

GARDENING
FOR
PLEASURE

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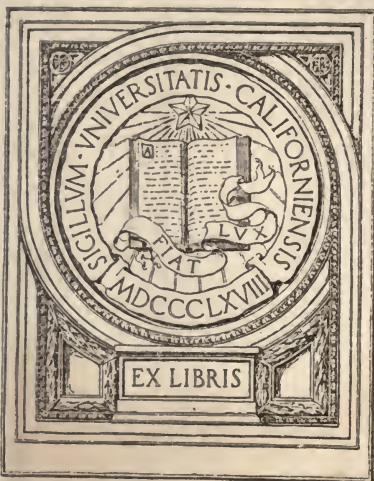
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JOHN FISKE

GARDENING FOR PLEASURE.

A GUIDE TO THE AMATEUR IN THE

FRUIT, VEGETABLE, AND FLOWER GARDEN,

WITH FULL DIRECTIONS FOR THE

GREENHOUSE, CONSERVATORY, AND WINDOW GARDEN.

BY

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BOOK OF PLANTS," "GARDEN AND FARM TOPICS," "HOW THE FARM PAYS," ETC.

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PREFACE TO SECOND EDITION.

TWELVE years have passed since the first edition of "Gardening for Pleasure" was published. In that time vast strides and changes have been made in all departments of horticulture, so that it has been found necessary not only to greatly enlarge the scope of this work, but also to make many changes. The newest and best methods of culture have been substituted for such as a farther experience has shown to have been faulty, so that it is believed that in all matters pertaining to amateur gardening, or "gardening for pleasure," the ground is as well covered as is practicable in a book of this size treating on such a great variety of subjects. As in the first edition, I have endeavored to use the plainest and simplest language I could, avoiding as far as possible all technical and scientific terms used by the professional gardener, the use of which would only tend to confuse and befog the beginner. Although this work is written only for such as garden for pleasure, yet I am well aware that hundreds every season, who have a taste for horticulture, branch out from private into commercial gardening, either from necessity or for a love of making a business of the work. To such, if the business of growing flowers or plants for sale is to be begun, my new edition of "Practical Floriculture" is recommended. If growing fruit or vegetables for market, I advise "Gardening for Profit." If the work of the farm is wanted to be made profitable, I flatter myself that my recent work on that subject, "How the Farm Pays," will help to that end.

PETER HENDERSON.

INTRODUCTION TO FIRST EDITION.

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I HAVE endeavored, in writing "Gardening for Pleasure," to divest it, as far as I was competent to do so, of the technical terms and phrases which professional gardeners use in writing or talking on matters relating to horticulture, and to use the plainest language at my command in describing the simplest methods of culture. Whether I have succeeded in making the subject as clear as I have desired to do, those who read the work must decide.

My aim in writing the book was to make it such as would be useful to the occupant of a city lot, or to the possessor of a few window plants, as well as to the owner of a country residence that is fully appointed in all matters relating to the cultivation of flowers, fruits, and vegetables. The necessity for such a book has been made evident to me by inquiries from hundreds of amateurs in gardening; inquiries to many of which neither of my previous works ("Gardening for Profit" or "Practical Floriculture") furnished proper replies; the one being written mainly for information for the market gardener, and the other for the commercial florist.

PETER HENDERSON.

GARDENING FOR PLEASURE.

CHAPTER I.

LOCATION AND SOIL.

WHENEVER practicable the location of the garden should be such as is sheltered from the north and west, either by hills or belts of timber. Where there is no such shelter naturally, it is of the first importance to plant belts of evergreens, such as Norway or Hemlock Spruce, in double or treble lines, at distances of six or eight feet apart, or if close enough to form hedges, all the better. When this is not done, a high board fence for shelter will answer a temporary purpose, but is neither so ornamental nor so effective as the shelter given by growing trees. Evergreens, such as Norway or Hemlock Spruce, can be bought from two to three feet high, at from \$15 to \$25 per hundred, and should be planted, according to size, from three to four feet apart, making a cheap and ever-improving screen or fence, which may be trimmed to any required height or thickness.

It is rare, in determining the site for a residence, that the soil is taken into consideration, and, in consequence, we sometimes find that the garden surrounding the house presents a barren appearance, that nothing can remedy short of placing a foot of good soil over the whole surface. This condition is not so often due to the natural poverty

of the soil, as to the grading off the surface soil, or to filling up to the desired grade with the material thrown out in excavating the cellars, or other subsoil, clay, or gravelly material, and placing these over the soil intended for the garden. This is often done for the convenience of contractors, to the great injury of the proprietor, without either being aware of the bad results. As a good soil will tend more than all else to give satisfactory results in garden operations, it is all important to secure it. When discretion can be used in deciding on a location, one should be chosen that has naturally a suitable soil, rather than to attempt to make it so by carting a foot of good soil over the bad, which would be found not only very expensive, but, in many situations, next to impracticable. I have before said, in some of my writings on this subject, that the soil best suited for all garden purposes is what is known as "sandy loam," not less than ten inches deep, with a subsoil of sand or gravel. Such a soil rarely requires drainage, is easily worked, and gives better results than that known as "clayey loam," with a putty-like subsoil of blue or yellow clay, which must be drained thoroughly before a seed is sown or a plant set out, or there will be no satisfactory reward for the labor.



CHAPTER II.

DRAINAGE.

As drainage will be in many instances indispensable to success, I will briefly state a few of the simplest methods that may be adopted, premising that it is utterly useless to expect to cultivate any soil satisfactorily that does not freely and rapidly carry off the surface water. An expert

in soils can determine almost to a certainty, by digging down two or three feet, whether or not a soil requires drainage; but the safest guide for the inexperienced is to judge by the growing crops in his neighborhood. If on a similar soil good crops of corn, potatoes, or hay are found on undrained land, then it is certain there is no necessity to drain; for no matter how cultivated, or how heavily manured land is, there can never be a good crop raised in any season, if the soil is water-logged. If the place to be drained is of large extent, and the ground nearly level, it will always be safer to call in the services of an engineer to give the proper levels and indicate the necessary fall, which should never be less than half a foot in the hundred, and if more can be had, so much the better. In heavy, clayey soils, we make our lateral drains three feet deep and fifteen feet apart. Where there is less clay in the subsoil we make them from twenty to thirty feet apart and four feet deep. If stones are plenty on the ground, they may be profitably used in filling up the excavated ditch to half its depth, as shown in figure 1,



Fig. 1.—RUBBLE DRAIN.



Fig. 2.—HORSE-SHOE DRAIN TILE.

and which is known as a rubble drain, using the larger stones at the bottom and smaller at top, and covering over with inverted sods, or six inches of shavings or hay, to keep the soil from being washed in among the stones, and thus choking up the drain. But when they can be

obtained at a reasonable price, the best and most durable draining is that done by tiles. It makes but little difference whether the tile used is the round with collars, or the horse-shoe. We rather prefer the latter, particularly if the bottom of the drain is "spongy," when we use a board for the bottom of the drain, as shown in figure 2. Here, again, great care must be used in covering up the tile with sods, shavings, or other covering, so as to prevent the soil being washed into the crevices and choking up the drain. This board is a common one of hemlock or spruce, cut in four pieces. It is ripped through the middle, and then these parts split in two, making boards of five inches wide by half an inch in thickness, thus



Fig. 3.—TRIANGULAR BOARD DRAIN.

making the common hemlock board stretch out to a length of fifty feet. It is often a very troublesome matter to get the few drain tiles necessary to drain a small garden, and in such cases an excellent and cheap substitute can be had by using one of boards. Take ordinary rough boards, pine, hemlock, or spruce, cut them into widths of three or four inches, and nail them together so as to form a triangular pipe, as represented in figure 3, taking care to "break the joints" in putting the lengths together. Care must also be taken that the boards are not nailed together too closely, else they might swell so as to prevent the water passing into the drain to be carried off. These drains are usually set with a flat side down, but they will keep clear better if put with a point down, though it is more trouble to lay them. Drains made in this way will last much longer than might be supposed. In excavations recently made we found wooden

drains in perfect order that had been in the ground for twenty-five years.

CHAPTER III.

PREPARATION OF THE GROUND.

AFTER draining (if draining is necessary) comes the preparation of the soil. Presuming that the ground where the new garden is to be made is an open space, clear of trees or other obstructions, there is no cultivation so cheap and yet so thorough as plowing and harrowing. To do this properly, the ordinary plow should be followed by the subsoil plow, stirring the subsoil up about fifteen inches deep, so that the water will pass through to the drains, natural or artificial, freely. After the plow and subsoiler, follows the harrow (the Acme is the best; see Implements), which should be weighted, so that the teeth sink six inches into the soil, in order to completely pulverize it. In Europe, it would be considered sacrilege to use a plow or harrow in the preparation of a private garden, and most of old-country gardeners among us will stand aghast at such advice; but I have been through all parts of the work, and am well satisfied, from no limited practice, that plowing and harrowing will not only do the work at one-fourth of the cost, but in a better manner than the ordinary digging or trenching with the spade. Let me here caution that great care be taken never to plow, dig, harrow, rake, or hoe ground when wet. If work must be done, pull out weeds, or set plants, if you will, but never, under any circumstances, stir the soil in preparation for a crop until it is dry enough not to clog. If stirred while wet, the particles stick together, and the crop is not only injured for the season, but in some soils the bad effects show for years.

CHAPTER IV.

WALKS.

It is no unusual thing to see the owner of a neat cottage make himself perfectly ridiculous by the way in which he lays out the walk from the street to his front door. There is a prevailing opinion that such walks should be curved ones, and gentlemen, often otherwise shrewd and intelligent, place themselves without question in the hands of some self-styled "garden architect," and thus manage to make themselves the laughing stock of a neighborhood. There was a well-marked instance of this in a garden occupying a block in almost the center of Jersey City, where a man pretending to have a full knowledge of the subject, induced the proprietor to have a walk running about one hundred yards from the street to the house, made so curved that its length was nearly twice that distance. It was hard on the butcher's and grocer's boys, and it was said that even book-peddlers, sewing-machine agents, and lightning-rod men looked ruefully at it and left him in peace. Some old authority on this subject says that there "never should be any deviation from a straight line unless from some real or apparent cause." So if curved lines are insisted on, a tree, rock, or building must be placed at the bend as a reason for going around such obstacles. It will be evident to any one who reflects upon the matter, that a curved walk running a distance of a hundred yards or so from the street to the house, across an unplanted lawn, is utterly absurd. All short foot-walks from the street to the house should be straight, entering from the street at as near right angles as possible, and leading direct to the front door. There should be no necessity for a carriage road to the front entrance of a house, unless it is distant

at least 100 feet from the street, and then a drive is best made by having an entrance at each side of the lot, as given in figure 4, presuming that the width of the ground is 500 feet, and the distance from the street to the front door is 150 feet. Even here the foot-walk should be direct. The width of the roads or walks must be governed by the extent of the grounds. For carriage-way the width should not be less than ten feet, and for foot-walks, five feet. Nothing is more annoying than to

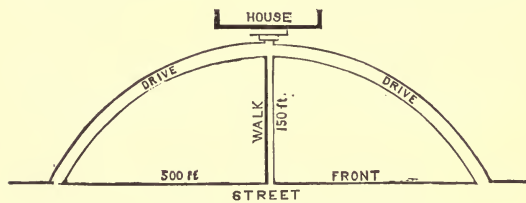


Fig. 4.—APPROACH TO A HOUSE—DRIVE AND PATH.

have a shower-bath in early morning from the dew from an overhanging branch in your narrow walk. We often see gardens of considerable pretensions where the walks are not more than three feet wide, where it is utterly impossible for two persons to walk abreast without getting their dresses torn or faces scratched by overhanging branches. Besides, it argues a narrowness in the owner, particularly if the grounds are at all extensive, and looks as if he were determined to cultivate every available foot of land. Of course, it is another matter when the garden plot is limited to the width of a city lot (20 or 25 feet); then such economy of space is perfectly excusable. The character of the soil must in a great measure determine the manner of making roads or walks. Every one must have noticed that, after a heavy rain, unpaved streets in some districts remain next to impassable

for many hours, while in others, after the same amount of rain, the roads will seem firm and comparatively dry. In the former all carriage roads, and even foot-walks, to have any satisfaction from them, should have their foundations formed something like that shown in figure 5. This gives thorough drainage for the water at each side, and a depth of from one foot at center to two feet on sides of rubble stone and gravel to form the bed of the road or walk; but in sandy or gravelly soils, through which the water passes quickly, no such expense is necessary, as an equally good road may be made by five or six inches of gravel. In foot-walks on such soils, I have



Fig. 5.—SECTION OF ROAD WITH DRAIN EACH SIDE.

found that three or four inches of gravel mixed with one fourth its bulk of cement to “bind,” when watered and well rolled, makes an excellent smooth walk, and one in which, because of its hardness, there is no trouble with weeds. Let me here say, that when weeds are troublesome on walks, or more particularly in paved gutters, that the quickest way to get rid of them is to sow salt over the surface about as thick as sand is strewed on a floor, and then sprinkle with water. Care must be taken, however, that the salt does not get on the grass or other plants, as, of course, it would be as quickly destructive to these as to the weeds.

CHAPTER V.

MANURES.

WHETHER one wishes to cultivate vegetables, fruits, or flowers, all soils, to give good results, sooner or later need manure; and this is more particularly the case with what are known as "vegetables," these being usually quick growing, succulent plants. No "fertilizer" answers so well for all purposes as thoroughly decayed stable manure; whether from horse or cow stable makes but little difference, except that that from the horse stable is best suited for heavy soils, while that from the cow stable suits best for light soils. The quantity used for vegetables or fruits should not be less than would cover the whole surface of the ground at least three inches deep, and it should be mixed with the soil as thoroughly as possible by plowing or spading. In the absence of stable manure, recourse must be had to concentrated fertilizers, the best of which are Peruvian guano and bone dust. Here a word of caution is necessary as to the quantity to be used, as their fertilizing qualities are concentrated instead of being diffused, as in stable manure. If either guano or bone dust, or fertilizers of similar character, come directly in contact, in large quantities, with the roots of plants, it injures them beyond remedy; hence in the use of these the necessity for caution. In our large field practice in vegetable growing, we use about 2,000 lbs. per acre of guano, sowing it on the surface of the ground after plowing, and then harrowing it in so as to mix it with the soil to the depth of five or six inches. Now, as there are 4,840 square yards in an acre, it will be seen that something less than half a pound of guano or bone dust is required for every square yard of surface to be fertilized. This quantity will just nicely cover the sur-

face about as thick as the sand on a sanded floor. After spreading on the dug surface, it should be mixed with the soil with a spading fork or long toothed rake to the depth of five or six inches, bearing in mind that the more thoroughly it is mixed with the soil the better will be the result. If used in "hills" for corn, tomatoes, melons, etc., the same proportionate quantity is to be applied, and the mixing must be equally thorough. Wood ashes are often a convenient fertilizer, and will be found to give excellent results if used as advised for guano and bone dust; but three or four times the quantity will be required to obtain the same results.

HOW TO USE CONCENTRATED FERTILIZERS.

Whatever kind of concentrated fertilizer may be used, I find it well repays the labor to prepare it in the following manner: to every bushel of fertilizer add three bushels of either leaf mold (from the woods), well pulverized muck, sweepings from a paved street, or, in the absence of either of the above, common garden soil. In every case the material employed must be as dry as it is possible to procure it. When guano is used, be careful to have it thoroughly pulverized and broken up before mixing with the other ingredients. The fertilizer must be well mixed with the soil or mold used by turning it at least twice. This mixing should be done in winter, or early spring, and the material packed away in barrels in a dry place for at least a month before using it. The main object of this operation is for the better separation and division of the fertilizer, so that, when applied, it can be more regularly distributed over the land; besides this, no doubt the fertilizing qualities of the leaf-mold or other substance are developed by this treatment. Experiment has shown that this method of using concentrated fertilizers of nearly all kinds materially increases their value. One of the most successful market gardeners in

our neighborhood has adopted this method for years, and in extensive experiments with different kinds of fertilizers, with and without being mixed, finds a saving of quite one third in quantity in thus treating them. He finds that 1,200 lbs. of guano, mixed with two tons of garden soil, and sown over the surface after plowing, and then harrowed in, is equal in effect to 2,000 lbs. of guano used without mixing.

We have ourselves experimented with guano, blood and bone, and bone flour, with nearly like results, and as a top dressing for grass we think the advantage of mixing is even more marked. When fertilizers are applied to corn, potatoes, tomatoes, etc., in hills or drills, it is not only more economical to mix in this manner, but much safer in inexperienced hands; for when any strong fertilizer is used pure, injury is often done to the roots by their coming in contact with it in too great quantity in the raw state, owing to imperfect mixing in the hill or drill, while, if composted as advised above, the danger is much less.

