia caelestis*, *Disa longicornis*, *D. maculata*, *D. venusta*, and perhaps a few others. Bright blue is the characteristic color of the Australian Caladenias, and light and dark shades of the same color are found in the small-flowered Burmese *Vanda carulescens* and the larger and more beautiful *V. carulea*, the latter forming the subject of the present note.

It was named by its discoverer, Griffiths, who first found it in 1837 near the River Borpane, where, at an elevation of 2,500 feet, it was growing in forests of Pine and Oak on trees of *Gordonia*, a Ternstroemiaceous genus. Hooker and Thomson, when traveling in that region several years ago, met with it in a wild state on the Khasya Hills at a height of 3,000 to 4,000 feet. It grew in such abundance that in a short time they obtained no fewer than 360 spikes, each bearing from six to twenty large flowers.

The introduction of *V. carulea* to cultivation is due to Messrs. Veitch & Sons, of Chelsea, who received plants of it from their famous collector, Thomas Lobb, about forty years ago. Owing to the unique color of its flowers, it caused at the time a great sensation, and even nowadays a well grown specimen calls out many expressions of admiration. With the exception, perhaps, of the magnificent *V. Hookeriana*, noted at page 392 of GARDEN AND FOREST, and the gorgeous *V. Sanderiana*, it is perhaps the finest *Vanda* yet known. Well grown specimens are from eighteen to thirty inches high, their stems being furnished with distichous, oblong, leathery leaves, about six inches long, and deeply bilobed at the apex. The flexuose peduncle springs from the axil of a leaf about midway on the stem, and bears a variable number of flowers, each from three to four inches across, and supported on pale violet, sharp-angled pedicels about three inches long. The sepals and petals are more or less oval in shape, and vary in color between light and dark blue, handsomely reticulated with white veins, giving to the flowers a mottled appearance. The small, narrow, projecting lip is of a deep violet blue, and is furnished behind with a short conical spur, at whose opening is a pure white auricle on each side, and at the base of the short, thick, white column are a pair of bright yellow crescent-shaped blotches.

Last September I saw two fine specimens of this *Vanda* in flower in the Royal Gardens, Kew. One plant had a spike of fourteen tolerably deep blue flowers nearly four inches across. At the same time a plant was blooming in this nursery with twelve flowers on the spike. Each flower measured four and a quarter inches across, and was of an intense blue, a shade which is seldom seen in this species.

When *V. carulea* was first introduced to cultivation, the fact of its being a native of India was sufficient reason in those days for it to be regarded as a stove plant. The altitude at which it grows in its native haunts not having been taken into consideration, the warm treatment which this species received naturally produced such disastrous results—most of the plants dying—that it remained a rare plant until it became more common by the importations of later years. A cool, airy house, with a temperature of sixty to sixty-five degrees Fahrenheit, suits this species best in summer, although no harm will result if the thermometer rises a few degrees more with the sun, from which the plants must be shaded when it becomes too warm. The plants make their growth during the spring and summer, and must then receive more or less liberal supplies of water, according to the vigor of their growth. When this is about to cease the flowers appear, usually in September and October, and if kept in a dry atmosphere they will retain their freshness for six weeks or more. During the winter months the plants should be rested, and only small quantities of water are occasionally required. Well drained pots, baskets or cylinders are suitable for the cultivation of this species, plants of which will thrive either simply in crocks and charcoal, top dressed with fresh sphagnum, when more attention must be given to watering, or in a compost of rough peat, sphagnum and charcoal, well mixed.

St. Albans, England.

John Weathers.

Odontoglossum Sanderianum.—This is a charming free-flowering Orchid, its value being greatly enhanced by a delightful Hawthorn fragrance. By many this plant is considered only a superior variety of *O. constrictum*, but it is more probably a hybrid between that species and *O. gloriosum*. This is evident more especially in its larger and more robust growth, and the erect character of the inflores-

cence. The fragrance must also come from *O. gloriosum*, but *O. Sanderianum* is an extremely variable plant, and the good varieties are by no means plentiful. Even the poor ones will be found very useful for cutting, and a batch of plants will ensure flowers almost every month in the year. They grow freely and strong spikes will produce nearly a hundred blooms.

Trichosma suavis.—This pretty little plant is now in flower, and greatly appreciated for its delicious fragrance. It is the only species of the genus, and, though introduced fifty years since from the Khasya Hills, has always been a very rare plant. Recent importations, however, have brought it within the reach of all. It thrives in the cool house potted in peat and moss, and watered as if it were a bog plant. The reed-like stems are clustered, about ten inches long, and terminated by two lanceolate fleshy leaves, from between which spring the short racemes of creamy white flowers, about an inch across. The side lobes of the lip are prettily striped with crimson, the wavy, recurved middle lobe bearing a yellow, crispy crest on the disk. The flowers last quite a long time on the plant, and, though not showy, they are very attractive and fragrant. Altogether, this Orchid is a genuine acquisition, especially since it may be grown in a cool house with greenhouse plants, its greatest requirement being abundance of water.

Kenwood.

F. Goldring.

Some Good Variegated Plants.—Prominent among variegated plants of comparatively recent introduction is *Ficus elastica variegata*, which will probably be largely used for decorative purposes as it becomes more plentiful. Its growth seems to be nearly as vigorous as that of the type, and the large leaves, well marbled with light green and creamy white, make it a pleasing contrast with the dark foliage of the species. Some difficulty has been experienced in rooting cuttings of this variegated *Ficus*, it being more shy in this respect than the green form; but this trouble has been overcome to a great extent by grafting it on the latter.

Dracena indivisa variegata is another interesting addition to this already numerous family. It is very similar in general appearance to the type, having the same gracefully arched foliage, with the additional charm of variegation in the form of stripes of creamy white. This plant probably originated as a chance seedling.

Another introduction of considerable merit is *Heliconia aureo-striata*, which in form somewhat resembles the *Hedychiums*, and has large, robust, Canna-like foliage from one to two feet long. As its name indicates, this *Heliconia* is variegated with fine stripes of yellow, the stripes to a greater or less extent following the plan of the venation of the leaves from midrib to margin. It has thus far been grown in stove temperature, but it is quite possible that it may prove useful outdoors in summer, and if so, its varied utility will give it greater value. It may be propagated by division, and grows well in light loam when given an abundance of water.

Holmesburg.

W. H. Taplin.

Kniphofias.—When noting these plants in a letter to you last year, I mentioned Mr. Gumbleton, of Cork, as being a careful collector and cultivator of *Kniphofias*. He has lately contributed to the *Gardeners' Chronicle* a series of notes and observations on the species and varieties which he cultivates, and which have flowered during the past summer and autumn. Mr. Gumbleton often falls foul of plants which many of us consider handsome enough to cultivate. To win his admiration a plant must have undoubted merit. It follows, therefore, that anything recommended by him may be taken as deserving a place in the garden. The number of *Kniphofias* noted by Mr. Gumbleton in the communication referred to is twenty-seven species and varieties, whilst he professes to cultivate no less than forty. In English gardens these plants, commonly known as "Red-hot Pokers," are used very effectively both as masses on lawns or by the side of water, or as border plants. Many of them flower late in the autumn, several massive beds at Kew having been quite ablaze with flowers until a few days ago. The hybrids are mostly of exceptional merit, being, as a rule, hardier and freer in flower than the species. Mr. Max Leichtlin, of Baden-Baden, has been a breeder of *Kniphofias* for some years, and he has this year several which differ both in form and color from anything hitherto seen. They are the result of crossing *K. comosa* and *K. Leichtlini*, both Abyssinian species, with those which are natives of the Cape. It is a remarkable fact that these plants, which mostly come from tropical or semi-tropical Africa, are hardy in the warmer parts of Great Britain, whilst many plants from cooler parts of the same continent will bear only a moderate amount of cold.

Kew.

W. Watson.

Coreopsis Drummondii.—Few flowering plants can compare with this for winter cutting, either in beauty or productiveness. It excels *Leptosyne maritima*, *Chrysanthemum segetum*, or the yellow variety of *C. frutescens*, and, at the same time, does not require half the care. A few seeds sown in September gave us plants which are blooming now and will continue to do so all winter. Florists could plant them about eighteen inches apart, in borders, giving about three feet of head room, but, for convenience, they can be grown in ten-inch pots. They will take almost any quantity of water and delight in liquid manure frequently.

The flowers coming from a packet of seed will vary in shade of color and in form and size of flower, but with careful selection, which we have adopted, a very fine and constant variety may be obtained.

Alpine Auriculas.—Like many other so-called hardy plants, these require some protection in winter in order to grow them well, but they are worth the trouble. We have made a specialty of them for the last two or three years, forcing them first sufficiently to have them in bloom two or three weeks before the natural time, which is in the early part of May. For this purpose we pot about twenty-five and leave the remainder in a cold-frame covered with a few Pine-needles. Auriculas are easily raised from seed sown in a cool frame, from which frost is barely excluded, about the first of February. They will make good plants the first year and bloom the following spring. The soil most suitable is a good loam with well decayed manure. Green manure should never be used with them.

Wellesley, Mass.

T. D. H.

Quercus dentata.—The Daimio Oak of Dr. Hall is said to be (p. 537) about twenty-two feet high and the finest the writer has seen. I did not know I had one so near the best. Mine is twenty-two feet seven inches, and measures twenty-five inches in girth one foot from the ground. Plants grafted from this tree have borne acorns, though smaller trees, of course, than the parent. It is one of the most rapid growing of all Oaks. Three feet for one season is not uncommon; and I have had branches five feet. My tree was from an acorn from Japan, kindly given to me by my friend Peter Henderson, not so many years ago, though I neglected to note the exact date.

Germantown, Pa.

Thomas Meehan.

Elæagnus angustifolia.—The note on page 600 in regard to the Indian variety of *Elæagnus* "known in gardens often as *E. angustifolia*," suggests a good word for the typical *E. angustifolia* of east Europe and central Asia as an ornamental tree, and a windbreak tree for the prairie states. As we have received it from Riga, Proskau, Voronesh and other points in east Europe, and as introduced extensively into Nebraska by the Russian Mennonites, it does not appear to vary in hardiness, habits of growth, size of tree, or beauty of foliage. It is a much larger and stronger grower than the form known as *E. hortensis* of south-west Europe, yet it is quite as handsome in expression and as fragrant when in bloom.