In regard to which of the fertilizers is most desirable, we find but little difference, provided each is pure. Guano at \$80 per ton is relatively as cheap as blood and bone fertilizer at \$65, bone flour at \$50. or superphosphate at \$40; for in the lower priced articles we find we are obliged to increase the quantity to obtain the same results, so that the cost is nearly alike whichever be used. The all-important point is the purity of the article, a matter that few working farmers or gardeners ever attempt to decide except by the results in culture; hence we advise each one who has been using a fertilizer that has proved satisfactory, to experiment but lightly with another until the new article has proved its merits. The competition in the manufacture of articles so much in use as fertilizers, has in many instances forced down prices below the point at which they can be profitably produced in a pure state; hence

the widespread adulteration with "salt cake," "plaster," and other articles utterly worthless but to make weight. Next in meanness to the quack who extracts money from a poor consumptive for his vile nostrums, is the man who compels the poor farmer or gardener, maybe a thousand miles away struggling for an existence, to pay freight on the sand mixed with his guano, or the plaster in his bone dust. In this relation I am reminded of a retribution that fell on the "Sands of Life" man, who figured so conspicuously a few years ago in New York. The advertisement of this philanthropic gentleman, it will be remembered, was that "A retired clergyman, whose Sands of Life had nearly run out," would, for a consideration, tell how the "running out" could be stopped in others. A kind-hearted fellow in Illinois, deeply sympathizing with the old gentleman on account of his loss of "sand," sent him by express—but forgot to prepay—a thousand pounds of the article! It is reported that the "retired clergyman," on opening the cask, expressed himself in a manner not only ungrateful, but utterly unclerical. We counsel no vengeance, but if some of these sand-mixing guano men could have the sand sifted out by their victims with compound interest added, and returned to them under the fostering care of an express company, it would be but even-handed justice.



CHAPTER VI.

SPECIAL FERTILIZERS FOR PARTICULAR PLANTS.

A MAN called at my office a few years ago with some dozen bottles as samples of special manures, indispensable, he said, as fertilizers for certain kinds of plants. He had those with him that he claimed to be specially prepared for cabbage, corn, potatoes, wheat, grass, lawns,

beets, etc., etc. He even invaded Flora's realm, and declared that his nostrum for Roses was a specific for any languid capers of this sometimes rather coquettish queen of flowers. His own arguments, which were rather plausible and glibly uttered, were backed up by numerous certificates—authentic, I have no doubt—where his “potato fertilizer” had worked wonders with some, with others his “corn manure” had been of undoubted benefit, and so on all through the list.

Now, I have no reason to say that the vender of these fertilizers was a quack, except the broad fact, gathered from an experience of nearly forty years, that has shown me that it makes but little difference with what fertilizer a crop is treated, provided the soil is properly pulverized and the fertilizer applied in proper proportions according to its strength. Had all his separate kinds of fertilizers been taken from the same bag (provided that bag contained a good article of bone dust or guano), the result to his patrons would have been the same, whether he had used it on one or all of the crops that he had special prescriptions for.

There are few market gardeners in the vicinity of New York who have not, at one time or another, been obliged to take anything they could get for fertilizing purposes, and the difference has never been specially perceptible when manure from horse stables or cow stables have been applied, or when \$100 per acre have been expended for bone dust or Peruvian guano, and these all used on a dozen different crops without any discrimination. Agricultural chemistry may be all very well in some respects, but if it gets down to such hair-splitting niceties as analyzing scores of special plants, and telling us that we must feed each with only just such food as the analysis shows it to be composed of, then our common sense, born of practical experience, must scout and ridicule such nonsense.

Plants, like animals, are not so much kept in good health by the special kind of food given as by the proper quantity and conditions surrounding the individual when the food is received ; and what proper temperature and pulverization of soil are to the plant, air and exercise, and also proper temperature, are the corresponding conditions necessary for healthy animal life. Who will say that the beef-fed English laborer is in any way the physical superior of the Irishman or Scotchman whose daily food has only been potatoes and oat-meal ? You get usually fine and nearly equal development in each case, but it is a condition due to a natural use of the muscles in the open air in a congenial climate rather than to anything special in the food. It would be quite as reasonable to tell us that a special food, chemically considered, is necessary for each class of our domestic animals as for our domestic plants, and none but the veriest charlatan or ignoramus will do either.



CHAPTER VII.

THE LAWN.

SINCE the introduction of the lawn mower, the keeping of the lawn has been so simplified that no suburban residence is complete without one, and there is now no more excuse for tall grass "going to hay" in the doorway than there would be for cobwebs taking possession of the rooms inside the dwelling. We occasionally see some parsimonious individual, even now, who remembers that in his grandfather's days grass was allowed to grow for the food of the "critters," and he leaves it for food for his "critters" still ; though at the same time his furniture inside, that nobody but himself ever sees, or has an

opportunity to admire, for such men are not usually troubled with friends, may have cost him \$5,000 or \$10,000. We have two or three notable examples of this kind in our immediate neighborhood, but it is gratifying to know that such neighbors are not numerous, for the example of the majority will soon shame them into decency. To have a lawn in first rate condition, the ground must be put in order in the way described under the heads of "Draining" and "Preparation of the Soil;" for if these are necessary anywhere, they are still more necessary for the lawn, the soil of which should be as thoroughly pulverized and enriched by manure as any ground intended for the cultivation of either vegetables or fruits.

Great care must be taken to have the surface of the ground for the lawn (unless a very large one) made perfectly level; for if this is not done before the lawn is sown, it cannot be altered except at great expense and inconvenience. After the surface is made level roughly, it should be further smoothed with the rake, or, what is even better, the disc harrow (see Implements), and all stones of any considerable size removed, so that the surface will be smooth for the action of the lawn mower. Wherever the extent of the lawn does not exceed 2,500 square feet, and where sods can be obtained from a suitable pasture near at hand without much cost, the quickest way to make the lawn is to sod it; but before doing so, the ground should be rolled or beaten down, particularly if any portion of it has been filled in, so that there may be no "settling" to form hollows or inequalities. A convenient size of sod to lay down is twelve by eighteen inches, and of a thickness of two inches. In laying see that the edges are neatly laid together, and the whole firmly beaten down with the back of a spade. If it is dry weather when the work is done, it may be necessary to thoroughly drench the newly-laid sod for a week or so after, every other evening. When the lawn is too ex-

tensive to be soddled, it can be sown with grass seed, which will produce a good lawn in three or four months.

Some of the fine lawns seen at Newport, R. I., are composed almost entirely of Rhode Island Bent Grass mixed with about one-sixth of white clover; but the humidity of the atmosphere there has no doubt more to do with the richness of the lawn than the variety of grass it is composed of. I may add a caution against the use of spurious seed for this purpose. It is no uncommon thing, either through ignorance or short-sighted economy, for "hayseed" to be taken direct from the hay loft and sown to form the lawn. If from good hay, the seed will be principally orchard grass or timothy and red clover, and vain would be all the attempts to get a smooth lawn from such a source. It would be about as reasonable to expect figs from thistles. The mixtures of grasses prepared by the seedsmen for the purpose are the simplest and safest to use. If the soil is rich, and has been thoroughly prepared, three bushels of the lawn grass mixture per acre will be sufficient; but if thin and poor, from four to five bushels had better be sown. If for small areas, sow at the rate of one quart for a space twenty by fifteen, or three hundred square feet. If sown in early spring, as soon as the soil is dry enough to work, a good lawn will be formed by midsummer the first year, if it has been mown regularly at intervals of eight or ten days. The seed must be sown as evenly as possible, and for this reason a calm day must be chosen, as a very slight wind will throw the seed into heaps. After sowing, the ground may be lightly harrowed if the surface is large; if not, give it an even raking; but in either case the ground should be smoothed down with a roller or patted with a spade, so as to form a smooth surface to be mowed. Although, if a choice can be had, it is best to sow the lawn seed in early spring, in this latitude in March, April, or May, yet it can be sown nearly as profitably in September,

or in the more southerly states in October. To keep the lawn in proper condition, it should be mowed over once every week if the weather is moist, and not less than once in two weeks even in dry weather; for if the lawn has been properly made in the first place, and "top dressed" with a good coat of well-rotted manure in fall, and the rough parts raked off in spring, the weather must be dry and hot indeed to prevent its growth.

LAWNS ON SLOPING BANKS.

It is exceedingly difficult to get a growth of grass from seed on a sloping bank at an angle of even fifteen degrees, because a heavy shower of rain on the sloping bank would wash off the fresh soil before the grass seed has formed enough roots to hold the young grass in place. To remedy this the following plan will be found most effective. To an area fifteen by twenty—three hundred square feet—or in this proportion, be the area large or small, take two quarts of lawn grass seed and mix it with four bushels of rather stiff soil, to which add two bushels of cow manure; mix the whole with water to the consistency of thin mortar. This mixture is to be spread on the sloping bank, first having scratched the surface of the bank with a rake. It should be spread as thinly as will make a smooth and even surface; in short, just as plaster is spread on a wall. The grass seed will start rapidly, and quickly make a sod of the richest green, its smooth, hard surface preventing its being furrowed out by the rains. It will be necessary, until the grass has fully covered the surface, to keep the plastered bank covered with hay or straw to prevent the covering from drying or cracking. If the weather is dry a gentle watering will hasten the growth of the seed. If sown at a season when the temperature averages seventy degrees, a green sward will be obtained in fifteen days. By this method, using orchard or other strong growing grasses, no cheaper or

better plan could be adopted for keeping up railroad or other embankments.

TO RENOVATE OLD LAWNS.

Lawns that have been worn out by neglect or other causes, or where it is not convenient or desirable to renew them by plowing up, will be greatly benefited by running a light harrow over them if the surface is large, or by a sharp steel rake for smaller areas. After stirring the surface by such means, judiciously, so as not to injure the roots too severely, lawn grass should be sown over the surface, using about half the quantity of seed required for new lawns, and over this, for each acre, or in the same proportions for lesser areas, sow five hundred pounds of some good "lawn enricher;" again harrow or rake, and roll down firmly.

WEEDS IN LAWNS,

such as thistles, dandelions, dock roots, etc., can only be removed by cutting them out with a knife. Thistle and dock roots should be removed as far as possible; but as to others, there is no necessity for cutting the whole root out. If cut *below* the crown the root will not start again.

ANTS ON LAWNS

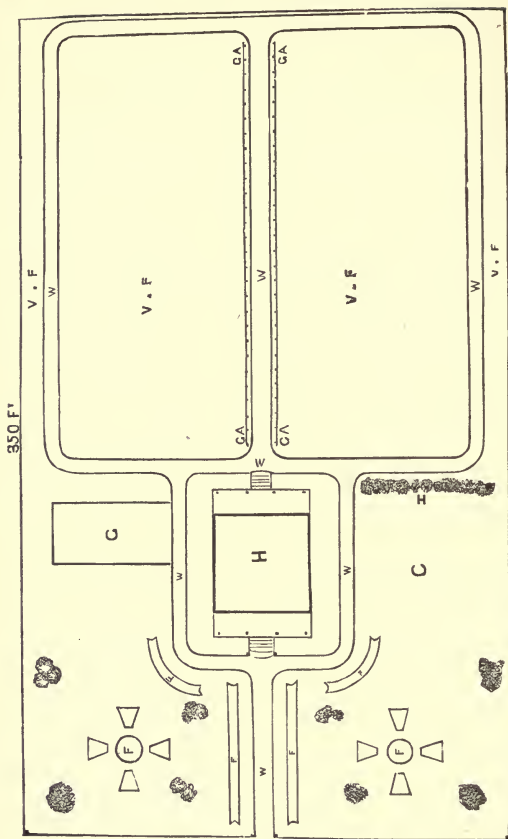
are a pest that we are almost powerless to cope with. Nothing seems to poison them, as either their instinct teaches them to avoid the ordinary insect poisons, or their constitutions are proof against them. Every thing we have tried has failed, except Pyrethrum or Persian Insect Powder. This applied by a bellows quickly suffocates them; but every insect needs to be struck by it, or it is useless, as it only kills them by suffocation. They can also be captured by placing fresh bones or molasses in plates around their haunts; they attack these before any thing else. By persistently thus catching and destroying them two or three times a day, they may be permanently got rid of.

CHAPTER VIII.

DESIGN FOR GARDEN.

As this book is intended to comprehend all the wants of a cottage or suburban garden, including flowers, fruits, and vegetables, it would increase its size too much to give a great variety of designs for the flower garden. Those that require such should consult some intelligent landscape gardener. Intelligent, I say, for nine out of ten that pretend to be landscape gardeners are not; but consult a man able to draw a neat design, for if he cannot do that he is not a very safe person to be intrusted with the working out of the plan of another. You are careful to ascertain that the architect for your house is a man of education and intelligence before you entrust yourself in his hands, but when it comes to designing the lawn and flower grounds, the veriest bog-trotter, who styles himself a "landscaper," is too often allowed to display his "art," and at the same time make you ridiculous. Rest assured that if such a pretender has not had ambition enough to become fairly well instructed, he is not likely to show much taste in designing your grounds.

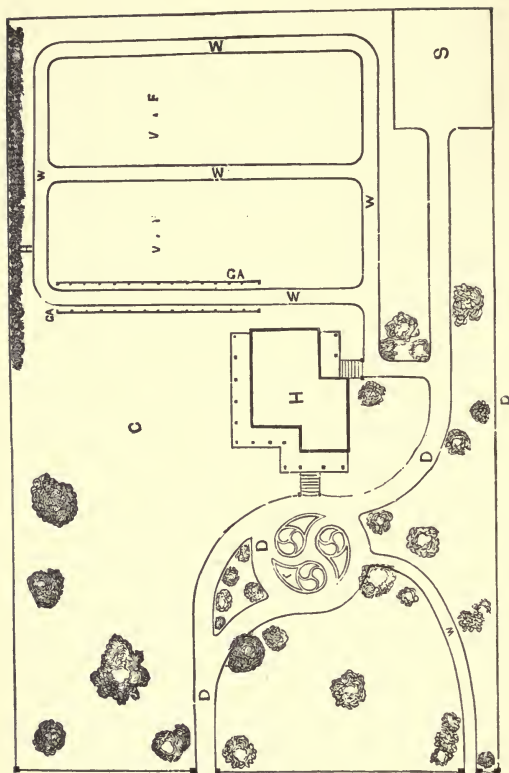
The design (fig. 6) shows an area of 200 feet by 350, or a plot of nearly two acres. About one third of the whole facing the street is used for flower garden and for dwelling, the two-thirds in the rear for fruit and vegetable grounds. There is a point in this sketch to which I wish to call attention, as it is one too often lost sight of. The flower garden and lawn face the street, while the fruit and vegetable grounds are at the rear. The view of these from the street is shut out upon one side by a screen or tall hedge of evergreens, B, and upon the other by a curvilinear glass structure, G, which may be used



200 Feet Front.

Fig. 6.—DESIGN FOR LAYING OUT GROUNDS.

either as a grapery or a greenhouse. The walk, w, passes on each side of the house to connect with other walks at the rear. The beds, F, may be planted in ribbon lines either with flowering plants or those with brilliant and strongly contrasting foliage. The flower beds, F, each side of the entrance near the front, may be made of any form that may be preferred. A simple circle, planted as suggested in the next chapter, will produce a good effect, and be more easily cared for than beds of the style here given. Most persons, where the floral ornamentation is, as in this case, confined to a few effective masses, prefer to change not only the manner of planting such beds each year, but to alter their form occasionally. The unbroken area of lawn at c is intended for a croquet ground. At the rear of the house the central walk is spanned by a grape arbor, G A, if one wishes the vines to afford shade, or a simple trellis may run on each side. The borders next the fence on each side and at the rear (not shown in the plan) may also be used for grapes, or will be convenient for raspberries, currants, and other small fruits. The large plots, v F, are for the main crops of vegetables and fruits. Asparagus, rhubarb, strawberries, and such other crops as remain year after year without being disturbed, should be so placed at the outset as to be interfered with as little as possible in the frequent working of the soil necessary for other crops. A lot of this size will require the labor of one man, whose time must be exclusively devoted to the garden, and to nothing else, to keep it in proper order. Such is the extent and something near the design of the grounds I use for such purposes. I generally have selected one of my most active men to take charge of it, and find he has plenty to do to do it well. A second design (fig. 7) shows a lot of the same dimensions, with a different arrangement. There being a stable, s, and no rear entrance, it is necessary to provide one from the front;



200 Feet. Front.

Fig. 7.—DESIGN FOR GROUNDS WITH CARRIAGE-DRIVE.

and in order to secure a greater breadth of lawn, the house is placed at one side of the centre of the grounds. The drive, D, in the design is made to turn around a group of flower beds of fanciful pattern; but this may be replaced by a single circle, planted as suggested in the next chapter, or by a group of ornamental evergreen or other shrubs. In this design the croquet ground is at C, and the grape arbor, G A, is used to shut out the view of the vegetable grounds from the street. A row of closely planted evergreens at H serves to break the force of the winds. The suggestions as to the other details in the preceding plan (fig. 6) apply to this also.