We now have trees in Iowa, chance introductions, fully thirty-five feet in height and with a diameter of trunk of nearly one foot. As to hardiness, I have seen it growing in perfect health on the Red River of the North at Fargo, and I have never known it injured in any part of north Iowa during our recent test winters. It is a dry-climate plant and I suspect it will thrive much better on the prairies than in the relatively moister and cooler summer air of the states east of the lakes.

In isolated positions, with the stem trimmed up, it stands much better than our native *Shepherdia* of the upper Missouri, which sun-scalds with us on the south side of the stem if trimmed into tree form.

The *E. argentea* of the upper Missouri is also perfectly hardy as a bush upon the prairies, as is the *E. macrophylla* of central Asia; but unlike the *E. angustifolia*, these handsome bushes are great sprouters, and will not, probably, become popular for ornamental planting.

Berberis Thunbergii.—Mr. Jack's words of praise of this Oriental Barberry are well merited and I am glad to state that it is a thing of beauty also in our trying climate. As Japanese plants are tender with us, I suspect the species is from north-west China or central Asia. We have a section of low spreading hedge of this plant beside one of our drives which attracts much attention during the growing season, and at this time (December 14th) the berries are as bright and handsome as in early fall. That it is a distinct species is shown by the fact that seedlings we have grown retain the peculiarities of habit, leaf and fruit of the original plants.

Ames, Iowa.

J. L. Budd.

Correspondence.

In the Hickory Matter.

To the Editor of GARDEN AND FOREST:

Sir.—In the issue of GARDEN AND FOREST for September 25th (vol. ii., pp. 459, 460), under the heading "Notes Upon Some North American Trees, XI.," being an installment of the exceedingly valuable and interesting series of papers upon this subject from the pen of the editor-in-chief, there is a discussion of the questions raised by me last November (*Bull. Torrey Club*, xv., 277), as to the generic name and classification of the Hickories. As I believe, however, that neither Professor Sargent nor I have written all that might advantageously be written on this subject, I venture to send you the following additions.

And, in the first place, I am of the opinion that there are more valid species than either he or I have yet been able to define. The specimen with curiously pallid under-surfaces of the leaves from Lookout Mountain, Tennessee, alluded to by me at the place above cited, may well be taken as an indication of an addition to the lists, from a region as yet but partially explored. Then there is a specimen here, collected by Mr. Frank Tweedy in Tom Greene County, Texas, evidently of the Pacanier section of the genus, but differing from the Pecan in its markedly punctate leaves and some other characters. As there are two names published, viz., *Hickoria Texana*, Le Conte, and *Carya Texana*, C. DC., both based on specimens of Texan origin, neither of which have yet been satisfactorily referred by subsequent writers, and Mr. Tweedy's specimen is only in flower, we are not yet able to characterize the species which it represents. Most likely it is *H. Texana*, Le Conte, but that was described from fruiting specimens only, and no mention is made of punctate leaves. *H. myristicaformis* has punctate leaves, but belongs to the other section (*Euhicoria*) of the genus, unless, indeed, its separation into two sections, as indicated by me, should be annulled by this Texan tree, a point which complete collections only can determine.

Professor Sargent differs with me in the spelling of Rafinesque's generic name, replacing the feminine noun *Hicoria* by *Hicorius*, which is masculine in form. Some of the reasons which governed me in taking up *Hicoria* are given in considerable detail in my paper above cited. There are a good many others, however, which my learned critic appears to have overlooked, but which hardly seemed necessary to establish my position. I did not discuss the fact that the names of trees are feminine in the Latin language, and that the Latinization of the Indian name "Hicory" would naturally be *Hicoria*; nor did I allude to the fact that Rafinesque's two modes of spelling actually represent but one word, which even made of masculine form in *Hicorius* would yet be feminine, and the specific names must agree in gender, and become, at any rate, *H. alba*, *H. glabra*, *H. minima*, etc., rather than *H. albus*, *H. glaber* and *H. minimus*, as he has written them. Clearly the two modes of spelling do not represent two genera, for there could not be *Hicoria* and *Hicorius* any more than *Popula* and *Populus*. The eccentric Rafinesque recognized this, for he wrote in his "Flora Ludoviciana" not *Hicorius integrifolius*, but *H. integrifolia*, and elsewhere used the two spellings interchangeably. And so I do not think Professor Sargent's charge that I have made a lot of synonyms will be considered a just one by students of botany or dendrology.

But the point in which he appears to me most at fault is in the following statement; he says, in speaking of Rafinesque's separation of the Hickories from the Walnuts: "His first attempt was made in 1808, in the *Medical Repository* (v. 352), in which, in a single paragraph, he simply enumerated, after the word *Scoria*, the specific names, in parenthesis, of five Hickories." Now, I do not wish to accuse Professor Sargent of unfairness, but I must reproduce here, for the sake of argument, just what Rafinesque is made to say at this place:

"*Scoria* (tormentosa, mucronata, alba, pyriformis, globosa, etc.), *Fuglans alba*, L., tomentosa, mucronata, Mich., etc. The Hickory."