CHAPTER IX.

PLANTING OF LAWNS AND FLOWER BEDS.

THE subject of lawn planting, including the proper setting and grouping of trees and shrubs, and their most effective disposal, is too extended for the scope of this book. These matters belong to works upon landscape gardening, and are ably treated in those by Downing, Kemp, Weidenmann, Scott, and others. But the planting of flower beds comes properly within our limits. The old-fashioned mixed borders four or six feet wide along the walks of the fruit or vegetable garden, were usually planted with hardy herbaceous plants, the tall growing at the back, with the lower growing sorts in front. These, when there was a good collection, gave a bloom of varied color throughout the entire growing season. But the more modern style of flower borders has quite displaced such collections, and they are now but little seen, unless in very old gardens, or in botanical collections. Then,

again, we have the mixed borders of bedding plants, a heterogeneous grouping of all kinds of tropical plants, still holding to the plan of either placing the highest at the back of the border if it has only one walk, or, if a bed has a walk on each side, the highest in the middle, and the plants sloping down to the walk on each side. The mixed system still has its advocates, who deprecate the modern plan of massing color as being too formal, and too unnatural a way to dispose of flowers. But be that as it may, we will not stop to argue the matter further than to state, that on a visit to England in 1872, and again in 1885, it was most evident that the "Carpet Styles" of massing plants, as done at Battersea Park and

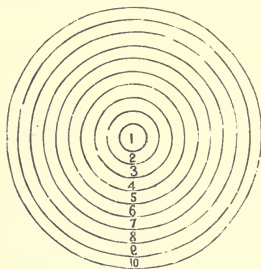


Fig. 8.—DIAGRAM OF FLOWER BED.

other public gardens in London, were interesting to the people in a way that no mixed border could ever be. Any one who has not yet seen the wonderful effects produced by the massing of plants in this way, has a treat before him. Nearly all the public parks in and about London are so planted, and thousands of cottage gardens vie with each other in imitation of the parks. But to plant in patterns or in ribbon lines requires for immediate effect a large number of plants, for the reason that they must be so set out that they will meet to form continuous masses shortly after planting.

An illustration in circles (for convenience) is given in figure 8, to show what plants can be massed together to give a pleasing effect. Of course, it will be understood that a bed of any shape can be planted in this manner as well as circular beds, only keeping in view the *width* of

the bed. For example, a bed having a diameter of ten feet may require eight or ten different kinds of plants to form the necessary contrast, while that of five feet will not require more than half that number. The following named plants are well suited for planting in masses or ribbon lines. They are named as nearly as possible in the order of their height, number one in each case being the tallest. Many will require to be "pinched back" to keep them at the proper height, so that the outline will form a regular slope from the center, or highest point, down to the front or lowest point. Thus, in list No. 1, *Canna*



Fig. 9. —SECTION OF FLOWER BED.

Indica zebrina will grow six feet high, while *Lobelia Paxtoni*, the lowest, is less than six inches. The section given in figure 9 will give an idea of the arrangement of a bed of this kind.

LIST NO. 1.

*Average height
in feet.*

1. <i>Canna Indica zebrina</i> , leaves green and brown striped.....	6
2. <i>Salvia splendens</i> , flowers scarlet.....	5
3. Golden Coleus, leaves orange and brown.....	4
4. <i>Achyranthes Lindeni</i> , leaves rich crimson.....	3
5. <i>Phalaris arundinacea</i> var., leaves white and green.....	2½
6. <i>Achyranthes Gilsoni</i> , leaves carmine.....	2
7. Bronze Geranium, leaves golden bronze.....	1½
8. <i>Centaurea candida</i> , leaves white.....	1
9. <i>Alternanthera paronychioides major</i> , leaves crimson and yellow ½	½
10. <i>Lobelia Paxtoni</i> , flowers blue.....	½

LIST NO. 2.

Average height
in feet.

1. Caladium esculentum, leaves large green.....	5
2. Japanese Maize, leaves striped white and yellow.....	5
3. Coleus Verschaffeltii, leaves chocolate crimson.....	4
4. Delphinium bicolor, flowers blue and white.....	3
5. Cyperus alternifolius var., leaves white and green.....	2½
6. Achyranthes Verschaffeltii, leaves crimson.....	2
7. Mountain of Snow Geranium, leaves white and green.....	1½
8. Tropæolum Ball of Fire, flowers flame color.....	1
9. Echeveria metallica, leaves gray, metallic lustre.....	1
10. Alternanthera paronychioides aurea, carmine.....	1

It will be understood that these lists of plants can be transposed in any way necessary to suit beds of all widths, keeping in view, that where small beds are placed near walks the lower growing kinds are most suitable, while for beds at greater distances from walks, or other points of view, the taller growing kinds must be used. Very fine effects are produced by planting on a lawn a single specimen of stately habit, such as some varieties of the Ricinus, or Castor Oil Bean, which grow ten and twelve feet in height in one season, and are particularly striking plants. Or, instead of this, a mass of six, eight, or twelve plants of Scarlet Sage will form a group six feet high by as many in diameter, and its dazzling scarlet color, contrasting against the green of the lawn, is superb. Many of the Amaranths are also well suited for planting in single groups. *Amarantus tricolor gigantea* (Joseph's Coat) grows to the height of six feet, and its leaves, in the late summer and fall months, exceed in brilliancy of color anything we know of in foliage; scarlet, crimson, and golden yellow predominating. Another, the *Amarantus bicolor ruber*, grows to the height of five feet, and is plumed with scarlet crimson. In contrast to these, plants of a more somber tint may be used, in individual specimens or in a group of such as Pampas Grass (*Gynierium argenteum*), or the Ravenna Grass (*Erianthus Ravennæ*). Each of these attain a height from six to ten feet, and have a

graceful appearance. The Japan Ribbon Grass (*Eulalia Japonica variegata*) and the Zebra Grass (*Eulalia Japonica zebrina*) each grows to a height of seven to nine feet, are perfectly hardy, and are grand plants for grouping or planting singly on the lawn. Besides being ornamental in foliage, their flower spikes, which, when developed, somewhat resemble ostrich plumes, add much to their beauty. These flower spikes are easily dried, and can be kept for years, making unique parlor ornaments. The Tanyah (*Caladium esculentum*) is a tropical looking plant growing three or four feet in height, and producing leaves sometimes eighteen inches across.

THE CARPET STYLE OF FLOWER-BED PLANTING

is now done largely in nearly all the public parks of the large cities in Europe, also with us, particularly in Chicago, Philadelphia, Boston, and Alleghany City. But in the great Central Park of New York and the Prospect Park of Brooklyn, all such ornamentation is mostly conspicuous by its absence, or is in quantity so meagre and in style so wretched as would disgrace a village of 5,000 inhabitants. But if we of New York suffer by the incompetency or want of taste in the management of our public parks, we have certainly reason to be proud of the efforts of some private gentlemen here. The private grounds of William B. Dinsmore of Staatsburg, N. Y., and John Hoey of Long Branch, N. J., have been noted for years for their grand display of carpet bedding—unequaled, perhaps, by anything else in the world. Mr. Hoey's, from its proximity to the famous summer resort of Long Branch, is visited daily by thousands, the private grounds of the munificent owner being thrown open as a public park. In the season of 1886, four beds in the grounds of Mr. Hoey were said to contain a million and a half of plants, arranged so artistically that at a distance they

might easily be mistaken for carpets laid out to air on the green lawn. In fact, a story is told of a thrifty old Jersey farmer and his wife, who had never seen these living carpets before, and who, happening to be driving in the grounds one day when a shower came up, drove up to Mr. Hoey's residence and told the servants to get in the carpets, as they were getting ruined by the rain ! The example set by Mr. Hoey in clothing his grounds in this gorgeous coloring, where it is seen by tens of thousands annually, has had more to do with extending the taste for the lawn decoration of flower beds than perhaps all other sources combined. The carpet style, so called, consists in using plants that can be kept down to a few inches above the level of the lawn. A great variety of succulent plants are used, such as *Echeverias*, *Sedums*, *Mesembryanthemums*, etc., together with numerous low-growing Alpine plants, such as *Ajugas*, *Cerastiums*, *Lysimachias*, *Lobelias*, *Ivies*, *Alternantheras*, etc., etc. This style of bedding requires an immense number of plants. One bed in the carpet style at Battersea Park, London, containing less than 1,000 square feet, required 4,000 plants to produce the desired effect in the design, and not a leaf of these was more than six inches above the lawn. Planting in this style admits of unlimited variety in the form of the beds and contrasts of colors. So great is the care exercised abroad in arranging the designs that colored papers, giving the exact tints of the leading flowers and colored foliage, are supplied by the dealers, in order that colored designs may be made and studied before putting them into execution ; for a single misplaced color may spoil the effect of the whole. In works of this kind the parts of the design should be separated by well-defined portions of turf, as the color of each member of it is brought out more clearly and distinctly, and the whole has a much better effect if a liberal amount of green is introduced. Figure 10 is introduced

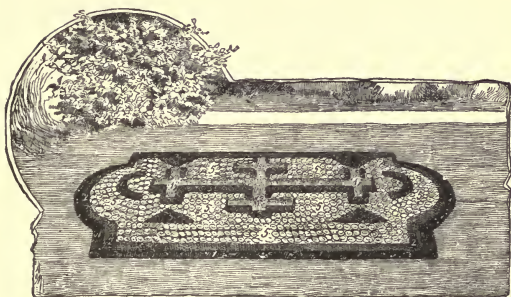


Fig. 10.—CARPET BED AS PLANTED.

- | | |
|--|---|
| 1. <i>Alternanthera paronychioides</i> major or Rainbow Plant, Crimson shaded. | 3. <i>Echeveria Californica</i> , Deep Sea Green. |
| 2. <i>Alternanthera aurea nana</i> , Golden Yellow. | 4. <i>Alternanthera versicolor</i> , Carmine and Rose |
| | 5. <i>Echeveria secunda</i> , Pale Bluish Green. |

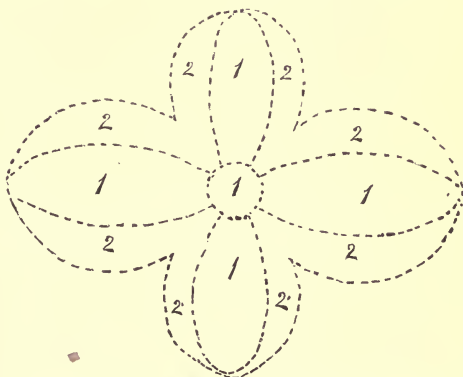


Fig. 11.—DESIGN FOR FLOWER BED.

1. Crimson Coleus.

2. Golden Coleus.

to give an idea of some of the simpler designs, as they appear when planted to produce the best effect. The planting of "Carpet Beds," when succulent plants are used, is costly from the necessity of setting them so

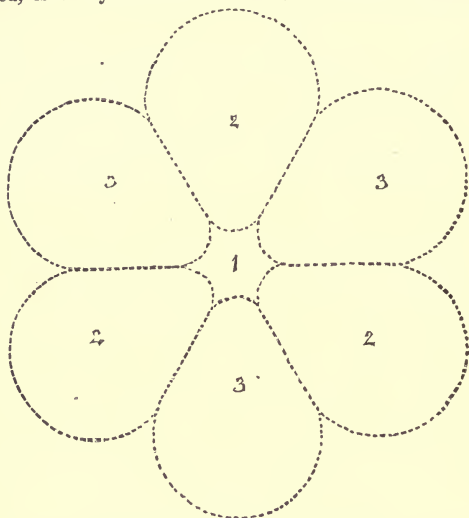


Fig. 12.—DESIGN FOR FLOWER BED.

1. *Coleus Verschaffeltii*, Crimson. 2. *Geranium General Grant*, or other Scarlet. 3. *Geranium Queen Olga*, Pink.

close that the whole ground has to be covered, as the growth of these is comparatively slow.

PLANTING IN RIBBON LINES, AND MASSING IN COLORS,

are in more general use than Carpet Bedding, not only for being much cheaper—the plants used being less costly—but, as they are of more vigorous growth, they can

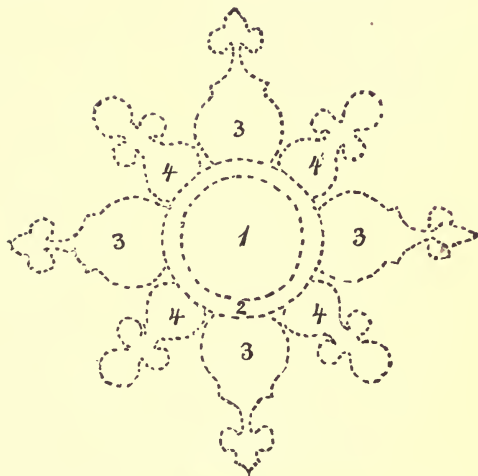


Fig. 13.—DESIGN FOR FLOWER BED.

1. *Alternanthera paronychioides major* (Rainbow Plant). 2. *Alternanthera aurea nana*. 3. Dwarf Scarlet *Tropæolum*. 4. Blue *Lobelia*.

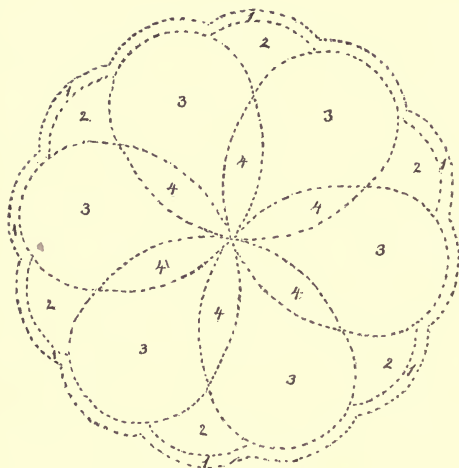


Fig. 14.—DESIGN FOR FLOWER BED.

- | | |
|---|---|
| <p>1. <i>Coleus</i> Golden Bedder.</p> <p>2. <i>Geranium</i> General Grant, or
other Scarlet.</p> | <p>3. <i>Coleus</i> Verschaffeltii, Crimson.</p> <p>4. <i>Dracæna</i> indivisa.</p> |
|---|---|

be set much farther apart, usually from nine to twelve inches each way. All such planting must necessarily be largely a matter of taste, although, of course, sharply contrasting colors make the most striking effects. As a rule, it is best to have comparatively few colors, and this will

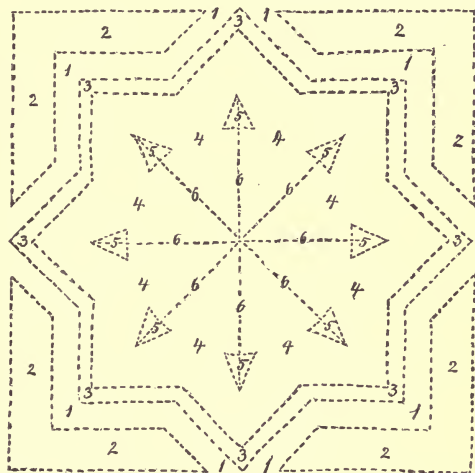


Fig. 15.—DESIGN FOR FLOWER BED.

- | | |
|--|--|
| 1. Grass. | 4. Grass. |
| 2. Blue Lobelia. | 5. <i>Alternanthera paronychioides</i> |
| 3. Dwarf Scarlet <i>Tropæolum</i> . | (Rainbow Plant), Crimson. |
| 6. <i>Alternanthera aurea nana</i> , Yellow. | |

account for our recommending comparatively few varieties of plants for the designs here given as examples. One important point in all planting of this kind is to trim the plants so that they shall form clear defined lines; that is, if they, in growing, overlap one another, they must be pinched back so that each color shows

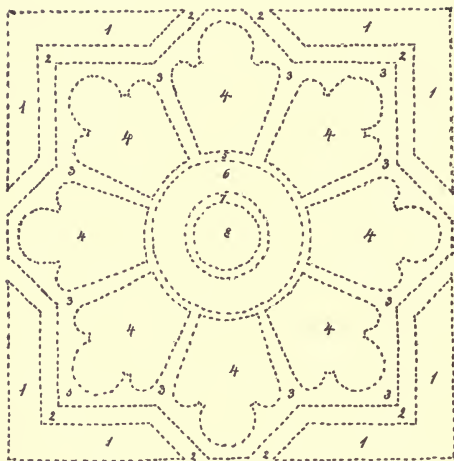


Fig. 16.—DESIGN FOR FLOWER BED

- | | |
|---------------------------------------|--|
| 1. Blue Lobelia. | 5. Anthemis coronaria, Double Yellow Marguerite. |
| 2. Alternanthera aurea nana, Yellow. | 6. Pink Geranium. |
| 3. Achyrantes Lindenii, Deep Crimson. | 7. Dracæna indivisa, or Fountain Plant. |
| 4. Geranium Mountain of Snow, White. | 8. Geranium General Grant, Scarlet. |

clearly and distinctly where they meet, also that the top growth be so pinched back that the bed presents a smooth and even surface.

“Ribbon lines,” so called, are where two or more lines

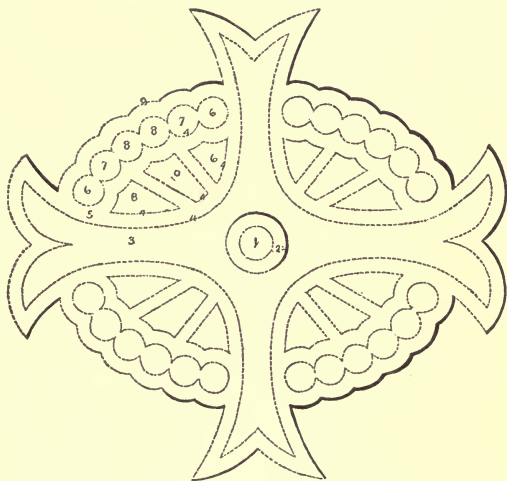


Fig. 17.—FANCY BEDDING AT LINCOLN PARK, CHICAGO.

- | | |
|---------------------------|-------------------------------|
| 1. Vase. | 6. Geranium Wonderful. |
| 2. Coleus Bacon. | 7. Geranium Madame Thebaud. |
| 3. Coleus South Park Gem. | 8. Geranium Mountain of Snow. |
| 4. Achyranthes metallica. | 9. Gnaphallum lanatum. |
| 5. Coleus Mary Stewart. | 10. Coleus Verschaffeltii. |

of color are planted along margins of drives or walks. “Massing in colors” is shown in the designs here given, figures 11, 12, 13, 14, 15, 16, and 17. These illustrations were designed by George A. Solly & Son, Springfield, Mass.

CHAPTER X.

FALL OR HOLLAND BULBS, ETC.

THESE bulbs are mainly such as are imported from Holland in the fall, and consist of Hyacinths, Tulips, Crocuses, Jonquils, Narcissuses, Snow-drops, Lilies, and various other less known kinds. With few exceptions, all these bulbs are hardy in our most northern states, though all are benefited by a covering of two or three inches of rough litter or leaves spread over the beds before freezing weather. The soil best suited for all bulbs is a rich, but rather sandy loam. All these bulbs may be planted at any time from the middle of September until the ground is closed by frost in December. Hyacinths should be planted at distances of six or eight inches apart each way, and from three to four inches deep. Tulips, the same distance apart, but a little less deep. Crocuses three inches apart and two inches deep. Jonquils and Narcissuses may be planted four inches apart and four inches deep. Snow-drops the same as Crocuses.

Very fine effects are produced by planting Hyacinths in lines each of one color, but when mixed colors are placed in the lines, care must be taken to have them arranged so that the bed will give a harmonious blending of color. Crocuses have nearly the same range of color as the Hyacinth, and may be planted either way.

All these bulbs are easily grown in pots. The Hyacinth requires a pot six inches in depth and diameter. In potting it is only necessary to fill the pot rather loosely to the brim, and press the bulb down, so that only about one-fourth of it appears above the soil. The pot should then be struck smartly on the bench to give the soil the proper degree of firmness, leaving it, when finished, about an inch or so below the rim of the pot. Then

water freely to still further settle the soil. When pots are not convenient, boxes four inches deep, setting the bulbs six inches apart, will do quite as well. The pots or boxes should then be placed where it is cool and dark, which will encourage a strong development of roots before the bulb starts to grow at the top. Such a situation can be made by covering up the pots or boxes with four or five inches of sand or leaves in a cool cellar, under the stage of a cool greenhouse, or in a sunken pit, or in some sheltered spot in the open air, in each case covering with sand or leaves, so as to exclude heat and frost; for it must not be forgotten that a strong development of root can only be had at a low temperature, say from forty to fifty degrees, and any attempt to force bulbs to make roots quicker by placing them in a high temperature, will most certainly enfeeble the flower. If we only observe how nature points out to us this necessity, we will see how safe it will be to follow her. In all hardy plants, the roots in spring (when the temperature is low) begin to form the rootlets before a leaf or flower is developed. To show the bad effects when this is not the case, take a root of any of our hardy Lilies and plant it in March, and take a similar bulb and plant it in May; it will be found that the early planted bulb, that had an opportunity to slowly develop its roots before there was heat enough to start the top, will give a finer growth and finer flower than the bulb that was planted in May, and ran up into growth before it had an opportunity to sufficiently push its roots into the soil. The culture of all the bulbs before named, in pots, is the same as that of the Hyacinth, only the Narcissuses and Tulips should be planted three or four in a six or seven-inch pot, and Crocuses ten or twelve in a pot. All these bulbs may likewise be grown in moss, or even pure sand, provided that it is kept damp; the necessity being a medium wherein the roots can revel in moisture. But whether potted in

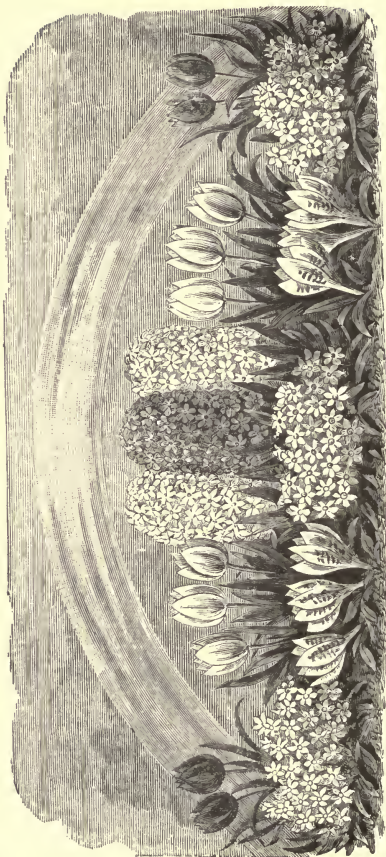


Fig. 18.—GROUP OF HOLLAND BULBS.

soil, sand, or moss, there will be no need to further water in this semi-dormant state (if they have been well watered at the time of potting), provided the pots have been covered up as directed, and kept cool and dark. If potted say the first week in October, they may be removed from their dark quarters in seven or eight weeks, only, before doing so, turn a few of them out of the pots to see whether they have rooted around the ball of earth. They may then be placed in full light and watered freely.

Holland Bulbs are also very effective in groups planted in the open border. The accompanying illustration, fig.18, shows a group of about thirty bulbs, consisting of Hyacinths, Tulips, Narcissuses, and Crocuses, arranged so as to give the greatest contrast in colors.

HYACINTHS IN GLASSES.

Although Jonquils and Narcissuses can be grown in water in glasses as well as the Hyacinth, they are not often so treated, Hyacinths being the only bulbs largely flowered in that way. The glasses for growing the latter bulbs in water, are made in various styles, from the plain old-fashioned Belgian to the ornamental Bohemian, and are either plain glass or colored green, amber, claret, and other shades. The glasses, which are best of a dark color, are filled with water just high enough for the base of the bulb to touch it. The glasses must be placed in a cool and dark place. Care must be taken that the water does not freeze, else the glasses will be broken, and the Hyacinths more or less injured. Single Hyacinths are better than double ones for glasses. The water should be changed every six or eight days.

THE BERMUDA EASTER LILY (*Lilium Harrisii*).

This is a grand variety of the well-known *Lilium longiflorum*, or Trumpet Lily. It was introduced seven

years ago from Bermuda, where it was found under cultivation. It differs from the old variety in being much larger in size; but its most valuable quality is, that it can be grown to flower in the greatest profusion from the Christmas Holidays throughout all the winter months until spring, according to the time it is planted and the temperature at which it is kept. Tens of thousands of it are now grown for church decoration at Easter; hence the name. The manner of cultivation is very simple, and need never fail in the hands of even the most inexperienced amateurs. The bulbs should be planted in what are called five-inch pots, that is, five inches deep and five inches wide at rim. The soil should be rich, at least one-third old, well-rotted manure. The pot should be rather loosely filled with this soil, and the bulb pressed down deep enough to cover the bulb merely. This may be done any time from the middle of August until December. Those potted in August will be in flower by the Christmas Holidays; those in October, November, and December correspondingly later.

After potting, one of the most important things to observe is the proper placing of the pots containing the bulbs. Like all other bulbs, to get the best results in flowering, the pots must be filled with roots before the tops start to grow; and, to do this, they must be placed in some cool place and excluded from the light. Those potted in August, September, or October can be placed outside, in the open air, and covered completely up with leaves or litter to the depth of four or five inches, until, on examination, the roots are found to be formed around the ball of earth. They should then be placed in the greenhouse or sitting-room, and if kept in a temperature of from sixty to seventy degrees, will come into bloom throughout January and February. Those potted later—say in November or December—should be placed in a cool cellar or cold frame, and covered up in the same



Fig. 19.—POT CULTURE OF THE BERMUDA EASTER LILY.

way as recommended for those placed out of doors, until they also form roots, when, if placed in the light, in greenhouse or sitting-room, they will flower from February to April, if kept in a temperature of sixty or seventy degrees. Each bulb will give from three to twenty flowers, according to size, and not one in a hundred will fail if these simple directions are followed. The flowers are four or five inches in length, and frequently much longer, of the purest white, and of the most delicious fragrance.

The Bermuda Lily is entirely hardy, when planted in the open ground, south of Washington, and will stand our winters in nearly all parts of the Northern and Western States, if covered up with four or five inches of dry leaves or litter, on the approach of cold weather in December.

Lilium candidum was formerly known also as the Easter Lily, but the Bermuda Lily (*L. Harrisii*) has so superseded its use for Easter decoration, that it is hardly now known as such. It is entirely distinct from the other, and grows from two to three feet in height, producing from six to ten flowers in a whorl at the top. Its culture, both for forcing and growing in the open ground, is almost identical with the Bermuda Lily, and it is well worthy of cultivation.

LILY OF THE VALLEY (*Convallaria majalis*)

is one of the most chaste and beautiful of all flowers. When planted in the open ground, where it is entirely hardy, its flowers are one of the first harbingers of spring. It is forced in immense quantities for winter flowers. The treatment is almost identical with that for Hyacinths and Lilies, only, whether the "pips"—the single "eyes"—or clumps containing a dozen or more "eyes" are used, they should be packed closely together in shallow boxes, and placed out of doors or other cool place for eight to nine weeks before being brought in to force for flowers

in winter; but, unlike bulbs, the Lily of the Valley does not make any root growth while outside. The object of placing it outside at all is to give it a period of "rest," which is absolutely necessary before it can be forced into flower. Lily of the Valley roots are not usually



Fig. 20.—LILY OF THE VALLEY.

to be had before the first of November; and if placed in boxes then and set outside, they should not be brought in to force until the end of December. If then put in a temperature of from seventy to eighty degrees, they will come into bloom in from ten to fifteen days. It is best to bring in a few at a time, so that they can be had in bloom throughout the winter; or, if wanted at any partic-

ular time after New Year, they can safely be relied on to flower in ten or fifteen days after being placed in a heat averaging eighty degrees. It is a good plan to cover the boxes slightly over with moss, so as to keep as moist an atmosphere as possible around the crowns while forcing them into flower.

There is one rather discouraging feature to amateurs

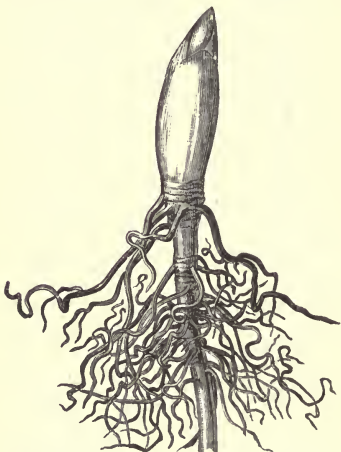


Fig. 21.—LILY OF THE VALLEY "PIP"—GOOD.

in forcing Lily of the Valley, and also with most bulbs, in the fact that, after being thus artificially treated, the crowns are of no further use, to force at least. They may be planted out in the open ground in spring after forcing, and will recuperate to some extent in a year or two, but the same crowns once forced will hardly ever do again for that purpose. An exception among bulbs is the Bermuda Lily, which seems to be in no way injured by being forced. The crown, or "pip," as florists sometimes call it, of the

Lily of the Valley, when sufficiently developed to flower, should be of the size and shape shown in figure 21.

THE TUBEROSE (*Polianthes tuberosa*),

when grown outdoors, should never be planted until the ground is warm. A good test (which our country readers can usually always avail themselves of) is never to plant the Tuberose until the corn crop is up two or three inches high, which, in the latitude of New York, is always about the first week in June. Dry bulbs or tubers then planted will usually flower in October. If wanted earlier, the dry bulbs should be started in moss or soil, in small pots or boxes, in a greenhouse or warm room, where there is plenty of light, about the first of May. Thus forwarded, if planted out by the first week in June, they will come into flower two or three weeks earlier.

Forcing the Tuberose—so as to have flowers during the winter months from January to April—cannot be done unless there are appliances of heat in the greenhouse that will keep up an average of eighty degrees, and that, too, with a moist atmosphere, as this bulb is of a nature that requires at all times a high temperature for its growth. It is, however, comparatively easy to have it produce flowers during November and December in the greenhouse by retarding the bulbs in some cool place until August. Planted then they make growth enough in the warm months of the fall to give them sufficient start to throw up the flower stems by the end of October. The greenhouse then, however, must be kept warm (say sixty-five at night with fifteen degrees higher in the daytime) for the proper development of the flowers during November and December. They should be set six or eight inches apart. The Pearl is the best for forcing, while the tall double is best for outdoor blooming. A new single variety of Tuberose, "The Albino," originated in St. Louis, Mo.,

in 1887. It has the peculiarity of throwing up from two to four shoots from each bulb, and occasionally two to three branches on each stalk. The flowers are of the purest white, star shaped, being more reflexed than the old sort. It is altogether a valuable variety, and is certain to be largely used for cut flowers. It is not yet offered for sale.

THE LILY (*Lilium*).

I have already alluded to varieties of the Lily that are used for forcing in winter, which at present is confined to the white varieties, *L. candidum*, *L. longiflorum*, and *L. Harrisi*. The hardy garden Lilies, which embrace a great range of color, are of the easiest cultivation, and, from the regal beauty of most of the species, are perhaps the most desirable of all our hardy perennial plants. They will flourish in almost any soil, though, like all other plants, a deep, rich, sandy loam is the best. Lily bulbs can be set out either in fall or spring. When planted in fall they should be covered with three or four inches of leaves or other litter; for, although perfectly hardy, withstanding the severest winter, all new plantations of any kind of plant are helped by a protection the first winter after planting. In spring planting they should be set out just as early as the ground is dry enough to work. The bulbs may be set, according to size, from three to four inches deep, and, if beds are to be formed of them, from nine to twelve inches apart. Although they will not bloom in complete shade, yet a position of partial shade is congenial to them; and they will do equally well in open sunshine. The finest species are from Japan, though we have some very beautiful native kinds. The following list comprises the best known kinds: *L. auratum*, or Golden Banded; *L. speciosum* and its varieties; *L. Krameri*, *L. Leichtlinii*, *L. tigrinum* *flora plena*, *L. Thunbergianum* in variety, *L. longiflorum*.

L. candidum, the oldest known species, comes from the Levant. Asia furnishes *L. Chalcedonicum*; Siberia the beautiful little *L. tenuifolium*, which is there grown as an article of food. The United States contributes *L. superbum*, *L. Canadense*, *L. Philadelphicum*, *L. Catesbæi*, *L. Carolinianum*, and *L. Columbianum*, together with *L. Washingtonianum*, *L. Humboldtii*, *L. parvum*, *L. Californicum*, *L. pardalinum*, *L. Roezlii*, *L. Parryi*, and *L. Walkeri*, from California. It may be added here that the California Lilies often remain in the ground a whole year before starting to grow.

THE CALLA,

or Lily of the Nile, is now known to botanists as *Richardia Æthiopica*. It is largely grown for winter flowers, and is of the easiest culture, the only attention being an abundance of moisture, and an average temperature of seventy degrees, whether grown in the greenhouse or sitting-room. Although it will grow and flower during the entire season without resting if sufficiently fed by being re-potted, yet it is more profitable to dry it partly off, say from June 1st to September 1st. This is best done by placing the pots on their sides outdoors, so as to prevent the rains from wetting the soil, and covering them slightly with hay or moss, so as to keep the sun from drying the roots too much; or, if a position of partial shade can be had, there will be no need of covering the pots. The roots thus rested will flower more abundantly and produce fewer leaves, and thus twice the number of flowers may be obtained from the same space. The bulbs are now being grown largely in California, where they are dried like Tuberoses and purchased by florists in the Eastern States. Thus dried, far more flowers are produced than when the bulb is kept growing.