Now, it is just as plain as day that Rafinesque indicated here a generic name for the Hickory, by giving the equivalent names already published by Linnæus, Michaux and others under *Fuglans*. This method of publication, by citing equivalents, has been used more or less by all modern authors. Indeed, Professor Sargent has himself used it in the very article I am now discussing. Desvaux, in translating Rafinesque's paper into his *Journal de Botanique*, has it "*Scoria tomentosa, mucronata*, etc., ce sont les *Fuglans alba*, L., etc."

(vol. ii., 170, Paris, 1809), showing that this was well understood at the time.

But, as I have elsewhere contended, Rafinesque evidently wrote *Hicoria*. The whole of his article in the *Medical Repository* shows faulty proof-reading, or no proof-reading at all, and the word came out *Scoria*. Afterward, except in the Louisiana Flora (1817), Rafinesque wrote it *Hicoria*, and the proof that he so wrote it originally is to be found in the following statements:

In the "Good Book and Amenities of Nature," pp. 48, 49 (1840), he says: "In the continuation of these trees in the 'American Grove,' American novelties are still more numerous. . . . The monographs of new and revised sp. are *Calycanthus*, 5 sp.; *Myrica*, 12 . . . of Hickory trees or *Hicoria*, Raf., 1808, 4 subg. and 4 new sp. . . ."

In his "Alsographia Americana" he says: "*Hicoria*, Raf., 1808. *Carya*, Nuttall, 1818, etc. As early as 1804 I proposed to separate the Hickories from the Walnuts, to which Muhlenberg objected. I did so in 1808 in my remarks on Michaux's Flora, and again in 1817 in my 'Florula Ludoviciana,' giving the almost Grecian name of *Hicoria*; yet Nuttall changed it in 1818 into *Carya*, which means merely nut. . . ."

Dr. Torrey has it *Hickoria* in his Catalogue of Plants growing within thirty miles of New York (1819), citing it as a synonym of *Carya*. There is a letter of Rafinesque extant protesting against this, and especially against the *k*. The word has also been spelled with a *k* by Le Conte and others, but there appears to be no authority for it.

It is, therefore, apparent that there is no valid choice between *Hicoria* and *Hicorius*; the only issue that can be raised is between *Hicoria*, a strictly applicable Latinized aboriginal name, and its misprint, *Scoria*, which, from what I have shown, can hardly be seriously taken up by any botanist.

Columbia College.

N. L. Britton.

[Dr. Britton's point as to the date (1805) of the establishment of the Rafinesquian genus would seem to be well taken, as there is no doubt what the species were that Rafinesque meant to include in it, and, consequently, no ambiguity in regard to the limits of his proposed genus can exist. His view is enforced by a canon (XLII.) of the code of nomenclature of the American Ornithologists' Union, which affirms that "The basis of a generic or subgeneric name is either (1) a designated recognizably described species, or (2) a designated recognizable plate or figure, or (3) a published diagnosis," to which is added as remarks: "Some writers insist that a generic or subgeneric name, in order to be tenable, must be accompanied by a diagnosis. However proper such a requisition may seem theoretically, the principle is thoroughly impracticable, and if enforced would lead to hopeless confusion. The custom of naturalists has been quite otherwise, and the mere mention of a type has been found to be often a better index to an author's meaning than is frequently a diagnosis or even a long description. Either of the three alternatives given above may alone be accepted as a proper definition. In the case of a diagnosis it must, of course, give some character or characters by which the organism it is intended to designate may be unmistakably recognized."

The question is, therefore, properly between *Scoria*, as printed, and *Hicoria*. The evidence points to a misprint certainly; and as a misprint it may, according to the rigid rules in nomenclature, be corrected. ("A generic name should subsist just as it was made, although a purely typographical error may be corrected." A. De Candolle.)—Ed.]

The Destruction of Evergreens for Christmas Decorations.

To the Editor of GARDEN AND FOREST:

Sir.—That the recent Forestry Congress in Philadelphia, which evidently had the preservation and prosperity of our forests honestly at heart, made no protest against the wholesale destruction of shapely young evergreens every year as Christmas-trees, strikes an interested onlooker as, at least, demanding comment. If this German fashion of sacrificing a tree at the Christmas-tide were a harmless fad, like the sending of holiday cards, or one likely to wear itself out before much positive hurt is done, it might pass unrebuked. But it is a growing custom, and has already reached such proportions that the yearly December slaughter of the "innocents"

unquestionably amounts to 1,000,000 or over east of the Mississippi River. That such an enormous devastation cannot long continue without impoverishing the forest supply of the future must be apparent to every one. No true lover of trees or intelligent patriot can behold the slain evergreen beauties stacked in the market-place at Christmas-time and consider their ultimate fate without a pang of regret, and even of anger, at the thoughtless sentiment that is gratified through such wicked waste, to say nothing of the ruthless extermination of various evergreen growths, which, if left undisturbed, make our woods forever beautiful, but, when woven into wreaths, soon perish, and then feed the fire or the garbage gulch.

No one is necessarily any the happier for the Christmas-tree, and the children who have been reared to regard the sacrifice of a lovely young tree for a few hours' entertainment as wicked and cruel, are as happy—if not happier—than the youngsters who, through custom, think Christmas a poor thing without a tree.

It is a possible thing in many families to use Orange and Oleander trees, which are grown in tubs, for Christmas decorating. It is also possible in many localities for young evergreens to be lifted, especially from nurseries, out of the ground, and the roots so cared for that the tree may be used for planting after the Christmas use is over, to live and grow into a perennial joy, more beautiful when decorated by nature with frost and gleam than a poor, murdered tree ever was, hung with strings and tinsel.