It is not well to give the Calla too much pot room, else

too much foliage is produced. We have found the best method to be not to use too large pots, and to use liquid manure freely, made from one bushel of cow dung to twenty-five or thirty gallons of water, or one pound of guano to ten gallons of water. When an excess of leaves occurs, cut them off freely, withholding water somewhat for a week or so after cutting the leaves off. By this method the plants can be grown closely together, and a larger crop of flowers obtained from the same space.

The Calla is one of the best of winter-flowering plants for room culture, needing little care beyond abundant water, and an occasional syringing or washing of the leaves to keep them free from dust and red spider. It is also a good plant for a large aquarium. The *Dwarf Calla*, a sport from the original species, is identical in all respects except that its flowers and leaves are about half the size of the original. *R. alba-maculata*, a species with beautifully variegated or spotted foliage, makes a showy plant. The flowers are smaller than the Calla, and white, with purple throat. It comes into flower in May and June, making it valuable for a succession. It is also desirable in a collection of plants with variegated foliage. Another species, *R. hastata*, is somewhat similar to *R. alba-maculata*, except that the flowers are a deep yellow with a purple throat. There is still another kind of "Calla," sometimes called the "Black Calla," from the very dark crimson of its velvet-like flowers. It is really, however, a plant of another genus, known as *Arum Palestinum*. It is quite a scarce plant as yet, but will be a great acquisition from its unique and novel color. Unlike most species of the genus *Arum*, the flowers of this are of a pleasing fragrance. The species are all propagated by offsets, which should be taken off when the plant is at rest, and grown on in small pots for one season.

GLADIOLUS.

There is perhaps no bulb that is so satisfactory or so easily cultivated as the Gladiolus; no other bulb embraces such a variation of color, comprising nearly every shade except blue. With the simplest culture there is an absolute certainty that they will flower, provided they are planted in fairly good soil and where they will not be shaded.

Time to Plant.—During the winter, Gladiolus bulbs, whether large or small, should be kept in a dry, cool cellar. As the bulb is nearly hardy, plantings may be made as soon as the ground is fit to work in spring; and even should the ground be slightly frozen after, they will sustain no injury.

Bulbs set out during April will be usually at their best flowering in August, but “succession plantings” may be made every ten days until the middle of July, which will give a succession of bloom the entire season. It is a common practice, with the New York florists, to reserve Gladiolus bulbs until August, which are then planted in boxes four or five inches deep, in rich soil. The boxes are kept out-doors until frost, when they are placed in a cool greenhouse, where they flower in November, at a time when everything is done outside.

Whether planted in the open ground or in boxes for forcing, they should be set at from six to seven inches apart, and about two to three inches deep, that is, so that the top of the bulb will be covered an inch or an inch and a half.

Gladiolus are admirably suited for cut-flower work, as they will keep for eight or ten days, and the unexpanded buds, if showing color, will develop fully when the stem is cut and placed in water. In addition to the fine hybrid varieties long in cultivation, M. Lemoine, of France, in 1884 succeeded in producing a new class, entirely

novel and of wonderful beauty. Each petal is spotted with crimson, carmine, scarlet, or rose, somewhat resembling the finest kinds of the Fancy Pelargoniums or Orchids.

THE AMARYLLIS (*Amaryllis*).

All the kinds are eminently ornamental and easy of culture, the great secret being to give them alternately



Fig. 22.—AMARYLLIS. (*Vittata* Type.)

a season of excitement and a season of repose. To do this effectually, the plants should be abundantly supplied with water and heat, and placed near the glass when they are coming into flower, and water should be withheld from them by degrees when they are done flowering, till they have entirely ceased growing, when they should be kept quite dry and in a state of rest. When in this state they may be placed in any obscure part of a greenhouse or in a cellar where it is dry, and of a temperature not under forty degrees. If kept in such a

situation during winter, some kinds may be turned out into a warm border in spring, where they will flower; and if the season be fine, they will ripen their bulbs in time to be taken up before the approach of frost.

The chief value of these plants, however, is to produce flowers in the winter season, which they readily do if they are kept dry and dormant during the latter part of the summer and autumn. Indeed, by having a large stock of these bulbs, a regular succession of flowers may be obtained during the year. When the dormant bulbs are wanted to be thrown into flower, they should be fresh potted in sandy loam and leaf mold, and put in a hot-house, hot-bed, or warm sitting-room, at any date from October to January, when the dry bulbs can be had. They should be kept rather dry, and covered up with leaves until the pot is well filled with roots, just as is done in forcing Hyacinths or Lilies, except, in the case of *Amaryllis*, the temperature requires to be kept ten degrees higher, the heat beginning at fifty degrees, and ascending to sixty or seventy degrees; and when the leaves or the flowers appear, the plants should be abundantly supplied with water. Our long and warm summers enable us to cultivate many of these beautiful bulbs in the open air, by merely protecting the roots in winter in some dry, warm cellar, as we do Dahlias or Potatoes.

THE CYCLAMEN.

Many amateur florists have an ambition to grow this beautiful bulb, and it is often done well even in an ordinary sitting-room, though, as it requires a season of rest, it is often injured by this not being given properly or at the right time. Cyclamen bulbs, in the dry state, can be procured usually from seedsmen in September or October. When received they should be potted in five, six, or seven inch pots, according to the size of the bulb. The pots should be well drained and filled loosely with rich, soft

soil, such as is composed of one-third leaf mold being best. Press the bulb into the earth so that its top is level with the surface. Give it a good watering, and then place it in some dark closet or cellar for three or four weeks, when it may be brought into the light. The bulbs can often be bought already started from the flor-



Fig. 23.—CYCLAMEN.

ists, when they may be placed among a general assortment of plants that are kept at fifty degrees at night with ten to fifteen higher in the daytime. The Cyclamen flowers usually from January to April. When done flowering the plants should be dried off by laying the pots on their sides, as recommended for Callas, say from May to September, and then started again in the way advised above.

CHAPTER XI.

PROPAGATION OF PLANTS BY SEEDS.

NATURE provides abundantly for the reproduction of plants, and the difficulty of multiplying by one method is compensated by the ease with which it may be done by another. Whenever we find a plant that takes root with difficulty from "slips" or cuttings, in nine cases out of ten we find that it seeds freely, and gives us a ready means of increase. Thus we find that the much-admired *Centaureas*, one kind of the "Dusty Millers" (the white-leaved plants now so much used in massing and for baskets) are exceedingly difficult and slow to root from cuttings, but are readily raised from seeds. Our fine strains of blotched *Petunias* are also troublesome as cuttings, but make plants quickly from seeds. The *Cyclamen*, with its turnip-like stem or bulb, could only be propagated by cutting it in pieces, disfiguring its shape, and requiring years to form a circular bulb again; but here we have seed coming to our help, which germinate freely, and make flowering plants in one year. The Apple *Geranium* never affords proper cuttings from which to make a plant, but it seeds freely, from which splendid plants can be produced in a few months. So the *Primulas* and *Cinerarias*, both slow and uncertain from cuttings, seed freely. *Echeveria metallica*, one of the beautiful plants of the Houseleek family, produces no bud from the base of the leaf, as nearly all the other species do; but, to make up, it seeds abundantly, and so with hundreds of other plants to which our space will not permit us to refer. There is no rule by which we can designate what plants are best propagated by seeds, and what by cuttings, experience being the only teacher, and even the experience of a lifetime is too short for

those of us that have had the largest practice. The descriptive catalogues issued by seedsmen and florists are now excellent practical guides in this matter, as the seeds of all plants best propagated from seeds are offered in the seed department of the catalogues, while those that are usually propagated by cuttings are offered in the plant catalogues.

Seedling plants can be nearly as well raised in the window of a sitting-room or parlor, provided the temperature is right, as in a greenhouse, for seeds do not need a strong direct light while germinating; in fact, that is often a difficulty in a greenhouse, as the surface of the seed-bed dries up too quickly in the direct sunshine, necessitating watering, which bakes the surface. The best thing wherein to sow seeds is a shallow box, which need not be more than two inches deep, with open seams at the bottom through which water will drain quickly. Fill the box within half an inch of the top with light rich earth. If it can be procured, nothing is better than black leaf mold from the woods, or light sandy soil mixed with an equal bulk of stable manure, so rotted as to resemble leaf mold; but it will not answer unless rotted as fine as dust. In the absence of either of these, sweepings from a paved street are excellent, mixed with light sandy soil, the object in all cases being *lightness* of the soil or mold in which the seed is to be sown; for if tiny seeds, as many of our flower seeds are, are embedded in a stiff soil, the germ in many of them is too weak to push its way to the light. When the proper soil has been secured, pat it down with a smooth board until it is as smooth and level as it well can be; then sow the seed carefully over the surface, distributing it evenly, and with a common kitchen sieve sift just so much earth evenly over the seed as will cover it and no more, pressing it down again with the smooth board; next take a watering pot with the finest kind of a rose, and shower the earth with the spray.

Keep the box at a temperature as near sixty degrees as possible at night, with ten degrees higher in the daytime, taking care to give it a shower of spray only when the surface appears to be dry. But few seeds will fail to germinate under such conditions. This temperature will suffice for the germination of seeds of nearly all annuals and general assortment of greenhouse plants, which may be sown in greenhouse, hot-bed, or sitting-room, from January until March; by that time, as the season gets warmer, seeds of tropical plants, such as Coleus, Egg Plant, etc., may be sown. But after the seeds have "braided," as the Scotch gardeners say, comes another difficulty. In quite a number of plants, particularly if sown in the house, just as soon as the seed leaf has developed, and before the first rough or true leaves have formed, the seedling is attacked by a minute fungus, that will often sweep off the whole crop in forty-eight hours if not attended to. The required attention is, that as soon as there are indications of the "damping off" of these tiny seedlings, they must be carefully taken up and planted out in similar boxes, prepared exactly as the seed-boxes have been. They may be planted quite closely, not more than half an inch apart, and let their further treatment be exactly the same as in germinating the seeds. In the course of a few weeks they will have grown freely, and they may then be lifted and placed in similar boxes, but wider apart, say three or four inches, or potted singly in two and a half or three-inch pots, as most convenient, until such time as they are to be planted out in the open ground, or used otherwise. In this way as great a number of plants may be raised from a twenty-five or fifty cent packet of seed as would cost \$25 or \$50 to purchase in plants, besides the far greater satisfaction of their being the product of your own hands.

CHAPTER XII.

PROPAGATION OF PLANTS BY CUTTINGS.

THERE is no more interesting operation to the amateur gardener than that of increasing his stock of plants by cuttings or slips. Heretofore it was accounted a great mystery, and unless with some of the commonest kinds of Geraniums, few amateurs ever presumed to invade the territory of the professional gardener. Nearly all writers on the subject had so befogged this simple matter with technical nonsense, that few, not regularly brought up to the business, presumed to attempt it. We now consider it one of our simplest operations; far simpler than raising many kinds of plants from seed. Though we raise over two millions of plants annually, and keep a professional propagator with three assistants doing nothing else the entire year but propagating plants from slips, yet we could take any careful, intelligent man from among our garden laborers, and install him as a competent propagator in a year, and for many of the commoner things in half that time. Where plants are propagated from cuttings in large numbers, we elevate a bench, usually four feet wide, above the flue or hot-water or steam pipes, to within a foot or so of the glass at the front, and on this table or bench we place three or four inches of sand, of any color or texture, provided it is not from the sea-shore (which contains salt). This bench is boarded down in front, so as to confine the heat from the flue or pipes under it, and give what is called "bottom heat." The sand on a bench so formed will indicate a temperature of perhaps seventy degrees, while the atmosphere of the greenhouse, particularly during the night, will be ten degrees less. Now, if the cuttings are in the right condition, and are inserted an inch or so in the sand, freely watered, and shaded

from the sun from 9 or 10 A.M. to 3 or 4 P.M., cuttings of nearly all kinds of plants are certain to take root in from ten to twenty days. But the cutting must be in the right condition, and this is best shown by the engraving (figure 24). It will be observed that the upper portion of the shoot is snapped or broken, while the



Fig. 24.—PROPER AND IMPROPER STATE OF CUTTING.

other is only kneed or bent. This “snapping point,” as we now term it, is a true indication of proper condition of the cutting. Where it bends and does not break, it is too hard; and though a cutting will root when in that condition, it will be slower in doing so, and the roots thrown out from it will be weaker and more wiry than when emitted from a cutting taken in the condition in which

it breaks. Besides, the plant grown from the older cutting is not likely to be so healthy or vigorous as one made when the shoot is in the proper state.

In propagating woody plants, such as Roses, Azaleas, or Camellias, this test of breaking or snapping of the cutting does not in these indicate the proper condition. Although they also will root if taken in the soft state, yet we find it is not quite so well to do so as to wait until the cuttings of these woody plants get harder. What this proper hardness is, it is not very easy always to determine. In Roses the best condition for taking the cutting is reached when the young shoot (of which the cutting is made) develops the flower bud to about the size of a large pea. Although the shoot on which the flower bud shows will make a proper enough cutting, yet, if it is not desired to waste the flower, cuttings had better be made of the "blind" shoots, *i. e.*, such young shoots as do not flower. In making the cuttings of Roses, or, in fact, of almost all plants (with a few exceptions hardly worth noting), there is no need to cut at a joint, although nine gardeners out of ten still do so, particularly those who have learned the business in Europe, where, in this as in many other things in horticulture, they still follow the dictum of some savant of a century ago, never questioning why. But our business necessities here have caused us to ride rough-shod over many of their set rules, and in none more ruthlessly than in this matter of propagating. But as this book is written mainly for amateurs in gardening, I will proceed to give a simple method by which any one can propagate plants from cuttings or slips, even when no greenhouse or hot-bed is at hand. It is called

THE "MUD" OR "SAUCER SYSTEM" OF PROPAGATING.

Take any common saucer or plate, into which put sand to the depth of an inch or so ; then prepare the cut-

tings in the usual manner, and insert them in the sand close enough to touch each other, as in figure 25. The sand is then to be watered to bring it to the condition of mud. The saucer with the cuttings is then placed on the shelf of the greenhouse, in the hot-bed, or in a sunny window of any room in the dwelling-house; in each case fully exposed to the sun and never shaded. But one condition is essential to success: until the cuttings become rooted, *the sand must be kept continually saturated with water and always in the condition of mud.* To do this the saucers must be watered at least once a day with a very fine rose watering pot, and the watering must be done very gently, else the cuttings may be washed out. There is every probability that ninety per cent. of all cut-



Fig. 25.—SAUCER PROPAGATION.

tings put in will take root, provided they were in the proper condition, and the temperature has not been lower than sixty-five degrees nor above one hundred. By the saucer system a higher temperature

may be maintained without injury, as the cuttings are in reality placed in water, and will not wilt, provided the water is not allowed to dry up. Still the detached slip, until rooted, will not endure a long continuance of one hundred degrees, and we advise that propagation be done at such seasons that the cuttings, wherever they may be placed, will have, as near as possible, an average temperature of seventy-five or eighty degrees *in the sunlight.* The cuttings will root (according to kinds and the temperature) in from six to twenty days. Verbenas, Heliotropes, Fuchsias, etc., root in a week, while Roses, Carnations, or Azaleas, take two, three, or four weeks. When rooted they should be potted in light soil (such as recommended in the article "Propagating of Plants by Seeds"), in pots from

two to three inches in diameter, and treated carefully by shading and watering for two or three days. The shading is best done by covering the cuttings, after they are potted off, with paper kept damp by sprinkling, say from 9 A.M. to 3 P.M. if the sun is shining on them. To such as desire more extended information on the subject of propagating plants by cuttings, I would refer to my work, "Practical Floriculture."

CHAPTER XIII.

PROPAGATING BY LAYERING.

ALTHOUGH florists now rarely resort to propagation by layering, yet now and then it may be desirable for amateurs to increase the number of some favorite plant during the summer season, where no other method of propagation can be used. The only difference between a layer and a cutting is, that the cutting is entirely detached from the parent plant, while the layer remains partly connected with it. Although layering may be done with the ripened wood of vines or shrubs of the growth of the previous season, yet it is preferable to use the shoot of the present year in its half-green state. For example, a rose or flowering shrub is pruned in the usual way in spring; by midsummer it will have made strong shoots one, two, or three feet in length from or near the

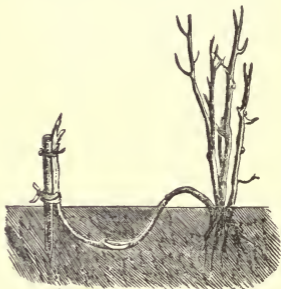


Fig. 26.—PROPAGATING BY LAYERING.

base of the plant. Take the shoot then in the left hand (after having stripped it of its leaves for a few inches on each side of where it is to be cut), keep the fingers under the shoot, and make a cut on the *upper part*, an inch or so in length, and to about half the thickness of the shoot; then slightly twist the "tongue" or cut part to one side, as shown in the engraving, figure 26. Having opened a shallow trench, fasten the branch down with a hooked peg, and cover with earth. It is a good plan to place a flat stone over the layer to prevent the soil from drying out. This plan of cutting the shoot in layering is rarely shown in illustrations on the subject, the cuts usually being represented at the under side of the shoot. When cut at the lower side, the shoot can not be laid down without danger of breaking it.



CHAPTER XIV.

ABOUT GRAFTING AND BUDDING.

It is often desirable to be able to bud or graft one variety of plant on another entirely different variety; and it is an interesting fact to know that the bud taken from one plant and inserted so that it grows in another, and is entirely sustained by the plant into which it has been budded, in no way changes its character. This fact is so well known to gardeners that they rarely think it necessary to mention it in writing on the subject, and many amateurs interested in horticultural matters have very confused notions on budding. To illustrate: if a leaf bud is taken from a white Rose, and inserted in the stem of a red Rose, all the branches that proceed from this bud, leaves or flowers, will be identical with the white Rose from which it was taken. Or if a leaf bud of the red Rose be inserted in the white, the same result will

follow ; it will be identical in all respects with the red variety. Or you may take a bud or graft from the sour-æst Crab Apple, and insert it into a branch of the sweetest Apple tree you can find, and the shoot which grows from the Crab Apple bud will ever remain a Crab, and will in no way be affected by the sweet Apple stock on which it is growing. Or if the operation is reversed, and the sweet Apple be budded or grafted on the sour, the result will be the same. Its individuality will be in no way changed ; it will be identical with the variety from which it was taken.

Still further to illustrate this matter of budding or grafting, you may take a Rose-bush having any number of shoots, it makes no difference whether one or a hundred. On each shoot you may bud a distinct variety of Rose, of all the colors, forms, or odors embraced in Roses, and each one will hold its distinct characteristic of color, form, or fragrance, be it crimson, white, pink, or yellow in color, double or single in form, or of tea or other odor. Or you may take a young seedling Apple tree, insert a bud of another into it, then, after that bud has made a growth, bud still another variety into that, and so on as many as is desired ; rub off all shoots in the stem that start below, and the variety last budded will hold its individuality unchanged, no matter though the life-sustaining sap flows through the cells of several different kinds. You may mark the space occupied by each of the varieties, and cut back to any particular variety, and the fruit that will be produced by that part, which will then be the top, will hold its character without change. What is true of Roses and Apples is, of course, equally true of whatever plant that can be grafted or budded.

The stock does not in any manner affect the individuality of the graft, and I supposed that this was one of the generally accepted axioms of horticulture ; but in a con-

versation not long ago with a gentleman whose opinion is entitled to consideration, I found him inclined to believe that there were some few exceptions to what had been admitted to be a general law, and in support of his argument he referred me for exceptions to Darwin's "Plants and Animals under Domestication." I have examined this work, and find but few cases wherein it is claimed that the graft is influenced by the stock, or the stock by the graft. At page 413, vol. i., is cited one of the most important, that of the *Cytisus Adami*, produced, it is claimed, by grafting the *Cytisus purpurea* on the *Cytisus Laburnum*. This so-called "graft hybrid" repeatedly showed its drooping racemes of flowers to be blended yellow and purple on the same raceme, and again, on the same plant, racemes clear yellow and clear purple unblended were produced. Again at page 457, vol. i., where "Prof. Caspary describes the case of a six-year-old white Moss Rose, which sent up several suckers, one of which was thorny and destitute of moss, exactly like those of the Provence Rose (*R. centifolia*), while another shoot bore both kinds of flowers, and in addition longitudinally striped flowers. As this white Moss had been grafted on the Provence Rose, Prof. Caspary attributes the above changes to the influence of the stock; but, from the facts already given, and from others to be given, bud variation with reversion is probably sufficient explanation;" and Darwin proceeds to give nearly a dozen cases of like variation where there was no grafting at all. A very marked case of this "bud variation" recently occurred in my own greenhouses. In a bed of about one hundred plants of the 'Tea Rose "La Nankin," all made from cuttings from one parent plant, we have had four distinct varieties. The original flower or bud has its base or lower half of a nankeen yellow color, while its upper half is pure white, the separate colors being clearly defined; yet among our plants from cuttings we have some flowers

that are entirely of the nankeen color, without white; then, again, pure white with no nankeen, and on one shoot the flowers came of a light pink or blush shade. Now had Prof. Caspary a grafted plant of "La Nankin" playing these freaks, he no doubt would have concluded that it was the influence of the graft on the stock. There are other instances in grafting where an amalgamation of individualities *apparently* occurs. These cases are familiar to all horticulturists of much experience, and are also alluded to by Darwin in the work above referred to. He gives a number of instances where the variegated Oleander grafted on the plain-leaved variety as a stock, imparts the variegation to the stock, or where a yellow-leaved ash tree, grafted on the common green-leaved variety, produced a blotched or variegated variety. That most of the variegation in the foliage of plants is due to disease, or at least some disturbance of the regular functions of the sap, there is but little doubt, and it is therefore but an accidental condition of the individual. Where a variegated plant is budded or grafted upon a healthy subject, the disease is transmitted from the unhealthy bud or graft to the healthy stock in a manner somewhat analogous to inoculation of smallpox virus in man. The character or constitution of the individual is in no way affected in the one case more than in the other. All who have been extensively engaged in the growing of plants, either in the greenhouse or in the open field, know that, when variegated kinds of almost any variety of woody plants are grafted on those having plain leaves, the variegation will be transferred to the plain-leaved stock, but the variegation *only*; it is changed in no other respect. The most common examples of this are the variegated *Abutilon*, variegated *Altheas*, or variegated *Ivies*, which almost invariably transmit the "diseased" foliage to the healthy stock; but there is never any change made in the coloring of the flower nor in the shape of

the leaves. I consider it most unfortunate for Mr. Darwin to have advanced the peculiarity of variegated leaves, as bearing on his theory of "graft hybrids." That leaf variegation is indicative of disease is manifest from many facts. It is quite a common thing to find a shoot sent out by the silver-leaved or variegated Geraniums that is pure white in stem and leaves, without a particle of green, or such golden variegated kinds of Geraniums as "Mrs. Pollock" will send out a pure yellow shoot; but all efforts to make plants of such shoots will fail. They may feebly root as cuttings, or they may be grafted on a green-leaved, healthy stock long enough to drag out a few weeks of existence, but the disease is here thoroughly established, and all attempts to propagate these entirely abnormal growths completely fail. It has been claimed that the Duchesse d'Angoulême and other pears are much better flavored when grafted on the quince than on the pear stock, and these are quoted as examples of the influence of the stock on the graft; but to me this seems capable of another explanation.

We know that the pear stock is a vigorous and rampant grower as compared with the quince, and may it not be that this vigor of growth in the tree impairs the flavor of the fruit in some varieties, just as we find the flavor of fruits impaired when grown in too rich soil? The effect of soil upon quality is particularly marked in melons. I remember that I once grew a field of three acres of Nutmeg melons. One half of the patch was rich bottom land, and the other portion was a rather poor hillside. The fruit produced on the bottom land was much larger, but so different from and inferior in flavor to those on the hillside that no one would have recognized the two as being of the same variety. Grapes grown on a shaly hillside are better flavored than on a rich alluvial deposit. The same, though in a less marked degree, probably occurs in other fruits under similar conditions. For these reasons I believe

it safe to assert that the preponderance of evidence is against the belief that the stock in any manner affects the graft other than that it may cause it to grow stronger or weaker, just as the stock is strong or weak, and the amount of such influence will be only such as a rich or poor soil would produce. In other words, the "stock" is only a medium or soil wherein the grafted individual grows, and affects it no more than if it drew its sustenance direct from the earth : strong, if on a strong stock, as on a fertile soil, and weak, if on a weak stock, as on a sterile soil.

I believe that the smallest or the greatest of God's creations has a separate and distinct individuality, and that they cannot be blended, except by generation, and that the product of generation, whether in the lowest microscopic germ, or in the highest type, man, has an individuality distinct and separate that it cannot attach to another.

CHAPTER XV.

HOW GRAFTING AND BUDDING ARE DONE.

AFTER this discussion of general principles, let us come to the practice of grafting and budding. In what has been said, the words have been used as synonyms, and their object is precisely the same—to propagate a particular plant upon a rooted plant of another kind. Among fruits we do this because we cannot multiply choice varieties by seed or by cuttings. Stocks are raised from seed, which, if allowed to grow and bear, may produce a poor and worthless fruit, or it may be a good kind. To make matters sure, we graft a twig of a kind that we know upon a seedling about which we know nothing. With Camellias, some of the choice kinds cannot well be propagated

from cuttings, but many of the commoner kinds will grow in this way, and the choice Camellias are grafted upon stocks obtained by rooting cuttings of the other strong growing kinds; so in various cases among fruits and flowers, budding or grafting affords the readiest, if not the only method by which we can multiply certain varieties. A graft is a twig containing one or more buds, and so inserted or planted in the stock that the new bark and new wood of the two shall be in close contact. In budding, a single bud with as little wood as possible, is inserted or planted below the bark of the stock, and in direct contact with its new or sap wood. While we give the two operations different names, the French call budding simply a variety of grafting—shield-grafting. In a general way, it may be stated that in grafting we use buds of a previous year, and insert them upon the stock where they are to grow the spring after they are formed, and as soon as vegetation starts, these buds commence to grow. In budding we use buds of the current season's growth. The recently formed buds, near the end of the growing season, are planted in the stock, where they unite, and remain dormant until spring, when the inserted bud pushes into growth at the time that the natural buds of the stock start. These statements apply only to out-door grafting and budding. When these operations are performed under glass, the propagator has control of atmospheric conditions, and varies them to suit the subjects in hand. In out-door grafting, such as that upon fruit trees, the cions are best if cut in the fall and preserved in sand or sawdust in the cellar during the winter; though with very hardy sorts this is not essential, they should be cut before any swelling of the buds takes place. The operation succeeds best when the buds on the cion are perfectly dormant, and those on the stock have swollen and about to open.

GRAFTING.

The various methods of grafting are too many to describe here. The simplest is the cleft graft. The stock is sawed off, and the end cleft or split for a few inches down through the center (figure 27); the cion (or two if the stock is over an inch in diameter), with two or three buds, has its lower end smoothly cut to form a wedge a trifle thicker on one side than the other (figure 28); the cleft in the stock is pried open by means of an iron wedge or a wedge-shaped stick, and the cion or cions set with the thicker edge of the wedge outward, observing to bring the inner bark and new wood of stock and cion in as close contact as possible. The opening wedge being withdrawn, the spring of the stock will hold the cions in place (figure 29). The junction

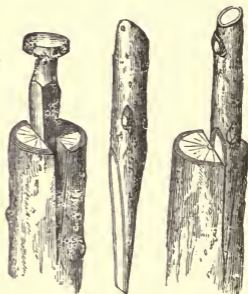


Fig. 27. Fig. 28. Fig. 29.

CLEFT GRAFTING.

is to be covered with grafting wax, or waxed cloth, taking care to completely cover every wounded portion of both stock and cion. It is by this method that most of the grafting is done by farmers all over the country. It is rude, but very successful. The objection to it is, that it leaves too great a wound to be closed over. For small stocks the whip-graft is generally used. It is much easier to do it than to describe it. Stock and cion should be as nearly of a size as possible. Both are cut with a similar slope, and in each slope is cut a tongue, as in figure 30. When the two slopes are put together, the two tongues are interlocked as in the engraving, taking care that the inner bark of stock and cion come in con-

tact as completely as possible. In this illustration the parts are represented as tied with twine, to show the joint below, but in practice the whole is completely covered with a band of waxed cloth. This, where practicable, is an excellent graft, there being no large wounds to heal over, and the points of union are numerous. This graft is much used by nurserymen in root grafting small apple and pear stocks. A very simple form called the side-graft is often employed by florists and nurserymen.

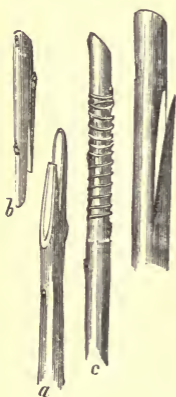


Fig. 30.—WHIP GRAFT.



Fig. 31.—SIDE GRAFT.

The cion is cut to a long wedge, and the stock has a downward cut made in its stem, into which the cion is inserted, as in figure 31. In grafting the Camellia, the Rose, and other hard-wooded plants, a combination of the whip and side graft is made use of, as shown in figure 32.

Grafting wax used to cover the wounds made in grafting may be purchased at the seed and implement stores,

or the amateur can make it himself. It should be soft enough to be molded by the heat of the hand on a cool day, but not so soft as to run when exposed to the heat of the sun. It is essentially rosin and beeswax, with tallow or linseed oil enough to make it sufficiently soft. A good formula is rosin 2 lbs., beeswax $1\frac{3}{4}$ lb., tallow $\frac{3}{4}$ lb. The better way for the amateur to use this is to melt the whole together thoroughly, and then dip in it strips of well-worn cloth, such as may be torn from a worn-out sheet or calico dress. These waxed strips will tear read-

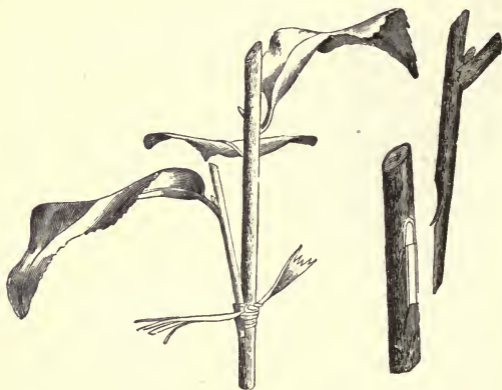


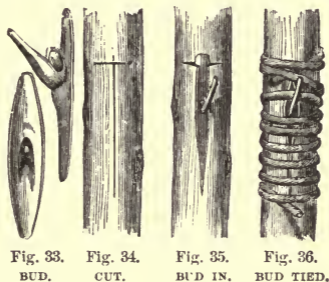
Fig. 32.—GRAFTING THE CAMELLIA.

ily, and may be neatly fitted to the graft to make a complete covering. The fingers should be slightly greased when applying the waxed cloth. We find in our practice of grafting Roses, for which we use mainly the Manetta Rose stock, to do the work from January to March, a slight bottom heat is indispensable for the best success; that is, from sixty-five to seventy-five degrees bottom heat, with ten degrees less "top" heat, must, as near as

possible, be kept in the greenhouse or hot-bed where the grafting is being done.

BUDDING.

The shoot or stock to be budded upon must be in a thrifty growing state, so that the bark can be raised freely from the wood, and the bud to be inserted must be in such a state that it shows prominently at the axil of the leaf. Select a smooth portion of the stem of the stock, strip it of leaves sufficiently to allow room for the



THE METHOD OF BUDDING.

operation, and then make a cut through the bark to the wood of an inch or so, with a cross cut at the top, as shown in figure 34. Although the illustration does not show it, a slight cut of the bark should be made above the cross-cut. This is done to allow the bud to slip in better. This custom, we think, is not general, but we find the operation is done quicker and better by its use. Next take the shoot from which the bud is to be cut, and selecting a properly developed bud, cut it from the shoot as shown in figure 33. The edges of the cut in the stock are lifted by the point of the knife or an ivory attachment to the budding-knife, the bud inserted and pushed down as in

figure 35. The portion of bark attached to the bud that projects above the horizontal cut in the stock is cut off, and the tie applied. The tying material should be Raffia bark, though cotton wick or other soft material will do. The engraving, figure 36, shows where to place the tie; but when of Raffia bark it quite covers the wound and excludes water and prevents drying. In two or three weeks after the bud has been inserted, it will be safe to remove the tying, and if the operation has been performed on a Rose in June, it will often make a considerable growth the same season; but if done in August or September, it usually lies dormant until the next spring. All shoots upon the stock below the bud must be rubbed off, both in budding and grafting, and when the bud that has been inserted starts to grow, the stem above it must also be cut back just above, so that the inserted bud, which now becomes the plant, may get the full benefit of the root.

CHAPTER XVI.

TREATMENT OF TROPICAL BULBS, SEEDS, ETC.