Seriously, is it not high time for all good people to frown upon a Christmas-custom that is neither Christian nor common sense, and which is at once so unnecessary and so harmful?

Bryn Mawr, Pa.

Mary Wager-Fisher.

[The trees which are used in the eastern states at Christmas are usually the Black Spruce and the Balsam Fir. The Hemlock, the Arbor-vitæ and the White Pine are used less commonly. These trees, where they spring up naturally, grow so close together that they are subjected, almost from the beginning of their existence, to a fierce and continuous struggle for life, in which hundreds perish where a single individual reaches maturity. The young trees in these forests would grow more quickly and with less expenditure of vital force if man would come in and help nature to destroy the weak for the benefit of the strong. This is what thinning means in forest-management. The coniferous forests of the United States can supply Christmas-trees for the whole world ten times over every year and be improved by the operation, provided they are cut with this purpose in view. The danger in this, as in every operation in the American forests, is, that the future is sacrificed for the present, and when young trees are cut for the Christmas-markets they are cut without any reference to the effect their removal will have on the future growth of the forest. This business is only a little rivulet added to the great stream which for two centuries has been slowly draining the American forests, and which is going to exterminate them unless some change takes place in the attitude of the American people toward forest-property. Nature does not recognize the infallibility of republics; nor can Americans, any more than less fortunate people, tamper with the workings of her immutable laws without incurring the penalties which follow their violation.—Ed.]

Wanted, a Chart of Standard Colors.

To the Editor of GARDEN AND FOREST:

Sir.—Permit me to call attention to an urgent need, which I believe is felt almost universally by naturalists—a complete nomenclature of colors for field use. It is not strange, without a standard authority upon the subject, that the colors of flowers are so rarely given with anything approaching uniformity or correctness. There are many puzzling shades and tints in nature which even artists who have made a special study of colors cannot name or correctly reproduce at first trial. It is even more difficult in animal life to correctly describe color, and this is found especially true when attempting to define the life colors of certain marine forms of the lower vertebrates and invertebrates. Mr. Robert Ridgeway, of the United States National Museum, has attempted to supply this want among ornithologists in an expensive volume encumbered by a dictionary of ornithological terms and other

technical matter, of use only to ornithologists. Further, as it was primarily designed for ornithologists, only those colors which obtain in our native birds are shown, and many colors and shades of common occurrence among our flowers and in the lower ranks of life are wholly unrepresented in the colored plates. Will not some one prepare a pocket edition, adapted alike to field and study, that shall, as far as possible, show every color in nature, and state also what combinations are necessary to produce each?

San Diego, Cal.

C. R. Orcutt.

The Disappearance of Wild Flowers.

To the Editor of GARDEN AND FOREST:

Sir.—In addition to the causes of the disappearance of our wild flowers, as stated by Professor Beal on page 527 of GARDEN AND FOREST, I would cite another. For many years I had been in the habit of visiting a cosy nook on Long Island, New York, where the *Sanguinaria Canadensis* grew luxuriantly, the ground being completely covered with foliage and flowers, in their season. The past spring I again visited the wood, after an absence of three years, but scarcely a flower was to be seen, only here and there one in the thicket, away from the former mass. Neither were there any tree leaves on the ground, the owner of the wood having raked them all off for bedding purposes, the result of which was the loss of our favorite flowers. The removal of the leaves left the Blood Root without the winter protection it needs. I think this will account for the loss of a great many of our native plants; the clearing of our forests has removed the protection that nature afforded them.

Floral Park, N. Y.

C. L. Allen.

The National Flower.

To the Editor of GARDEN AND FOREST:

Sir.—The national flower should be as nearly universal in the states as possible. It should be a home flower, not imported. It should lend itself to art in form and color. It should be significant of a national sentiment and embody an American idea. Let me suggest another, yet unnamed, for the honor of representing our country, namely, the Starwort or Aster. It is more abundant in North America than elsewhere. One hundred and twenty-four species belong to our flora. It ranges from the Atlantic to the Pacific and from Canada to Central America. It is beautiful; it is hardy; it is perennial; and deserves the sentimental regard of all who see it yearly adorning our fields and woods in summer and autumn.

Let the wild Aster be our country's flower.

See how it gems with stars the glorious flag!

Onward it spreads, the symbol of our power,

"The Star of Empire," past each barrier crag;

And every blossom, many joined in one,

Presents the Union, peace and freedom won.

Cambridge, Mass.

E. S. D.

Recent Publications.

A Rambler's Lease, by Bradford Torrey. Houghton, Mifflin & Co., 1889.

This little book is a record of the impressions and observations of one who, in the phrase he quotes from Charles Lamb, delights to "walk about, not to and from." Such books, as we have had occasion to say more than once before, are growing to be a prominent and distinctive feature in American literature, and each new one deserves a welcome as a sign that the love for out-door life, as it means not sport, but a keen, intelligent pleasure in the beauty and significance of natural objects, is steadily on the increase among our countrymen. Perhaps certain recent volumes by other hands have been more poetical, more full of the personality of the writer than Mr. Torrey's. Nevertheless there is individuality and a touch of poetic feeling in his pages, too; and he has occasionally an epigrammatic way of putting a valuable truth which should impress it with peculiar distinctness upon the mind of the reader. When, for example, he says that he has almost written "highwayman" instead of "highway surveyor," we feel a sympathetic thrill inspired by the memory of such ravages among beautiful road-side growths as he himself is deploring.