ANY information that can be given in an article short enough to be suitable for amateurs on a subject so extended as this must be confined to a few well-known and leading plants most valued for general cultivation. The Tuberose is one of the tropical class of bulbs, requiring at all times a high temperature. Details of culture will be found in the Chapter on Bulbs, Fall or Holland, Page 44.

Some of my readers have seen or cultivated the bulbs known as fancy or spotted-leaved Caladiums. There are probably no plants that assume such varied and wonderful markings of the leaves as these, so that when first seen it is difficult to believe that such painting is the work of Na-

ture and not of art. When properly grown, Caladiums are among the most attractive plants at our agricultural fairs and horticultural exhibitions. The continued high temperature necessary for the healthy growth of the Tuberose is equally indispensable for the Caladium. The bulbs or tubers we treat at first exactly in the same manner as the Tuberose when started for early flowering out-doors ; that is, they should not be started much before May 1st, and never should they be kept for any length of time in a less temperature than sixty-five degrees. They are best started in small pots, and should be shifted into larger ones as soon as these get filled with roots. Started in May, and properly treated, they should be large enough by August or September to require a flower pot twelve inches in diameter, and the plant should be, according to the variety, from two to three feet in diameter across the leaves. Caladiums require a little shade, and if kept in a greenhouse during summer, the glass should be shaded, but the light of an ordinary sitting-room would be just about right ; so that even those who have not a greenhouse can grow these rather rare and beautiful plants with perfect ease. The only thing necessary, if grown as a window plant, is to turn the pot around every few days, so that each side may get a proper amount of light, a necessity with all plants grown in windows. Caladiums do well a little shaded in the open air, either in baskets on verandas or planted in the open ground. The soil best suited for its growth is that known as sandy loam, to which should be added one-third rotted manure or leaf mold.

The same time of starting and a similarly high temperature is required for Begonias of all kinds, Bouvardias, Cannas, Cissus, Coleuses, Dracænas, Euphorbias, Poinsettias, Salvias, and all other plants known as "hot-house" or "tropical," and the same general treatment will in nearly all cases lead to satisfactory results. All

of the plants or bulbs referred to will dwindle or die if long kept in a low temperature, and hence it is important that amateurs should remember that they ought not to attempt the cultivation of these plants unless they have the means of steadily keeping up the necessary high temperature. For that reason we recommend that they should not be started before May, as then they run less risk of being chilled.

What is true of tropical bulbs or plants is equally so of tropical seeds. Those who have not had experience, or who have not the means of keeping up the necessary high temperature, should not sow the seeds of tropical plants before April 1st. Of vegetable seeds, the best known of this class are the Tomato, Pepper, and Egg Plant. I know they are often started in March in hot-beds or greenhouses with satisfactory results; but let any one try the experiment of sowing on March 1st and on April 1st, and note the result in the earliness of the crops from the two sowings, and he will find that the chances are that the last will be first. If it were always practicable to keep the necessary temperature steadily along, the first sown would be the first; but this is often very difficult to accomplish, while there is but little difficulty with the later sowing, as assistance is then given by the increasing outside temperature. For this reason seeds of tropical annual flowers, such as Amaranths of all kinds, Balsams, Salvias, Double Portulacas, Cannas, Coxcombs, Zinnias, etc., should not be sown before April in the hot-bed, or, if in the open ground, in this latitude, not before May 15th.

CHAPTER XVII.

THE POTTING OF PLANTS.

THIS naturally follows the preceding chapter, and I will briefly state a few of the most important points. First of all is soil, or potting mold, often rather a troublesome thing to get by those who have only a few dozen plants to repot. The soil used by us, and by most florists, for nearly every plant we grow, is one combining freshness, richness, and what is called "friableness" of texture. This condition we get by paring off the sod from the roadside, mixing it with one-third of well-rotted stable manure, throwing it in heaps until it rots, and turning it over two or three times until the whole is well mixed. If the plants are small, we run it through a fine sieve before using it; if large, we use it rough, without sifting. But it may not always be convenient to get this material, and it is by no means indispensable to success. Leaf mold from the woods, mixed with any fresh field loam, and a little rotted stable manure, will answer nearly as well; or city folks can get sweepings from the pavements, and these, mixed in equal bulk with any good fresh soil—that from an old cultivated garden is not usually so good—will make a potting soil in which almost any plant will grow vigorously. Small lots of potting soil had best be got from the nearest florist.

Now, having the soil in proper condition, the next thing is the pots, which, if they are not new, should be thoroughly washed, so that the evaporation of moisture will take place freely through the porous sides. One of the most common errors among amateur cultivators is to put their plants in too large pots. If a plant such as a Rose or Geranium is lifted up out of the ground to be potted, it should be placed in a pot only large enough to allow an inch or so of soil to be placed below and around

its roots ; or, to make it better understood, if the plants are, say a foot high and a foot in diameter, they should be pruned back so that the diameter will not be more than six or eight inches, and for such sized plants the pot should not be more than six inches wide and deep.

The same rule applies to plants that have been growing in pots. If the plant is now in a pot three inches wide, a proper shift will be to one four or four and a half inches wide ; if in a five-inch, shift to six and a half or seven-inch, and so on. In taking a plant out of a pot to place it in another, turn it upside down, with the fingers of the left hand spread over the surface of the earth or top of the ball, and with the right hand holding the pot by the bottom, give the rim a smart rap on the edge of a board, and the ball of earth enveloping the root will come out, just as a jelly will out of a mold. I am particular in referring to this simple matter, knowing that it is no uncommon thing for ladies to break the pot with a hammer in their endeavors to get at the roots, although they would hardly sacrifice a bowl to get at the jelly. In shifting, or repotting, place a little soil in the bottom of the pot; then place in the ball of roots exactly in the center, which will leave a space of from half an inch to two or three inches between this and the sides of the pot, according to the size of plant to be shifted. To pack this space between the side of the pot and the ball of roots with soil, it is better to use a flat stick with which to crowd it in moderately firm, filling up the pot to within an inch or so of the rim, this space being required to enable it to hold water. A point of great importance not generally known in shifting plants, is, if the ball of soil surrounding the roots is hard or encrusted, to beat around it gently with a light piece of wood, so as to loosen the outer crust. If this is not done there is some danger of it getting too dry, as the water cannot so easily penetrate the hard ball of roots and earth as it can the

loose soil in which it is being potted. The same rule applies to all pot-bound plants when planted in the open ground. Beat the ball gently or squeeze it with the hand, so as to give the roots a better chance to start out into the fresh soil. After potting, give a good watering with a sprinkler to settle the soil to the bottom of the pot; but after this be sparing of water until the plant shows signs of new growth, which will take place simultaneously with its making roots in the fresh soil. We usually use no potsherds or drainage until they reach the size of five inches in diameter; but after that size, particularly if the plants are to be grown in the winter months, when plants are to be shifted, one-fourth of the depth of the pot is filled with broken pots, charcoal, or broken oyster shells, placing the largest pieces at the bottom, and covering up with the finer portions at the top. Over this drainage it is all important to place some material that will prevent the soil from being washed into the drainage and choking it up. By far the best thing we find is waste cocoa-nut fiber, or the new packing material known as "excelsior." We ourselves now use a wad of the "excelsior" as drainage for all pots under seven inches, and nothing else, dispensing entirely with potsherds.



CHAPTER XVIII.

WINTER-FLOWERING PLANTS.

THE increase in the taste for winter-flowering plants, within the past few years, has been even more positive than that for the cultivation of plants out of doors. Formerly it was rare for florists to fill an order in the fall; but now, during the months of October, November, and December, they make shipments daily in large quantities to every section of the country; and these nearly equaling in number those of plants for the open

ground in May and June. The plants best suited for flowering in winter may be divided into two classes. First, those requiring a moderate temperature at night, say an average of fifty degrees. In nearly all cases where reference is made to "night temperature," it will be understood that the "day temperature" should be ten to fifteen degrees higher. This is to imitate, as far as possible, the conditions found for the best growth in the natural temperature in the open air. Thus, we find in this section of the country, that in the open air we get the most vigorous growth (in plants that are natives of temperate latitudes) from the middle of May to the middle of June, and from the middle of September to the middle of October. For most plants (such as Roses, Carnations, Geraniums, etc.) the average temperature of night and day should be between sixty-five and seventy degrees, or fifty at night with fifteen degrees higher in the daytime. Temperature is always taken by having the thermometer hung in the shade; for if exposed to sunlight it will run sometimes fifteen to twenty degrees higher, which would be deceptive. Whether the plants are grown in the parlor or sitting-room of a private dwelling, or in a greenhouse specially constructed for their culture, the conditions should be as nearly as possible the same; that is, uniformity of temperature ranging from forty-five to fifty-five degrees at night, and an avoidance of a dry atmosphere. It is easy enough in the greenhouse to get a properly humid atmosphere by sprinkling the paths with water; but in a room in the dwelling house, the only thing that can be done is to place pans of water on the stove, furnace, or whatever may be the source of heat. If plants are kept in a sitting-room or parlor, an east, southeast, or south aspect should be chosen. Plants of the class that may be grown at an average temperature of fifty degrees at night are Azaleas, Abutilons, Ageratums, Carnations, Cinerarias, Catalonian Jessamines, Cape Jessamines, Camellias, Callas, Cho-

rizemas, Geraniums of all kinds, Hibiscus, Hyacinths, Myrsiphyllum (Smilax), Mahernias, Primulas, Stevias, Roses, Violets, and the various kinds known as *green-house* plants, which, together with those above named, can be found fully described in the florists' catalogues.

The second class, or hot-house plants, require an average temperature of sixty degrees at night, the range of which, however, may occasionally run from fifty-five to sixty-five degrees without injury. Of these we name the following: Begonias, Bouvardias, Clerodendrons, Euphorbias, Epiphyllums, Fuchsias, Heliotropes, Poinsettias, Roses (these will do in either temperature, though rather better in the lower), Tuberoses, etc. For farther lists and descriptions of varieties, reference may be made to the catalogues. The necessity for this difference in temperature is not absolute, as many plants will do very well in either; but we make this distinction as a guide to those having a choice of temperature, in order that they may select the plants that are best adapted to the one at command. In a greenhouse, particularly if heated by a flue, there is often a difference of five or ten degrees between one end and the other; and in such a case the plants named in the first class must be placed at the cool end, and those of the second class at the other.

One of the most troublesome pests of plants grown in the greenhouse or the sitting-room in winter is the aphis, or "green fly," as it is termed. We have no difficulty in getting rid of it in the greenhouse, when it is separate from the dwelling; all that is necessary is to get some tobacco stems (such as are thrown out as refuse by cigar makers), and sprinkle them with water, so that they become slightly damp. About half a pound or so for a greenhouse twenty-five by twenty feet is placed over a small handful of shavings, only enough to light the dampened tobacco, as too many shavings might injure the plants by smoke. The burned tobacco stems give

out a smoke that is quickly fatal to the "green fly." To thoroughly prevent the least appearance of this insect, the greenhouse must be fumigated every four or five days. We fumigate all our greenhouses twice each week during the winter, and dust the leaves with tobacco dust after syringing in summer; our rule being that an aphid must never be seen upon any plant in the houses. If the greenhouse is attached to the dwelling, so that the tobacco smoke would find its way into the rooms, recourse may be had to another remedy: take the same waste tobacco stems, and steep them in water until the liquid is of the color of strong tea. With this water syringe the plants freely twice a week. Another plan is to sprinkle the leaves with water, and then shake snuff or tobacco dust over them. This will not only effectually destroy the green fly, but will keep in check many other insects that infest plants. Where only a few plants are kept in rooms, the easiest way is to dip the plants entirely in the tobacco water, moving them up and down in the liquid, to wash the insects off if they have a firm hold.

The "red spider" is another pest to winter-blooming plants, even worse than the aphid, and wherever it is seen you may be certain that the atmosphere has been too dry, and very likely the temperature too hot, as it is rarely found in a cool, damp atmosphere. The treatment for this insect in the greenhouse is copious syringings with water; but where only a few plants are grown in the house it is best to go over the leaves, especially on the under side, with a wet sponge or a brush. The red spider is so minute that it is hardly distinguishable by the naked eye, but its destructive effects are quickly perceivable, as the leaves upon which it works soon become brown, and if the leaves are closely examined, particularly the under side, the minute insect will be seen in great numbers.

Another troublesome insect among plants that are

grown in a high temperature is the "mealy bug." The insect is flat, and whitish brown, usually nestling at the axils of the leaves, where it is covered with a white powder, making it easily distinguishable. This is one of the most annoying of all insects that attack plants, and until a few years ago no certain remedy was known; but we have now in "Fir Tree Oil," mixed in the proportion of one pint to ten gallons of water, and syringed on once a week, a certain remedy against mealy bug, scale, red spider, and, in fact, nearly all insect life. The use of it must be continued once each week, or the remedy will not be effectual. Where only a few plants are grown the same remedy can be applied with a soft brush or sponge on the leaves. Another pest, not an insect, but a vegetable parasitic growth known as mildew, affects but few plants in-doors except the Rose. (For remedies see chapter on Insects and Mildew.)

The amateur is warned against the common practice of placing plants in too large pots. As a general thing, when plants are received from the florist they are without pots, and are usually in a condition requiring them to be shifted into a pot larger than they have been growing in. For example, if they have been grown in a pot of three inches diameter, place them in one a size larger, or four inches in diameter; if they were in four-inch pots, give them one five or six inches across, and so on. Florists, as a rule, do not practice crocking or draining pots until the pots get to a size over four inches, and often not then, because, having pots of all sizes on hand, they do not need to give plants any larger shift than necessary, and hence there is less need for drainage; but often the amateur has to change a plant that has been grown in a pot of three inches diameter into one of six inches, and then it is necessary to fill up one-third of this too large pot with broken pots, charcoal, or some such material, to drain off the surplus moisture that would other-

wise be injurious, in consequence of the pot being too large for the plant ; but if the pot into which it is shifted is properly adjusted to the wants of the plant, the putting in of crocks for drainage may be dispensed with. The need of a larger pot is shown by the earth becoming so filled with roots that they well cover the outside of the ball ; but shifting into a larger pot should be done while the roots are yet white. If left until the roots get thoroughly matted, brown, and hard, it is too late, and the future growth will be seriously retarded. If the plant has been allowed to reach this condition, which we call "pot bound," it is best to lay the ball of roots on one hand and slap it smartly, so as to loosen it. By this treatment the new fibers strike out more readily from the hard roots than if left with the ball still compact. After lifting a plant, give it one good watering, so that the soil will be thoroughly soaked to the bottom of the pot ; but after that, keep rather dry until there are indications of new growth. (For manner of potting, see chapter on "The Potting of Plants.") We are often asked as to the use of guano and other fertilizers on in-door plants. As a general thing we use none in our own practice, preferring to shift the plants into fresh soil at the proper time rather than to do so, and we would advise the same to our friends of less experience, for the use of all such stimulants is, under certain conditions of the plants, dangerous in unpracticed hands. When it is inconvenient to shift winter-flowering plants into larger pots, they will be greatly benefited by stirring up the soil on the surface of the pots to the depth of an inch or so, or down to where the young roots appear, taking care not to disturb these too much. Throw away the old soil, and replace by rich, fresh soil, in which one-twentieth part may be bone dust. This is called "top dressing." The various kinds of bulbs used for winter flowering are fully detailed under their separate kinds. (See Bulb Forcing.)

GARDEN CULTURE OF THE ROSE.

One of the most difficult questions that the florist has to answer to his customers is what kinds of Roses are the most suitable to plant. If in a section of the country where there are only slight frosts, and the thermometer never falls lower than twenty or twenty-five degrees above zero, then the Tea, Bourbon, Bengal, and Noisette, all of which are evergreen and ever-blooming, should alone be grown, as they will all stand over the winter in such a temperature. The so-called Hybrid Perpetual Roses, which are hardy in the Northern States, do but little good in such climates as that of South Carolina, Louisiana, or Florida, for the reason that, being deciduous—that is, they lose their leaves in winter—the warm climate denies them the rest their nature requires, and, consequently, they either die outright or continue a feeble existence. It is not easy to draw the line at which these Roses fail, or where they succeed. As a rule, it may be said, that the hotter the climate the more unsatisfactory they will be. At the North, again, we are met by the difficulty that nearly all the Monthly Roses are too tender to stand our winters, where the thermometer reaches zero.

An old German florist, in reciting his tribulations on this subject to me a few years ago, said: “I haf so mooch trouble with de ladies when dey come to buy mine Rose. Dey all wants him hardy, dey wants him dooble, dey wants him nice goolor, dey wants him nice shape, dey wants him fragrant, dey wants him moondly, dey wants him to be everydings in one Rose. Now I haf to say to dem ladies, though not what you call an ungallant man, I say, dat I sees not dat lady dat is rich, dat is young, dat is good demper, dat is beautiful, dat is healdy, dat is smart, dat is everydings in one lady. I sees her not mooch.”