Birds, even more than plants, have been the objects of Mr. Torrey's studies, and his chapters are pretty equally divided between the attractions of animate and of inanimate nature, thus giving his book more variety than is found in some others of its character. Few pages are pleasanter than those which, under the title of "Bashful Drummers," describe his long-thwarted efforts to see as well as hear the partridge drum-

ming—none, unless it be those which recount his "Woodland Intimacy" with a vireo. Another very charming and more definitely instructive essay was noticed in these columns when first printed some months ago in the *Atlantic Monthly*—the one which recites the surprising number of plants which may be found blooming in November on a New England sea coast. In "Esoteric Peripateticism" we have a delightful plea for those contemplative rambles, which are too often considered a mere waste of time in this busy land. As Mr. Torrey well says, every impulse toward such a manner of spending one's hours should be sedulously encouraged because "there is little danger that the lives of any of us will be too solitary or lived at too leisurely a rate. The world grows busier and busier. Those whose passion for Nature is strongest and most deep-seated are driven to withhold from her all but the odds and ends of the day. We rebel sometimes; the yoke grows unendurable; come what may, we will be quit of it; but the existing order of things proves too strong for us, and anon we settle back into the old bondage." Mr. Torrey's "ideal plan" would include two walks a day—"one in the morning for observation, with every sense alert; the other toward night, for a mood of 'wise passiveness' wherein Nature should be left free to have her own way with the heart and the imagination." He well emphasizes the fact that really and fully to enjoy hours out-of-doors some branch of science should be studied, that the senses may be alert to good purpose and the intellect as well as the faculty of mere passive enjoyment be gratified. Of course, as he admits, there is some danger in scientific study—the danger that the receptive, emotional, beauty-loving faculties may be blunted and the mind alone be used. "One may become so zealous a botanist as almost to cease to be a man. The shifting panorama of the heavens and the earth no longer appeals to him. He is now a specialist, and, go where he will, he sees nothing but specimens." But this danger can be avoided. It is possible to "give free play to fancy and imagination without permitting ourselves to degenerate into impotent dreamers. Every walker ought to be a faithful student of at least one branch of natural history, not omitting Latin names and the very latest discoveries and theories. But, withal, let him make sure that his acquaintance with out-door life is sympathetic and not merely curious or scientific." Only by a combination or alternation of the two moods—the two attitudes—can the truest enjoyment be extracted from the natural world. And how the two may exist and develop together Mr. Torrey displays so well in his various chapters that his example should profit as well as entertain all those who are moved to make the best of that "Rambler's Lease" in the real estate of others to which they as well as he have a right.

Recent Plant Portraits.

Botanical Magazine, December.

THRINAX EXCELSA, *t.* 7088; probably one of the so-called Thatch Palms of the West Indies, but described from a plant of uncertain origin long cultivated in the stove-house of the Royal Gardens.

TIGRIDIA PRINGLEI, *t.* 7089; first described and figured by Mr. Watson in GARDEN AND FOREST (*i.*, 388, *f.* 61).

CABOMBA AQUATICA, *t.* 7090; an interesting aquatic plant found in still waters from Mexico to southern Brazil; differing from the species (*C. Caroliniana*) of the southern United States by its much narrower leaves and yellow flowers (those of the North American species are white). The Cabombas are remarkable in the two forms of leaves produced on the same stem, the one form submerged and the other floating. The submerged leaves are round in outline, but are cut into narrow, thread-like divisions, while the floating leaves, with much longer petioles, are round and peltate. The small flowers are attractive, although they remain open during a single day only.

AMORPHOPHALLUS EICHLERI, *t.* 7091; a showy species from an island in the Congo River. The flowers, like those of the other species, emit a horrible odor.

CLINTONIA ANDREWSIANA, *t.* 7092; a native of the California coast-region, with showy, rose colored flowers in a dense terminal umbel.

MASDEVALIA CHIMERA, *Gartenflora*, December 1st.

SALVIA SPLENDENS, var. Bruanti, *Gardeners' Chronicle*, December 7th. A variety with tall spikes of bright scarlet flowers and good habit.

SALVIA BETHELLI, *Gardeners' Chronicle*, December 7th. A form of *S. involucreata*, with very large spikes of puce-colored flowers.

Notes.

In all our eastern cities Carnations are scarce and high, owing to the unusually wet summer.

The growers who have succeeded in obtaining a very late crop of Chrysanthemums have been reaping a rich harvest. The variety named Christmas Eve has been an especial favorite in Boston.

The demand for Violets for the holiday trade has been urgent, both in Boston and New York, in spite of the high prices, caused by a limited supply, while in Philadelphia single Violets have never been so abundant. There is little call for white Violets.

Philadelphia florists are growing *Cypripedium Lawrenceanum* quite extensively, as its bold flowers, on long stems, are always salable, and generally one-third higher than those of *C. insignis*. Of the latter kind some 2,500 flowers were ready for market in Philadelphia on Monday.

Mistletoe has become very popular, and has been sold in great quantities this year in northern cities. The supply comes from the south, where collectors have learned to pack it properly, so that it reaches our markets in excellent condition. A few years ago a considerable quantity was sent here from England, but it was packed so carelessly that it was almost useless for any decorative purpose.

For the Christmas trade in Boston, Roses of various shades of pink and red have been in greatest demand. In Philadelphia a rather deep pink Hybrid Perpetual Rose has proved something of a sensation. It was at first considered a sport, but experts have identified it as Mademoiselle Marie Cointet. It is a globular flower, though not of such good form as either Mrs. Laing or Madame Gabriel Luizet, and it is rather darker than either. Its chief value is its earliness, as it will bloom a week or ten days before either of the above popular varieties.

The December number of the *Botanical Magazine* completes the 115th annual volume. It is dedicated by the editor, Sir Joseph Hooker, to Isaac Bayley Balfour, Professor of Botany in the University of Edinburgh, "the greatest and most influential botanical chair in the Queen's dominions," and the author of important books on the botany of Rodriguez and of Socotra. Seventeen years ago the same editor dedicated the ninety-eighth volume to Professor Balfour's father, then the distinguished occupant of the Edinburgh professorship.

A new industry seems to have been started in the Bermudas, where the culture of *Lilium Harrisii* has been made such a success. Early this fall there came to this market the first supply of dry rhizomes of Calla Lilies in sizes fit for forcing. Some of these are now in flower, having been potted about sixty days, but they would probably have bloomed in less time had careful attention been given to them. As these rhizomes can probably be produced very cheaply, no doubt the industry will increase, for there will be a large market for roots ready to throw bloom promptly, at a moderate price.

The new vegetable, *Stachys affinis*, has become quite popular in France, and is found now in all the principal fruit shops in Paris, the price varying from twelve to twenty-five cents a pound. At Amiens, one of the principal centres of production, it has been sold for fifteen francs a hundred pounds. Some one in that city conceived the happy idea of making a preserve of the tubers. Prepared in this way they lose nothing of their quality, and the question of keeping them is settled—a question of considerable importance, as the tubers in their natural state cannot bear exposure to the air for many days without decaying.

The sudden death on Tuesday, December 3d, of Dr. W. R. McNab is announced. Dr. McNab, the son and grandson of the distinguished curators of the Royal Botanic Garden at Edinburgh, was at the time of his death Professor of Botany at the Royal College of Science, Dublin, and the director at the Botanic Garden at Glasnevin. He was distinguished by his investigations in physiological botany and the minute anatomy of plants, both recent and fossil. Dr. McNab is, perhaps, best known by his researches into the minute anatomy of the leaves of conifers. He has for many years been an active and successful teacher.

The last issue of *Forest Leaves*, that for December, contains an interesting portrait of a specimen of the Bald Cypress from a photograph by Professor Rothrock. This specimen, which is growing on the borders of the James River, is a fair representative of the tree as it is seen sometimes standing alone in the water. It retains its wide-spreading branches, which

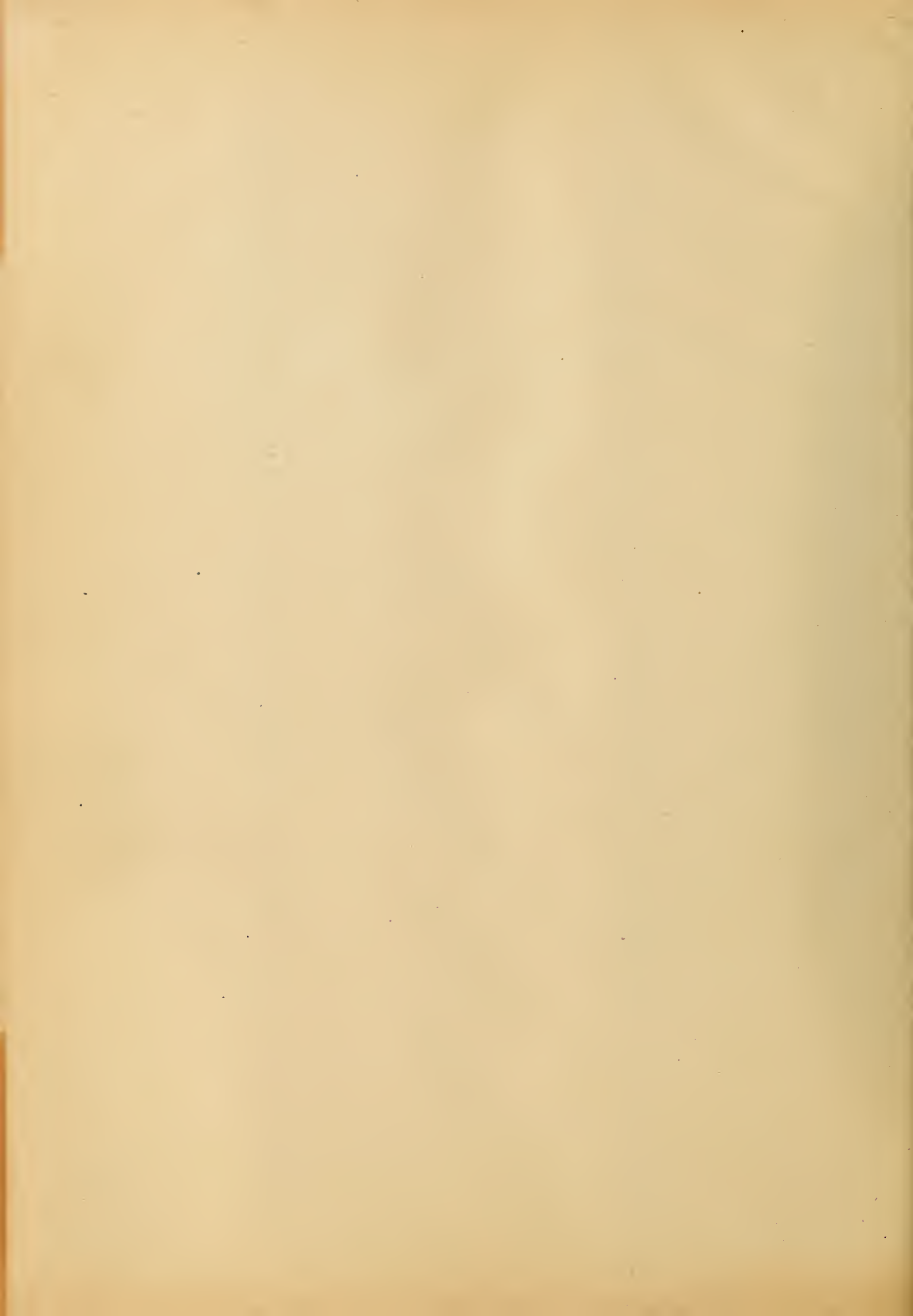
spring from the trunk at nearly right angles and which give to the top the flat appearance which characterizes the species. The trunk in the particular specimen selected for this illustration is surrounded by an unusual number of the peculiar growths known as "knees," which are unusually well developed.

In a speech before the Forestry Commission of New Hampshire, at a meeting held at Manchester, Mr. Joseph B. Walker, chairman of the commission, stated that \$2,500,000 were annually expended in New Hampshire by summer boarders. People more and more are coming to want country homes—and the charm of these country homes, he thought, lay in the forests that covered mountains, purified the air and beautified the landscape. He urged upon the people that if they denuded the mountains of their forests no one would want to come to New Hampshire, and the large revenue already received, and which was increasing from year to year, would be cut off. The *Southern Lumberman*, in commenting on this reason for forest-protection, shrewdly asks whether the same arguments could not be used for preserving the forests which help to make attractive the winter resorts of the south.

In view of the depression of the Orange market, President Fairbanks, of the Florida Fruit Exchange, publishes a statement of what he considers the material facts of the case. He first observes that while West India oranges mature in September and October and the Mediterranean and California oranges are not sweet until March, the fruit growers of Florida should have control of the market from the first of December until the first of March. Very few Florida oranges, however, attain much sweetness before the middle of December, but this year half a million boxes, probably more than one-fourth of the entire crop, of partly green and altogether sour fruit were thrown on the market in November. As a result of this excessive supply of green and acid fruit, which was a libel on the good name of Florida oranges, buyers became few and suspicious. The lesson to be learned from this recital is not far to seek.

A carefully illustrated bulletin, just issued by the Experiment Station of the Kansas Agricultural College, is devoted to the smut in Oats caused by the minute parasitic plant, *Ustilago Segetum*. The parasite is carried with the seed oats, and perhaps never by manure from smutted straw. The disease is more destructive than is generally believed, causing a loss this year of more than eleven per cent. of the crop on the college farm and a probable financial loss of more than a million dollars to the farmers of the state of Kansas every year. Various fungicides were tried, which lessened the amount of smut, but at the same time affected injuriously the germinating power of the seed and reduced the vigor of the plants. The chief interest of the bulletin, however, lies in the fact that a trial of the hot water treatment, first published in the *Gardeners' Chronicle* by Professor Jansen, of Copenhagen, showed that the smut could be entirely prevented by soaking the seed for fifteen minutes in water heated to a temperature of 132 degrees. A chapter on the natural enemies, both vegetable and animal, of the smut, contains much that is interesting, although of little practical importance, since the disease can be so easily controlled.

The endeavor to establish a botanic garden in the City of Montreal, three years ago, though it met with great opposition at the time, is likely to be realized at no distant day, though the original plan has been greatly modified. For some time past efforts have been directed toward the establishment of a garden in connection with McGill University, and the end has been so far attained that a portion of the grounds, embracing somewhat more than three acres, has been set apart for that purpose, the intention being to occupy eventually about six acres. During the past season a pond for aquatic plants has been constructed, and walks and beds have so far been laid out that planting will begin with the opening of spring. There are already in the grounds upward of one hundred native and exotic trees and shrubs, besides a fair collection of herbaceous plants. These will be added to from the native flora. There are also on hand several hundred specimens raised from seed received from the Imperial Botanic Gardens of St. Petersburg, and the Royal Gardens, Kew, all of which have been raised and cared for in private grounds and conservatories. Active efforts are being made for the construction of a conservatory, which it is hoped may be erected soon. It is the intention to adapt the garden to the purposes of collegiate work and the representation of the native flora, together with such exotic species as may be hardy and prove otherwise desirable.



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