This was true of the Roses when my old German friend told of his troubles, but since then we have been fortunate in getting a new class of Roses known as the

HYBRID TEAS,

all of which, by covering with four inches of leaves put on in December around the roots, prove perfectly hardy in most of the Northern States, besides being all *monthly*, all *double*, all *fragrant*, and all of *fine form*. These now comprise many fine kinds, among which are :

Dinsmore, bright scarlet crimson, splendid form.

Ball of Snow, pure snow white, fragrant.

La France, deep pink, shading to light rose, splendid.

American Beauty, rich light crimson, grand form, large size, and exceeding all other Roses in its delightful odor.

Lady Mary Fitzwilliam, rosy blush, globular, large.

Pierre Guillot, very dark crimson.

Thus far there are no Roses having a yellow tinge that are hardy, and it is doubtful if there ever will be a *yellow monthly* Rose sufficiently hardy for the Northern States.

MONTHLY OR TEA ROSES.

The class best adapted for sections of the country where the thermometer never falls below twenty degrees *above* zero, is yet extensively grown in the summer season in all the Northern States, for the reason that in it we have not only a distinct and delicious tea fragrance, but a far greater range of color than is found in either the *hardy* Hybrid Tea or Hybrid Perpetual class ; for in these the colors only range through shades of white to crimson, while in the Tea or Monthly class we have all shades of yellow, copper-color, and orange, besides all the colors embraced in the hardy sorts. Moreover, the Tea class of Roses gives greater profusion of

bloom, and is easier propagated ; consequently the plants are now sold so cheap that many plant beds of them for their value for summer flowers only.

HYBRID PERPETUAL ROSES.

This name is certainly misleading when the plants are grown in our hot and dry summers, for they really give only one good bloom in June with us, though in the cool and moist climate of Great Britain many of the kinds bloom nearly the entire season. Individually this is by far the finest class of Roses. The flowers are of the largest size, and nearly all have the delicious fragrance peculiar to the old Moss and Damask Roses. The size of many of them is immense, often five inches in diameter. All are hardy, requiring no care after planting ; but, as has been said, most of them bloom only once, and hence are not so satisfactory in this respect for our climate as the ever-blooming sorts.

SOIL AND CULTURE OF ROSES IN THE GARDEN.

Like nearly all other plants, Roses delight in deep, rich, well-drained land. (See Chapter on Soils.) When a bed of Hybrid Perpetual Roses is to be planted, the soil should be dug to the depth of at least one foot, and well mixed with a coating of two or three inches of rotted cow manure. In the absence of that, sow bone dust on the surface just thick enough to cover it, or about half a pound to a square yard, and mix to the depth of a foot with the soil. If Hybrid Perpetual Roses are to be set out for a permanent bed, plant from eighteen to twenty inches each way ; if Hybrid Teas, from fourteen to sixteen inches ; and if Monthly or Teas, about twelve inches. The Hybrid Perpetual and Tea Roses require to be pruned like any other hardy shrub. Cut

the young wood, any time after the leaves have dropped, back to two or five eyes, regulating it according to the strength of the shoot, the weaker shoots being cut to two or three eyes, the stronger to four or five, shaping the bush so as to get it into good form. The Monthly or Tea Roses require but little pruning except to thin out the "blind" or old wood, or topping by pinching out the center of any shoot that is growing too luxuriantly, so as to keep the plant in good shape.

ROSE GROWING IN WINTER

is now such an important part of floriculture that hundreds of *acres* of greenhouses in the vicinity of all our large cities are specially erected for and devoted to the culture and production of buds during the fall, winter, and spring months. To describe the various modes of culture in all their details would take more space than can be afforded for it in "Gardening for Pleasure," and to such as desire to go into Rose-growing as a business, I refer to my new edition of "Practical Floriculture." For amateur readers I will here detail a few brief instructions.

When a few dozen plants of Roses only are to be grown, it is perhaps best to grow them in pots. They can be procured from any of the florists who make a business of growing Roses for winter, in September, October, or November, at a cost of from four to six dollars per dozen, for such plants as are grown in five or six-inch pots, and average from ten to fifteen inches in height. These are usually in a condition to shift into larger pots. If in a five-inch they should be shifted into a seven-inch, and in like proportion according to size of pots or plants, care being taken to thoroughly drain the pots, as it is impossible to get good results from Roses in winter unless the water can pass through the soil freely. If to be

grown on a large scale, then the plan used by florists to set the plants out on raised benches should be used. When to be grown on benches, they should be planted in July, August, or September, and if wanted in quantity can always be obtained from the rose-growers at the wholesale rates, which run from twenty to thirty dollars per hundred, according to size and variety.

SOIL AND BENCHES.

The soil in which the Roses are to be grown should not exceed five inches in depth, the boards being so arranged as to allow free drainage for the water. Perhaps the best way to make the bottom of the bench is to use wall strips or other boards, not to exceed four inches wide, leaving a space of at least half an inch between the boards or strips, so as to make certain of perfect drainage. The bottom is first covered with thin sods, grass side down, or what, in our opinion, is better, the new packing material called "Excelsior," and then the soil is placed on to the depth of four inches. This soil is made from sods cut three or four inches thick from any good, loamy pasture land, well chopped up, and mixed with one-fourth of well-rotted cow dung to three-fourths of sods. In our own practice we use, in addition to the cow manure, one-thirtieth part of pure bone dust. It is perhaps best to let the sod be well rotted before it is used, although, if this be not convenient, it will do fresh, if well chopped up. Of late years we have used the Acme harrow to break and mix up with the manure all soil used for Roses, at a saving of three-fourths of the labor.

DISTANCE TO PLANT.

The distance for Roses such as I describe (those that have been grown in six-inch pots, and averaging one foot

high) should be one foot each way, so as to get the full benefit of a crop by January. It is true that, if planted twice that distance, they would be thick enough before bearing; but they will not fill up sufficiently until the middle of January, if planted much wider than one foot, and it is always before that date that Roses are highest in price. The temperature at which Roses are grown in winter is an average of fifty-five degrees at night, with ten to fifteen degrees higher during the day. Consequently, if heated by hot water, in this latitude, a house twenty feet wide will require eight runs of four-inch pipe to maintain that heat; if sixteen feet wide, about six runs; and if twelve feet wide, about four runs. If heated by steam, a one-and-a-half-inch pipe will be about equal to a four-inch hot-water pipe.

VENTILATION

is an important matter. In a Rose house twenty feet wide, sufficient ventilation will be obtained by having lifting sashes, to the width of thirty inches, placed along the whole of the roof on the south side, hinging them so that they will open at the ridge pole. For this purpose the patent ventilating apparatus should be used, which costs from sixty to seventy cents per running foot.

WATERING AND MULCHING.

Watering is a matter of the first importance, and requires some experience to know what is the proper condition. It is not often that Roses require to be watered. The heavy syringing necessary each forenoon in clear weather to keep down red spider is generally sufficient to keep them in the proper condition of moisture; of course, good judgment must be used to syringe heavier in warm, bright weather, when the plants are in vigorous growth, than in dull weather, or when the plants are not so vigor-

ous. Better to err on the side of dryness, particularly from October to March. Whenever there are indications of the soil being too wet, stop syringing, but keep the air of the house moist by watering the paths. The best growers now use very little mulching until the days begin to lengthen in February or March, the "food" given being usually a top dressing every three or four weeks, from October to February, of half an inch of compost, consisting of two parts of well-rotted cow dung to one part fresh soil, to which is added about one-tenth part of pure bone dust. Frequent light stirring of the soil is of advantage to admit air to the roots and assist the evaporation of moisture from the soil.

There is some difference of opinion as to the value of liquid manure in Rose forcing in winter. In our experience we have found that it had better not be used on Roses growing on the benches or in pots until about February 1st, when the days begin to lengthen and the sun becomes brighter. In the case of Hybrid Perpetual Roses growing in pots, that have been started from dried off or rested plants about October 1st, which should come into bloom during December and January, it is well to water such plants once a week with liquid manure, so as to get the best development in color and size of buds. We prefer liquid manure from cow dung to all else. It is perfectly safe, no matter how strong it is made, and we think it is more lasting in its effects than liquid made from guano or similar fertilizers. Fumigating with tobacco smoke for the suppression of the *Aphis* (green fly) should be done twice a week; or, what will answer equally well, a mulch of two or three inches of tobacco stems spread on the walks or under the benches, will keep off the green fly if renewed every five or six weeks. Rose growers practice this method now almost entirely. It is quite as effective as fumigating, and safer, as that more or less discolors the buds.

PRUNING.

But little pruning is done to Tea Roses until they begin to get too thick towards spring. The "blind-wood" should then be gradually and judiciously thinned out, care being taken not to cut too much off at once, as that would be certain to more or less check the vitality of the plant by gorging the rootlets with water; hence, after pruning, for a few days water sparingly.

TEA ROSES; VARIETIES TO FORCE.

The varieties grown are changing every season, and no list we can give to-day is likely to remain as the best ten years hence. The favorite Tea Roses now grown for winter are *Perle des Jardins* (yellow), *Sunset* (orange), *Papa Gontier* (carmine), *Niphetos* (white), *Catherine Mermet* (rosy pink), *Souvenir d'un Ami* (delicate peach color), *Cornelia Cook* (white), *Marshal Robert* (pale yellow), *Madame Cusin* (pink), *Bon Silene* (carmine), *The Bride* (white), *William Francis Bennett* (crimson), *American Beauty* (light crimson), *La France* (rich peach color), *The Puritan* (white), and *Meteor* (scarlet crimson). The last five are "Hybrid" Teas, but they are usually grown as Teas.

Of Climbing Roses, which are grown on the rafters of the greenhouse, *Maréchal Niel* (yellow), *Lamarque* (white), *Gloire de Dijon* (salmon rose), *Red Gloire de Dijon* (carmine), and the new *Waltham Climber* (deep crimson), are the best. This last has not yet been largely tested, but in all probability it will supply a want long felt. It is a double Rose of fine form and of exquisite crimson color, equal in nearly all respects to our finest Hybrid Perpetuals; all dark Roses that we have hitherto had in climbers being shy bloomers with inferior flowers. Unfortunately, none of the Climbing Roses that are used

in the greenhouse for winter flowering are hardy enough to stand our winters in the Northern States, though most of them prove hardy south of Richmond.

The Hybrid Perpetual class of Roses are less grown by amateurs than the Teas, and if wanted in midwinter require special treatment, which our space here will not admit being given, but which is contained at length in "Practical Floriculture." The varieties of Hybrid Perpetuals best adapted for early forcing are : Anne de Diesbach (rich pink), Countess of Oxford (very large, soft, rosy carmine), Magna Charta (splendid bright pink), Mad. Gabriel Luizet (light pink, splendid), Paul Neyron (immense size, dark pink), Baroness Rothschild (rich shade of rose), Rosy Morn (cherry rose, large and full), Merveille de Lyon (pure white, other characteristics same as Baroness Rothschild), Anne Alexis (dark pink), General Jacqueminot (crimson), Princess C. de Rohan (crimson, almost black), Dinsmore (crimson scarlet), Marquis de Castellaine (brilliant pinkish carmine), Pride of Waltham (peach color), Mrs. Laing (light shade of rose color).

MILDEW.

Roses, when grown under glass, with proper attention to temperature and moisture, are not usually attacked by Mildew ; but, as a preventive, it is well to paint the hot-water pipes once every two or three weeks with a mixture of sulphur and lime or sulphur and guano, made of the consistence of whitewash (the guano or lime is simply to make the sulphur stick better to the pipes). We also use this mixture of sulphur on our steam pipes, but only on about one-sixth of the surface. If the whole pipe were covered, as in the hot-water pipe, the fumes would be strong enough to hurt the plants. The fumes of sulphur, as diffused by the heated pipes, is a never-failing means of destroying the germs of Mildew or

any other fungoid growth, and also holds in check, to some extent, the red spider, an insect often so troublesome to the Rose. In the summer, or at any season of the year when no fire is used, it is well to dust the foliage lightly with a mixture of sulphur and tobacco dust once a week, after the leaves have been wet by syringing or watering, so as to kill the *aphis* or green fly and prevent mildew at the same time.

THE ROSE-BUG OF THE GREENHOUSE.

For the Rose-bug (*Aramigus Fulleri*), so detrimental to success in Rose growing under glass, there seems no sure remedy except the slow one of catching and killing the insect as soon as it is seen on the leaves. It is not easily observed, as it gets under the leaves and close to the shoots of the plants. Its presence is known by the bitten leaves showing where it is feeding. It will be understood that it is not the Rose-bug in its perfect state that does the injury. The bug deposits its eggs close to the root of the plant; these quickly hatch into larvæ or maggots, which at once begin to feed on the roots of the Rose, destroying it completely. Many years ago we adopted the plan of paying our boys one cent apiece for the bugs which they caught at their dinner-hour, and by this method have completely kept them under, so that to see one now is a rarity. The perfect bug is of grayish color, about half an inch in length, and somewhat of the appearance of the common beetle. Hundreds fail to succeed in growing Roses from no other cause than that the roots of the plants are being sapped by this insidious pest.

For the best results in winter forcing of the Rose, or, in fact, for the production of any kind of fruit or flower during the dull winter months, it is all important that the greenhouse be such as to give the greatest amount of

light possible; for that reason I advise, for all such work, the style known as the three-quarter span, shown in figure 58.

ORCHID CULTURE.

The taste for cultivating Orchids is rapidly increasing. Every season dozens of amateurs already possessing green-houses begin the culture of Orchids. To be successful, careful attention and some knowledge of the subject by actual practice are necessary; but as most of our gardeners are such as have had European training, nearly all that are proficient in their business have a knowledge of Orchid culture. It is about the only part of floriculture that I have had no actual practice in, so that I am glad to avail myself of the experience of one of the most successful Orchid growers in this or any other country, Mr. Wm. Gray of Albany, who kindly has written the following brief instructions :

The best twelve well-known kinds are, *Cattleya Trianae*, *Dendrobium nobile*, *Dendrobium Wardianum*, *Lælia anceps*, *Cælogyne cristata*, *Lycaste Skinneri*, *Odontoglossum Alexandræ*, *Odontoglossum Pescatorei*, *Cypripedium insigne*, *Phaius Wallichii*, *Calanthe Veitchii*, *Calanthe vestita*. The next twelve are *Cattleya Mossiæ*, *Cælogyne ocellata*, *Cypripedium Spicerianum*, *Cypripedium villosum*, *Dendrobium crassinode*, *Phaius grandifolius*, *Phalænopsis amabilis*, *Phalænopsis Schilleriana*, *Phalænopsis Stuartiana*, *Vanda cærulea*, *Vanda Sanderiana*, *Zygopetalum Mackayi*. (For descriptions, see Orchid Catalogues.)

Of these the best suited for growing in pots are *Cattleyas*, *Dendrobiums*, and *Odontoglossums*, all of which do well in coarse chopped peat, pots nearly filled with crocks; *Cælogyne* and *Lycaste*, coarse, sandy peat, with chopped, half-decayed leaves; *Cypripediums*, *Phaius*, and *Zygo-*

petalums in peat and loam, and a little rotten manure ; *Phalænopsis*, *Vandas*, and *Lælias* do well in baskets, pots, or small pans, in chopped sphagnum ; the drainage must be perfect. *Calanthes*, chopped sods of sandy loam, with not over-fine leaf mold. The plants must be made steady with stakes and copper wire.

The kinds suited to grow on bark or cork, or other such material, are *Cattleyas*, *Lælias*, *Phalænopsis*, *Vandas*, and *Dendrobiums*. These all do well on blocks of cork, rafts, cylinders, etc., with sphagnum or other moss ; but take more care, as they dry so quickly. A plant on a block will take water twice a day ; the same in a basket only once in two days. Blocks can be hung overhead, and dipped twice a day in hot, dry weather.

The temperature should be, for such varieties as *Phalænopsis*, *Vandas*, *Dendrobiums*, and *Cypripediums*, in winter, sixty to sixty-five degrees at night, to seventy-five degrees by day, with air ; in summer, seventy degrees at night, ninety or more degrees by day, with plenty of air and ventilation at night. *Cattleya*, *Lælia*, *Phaius*, *Calanthe*, *Cælogyne*, and *Zygopetalum*, in winter, fifty-five or sixty degrees at night, seventy degrees with sun by day ; in summer, sixty-five degrees at night, eighty-five degrees by day, with plenty of air. *Odontoglossums*, in winter, fifty-five degrees at night, sixty-five degrees by day ; in summer, as cool as they can be kept. All want abundance of atmospheric moisture night and day.

Some kinds, such as *Phalænopsis* and *Vandas*, grow at all seasons ; *Cypripediums*, *Cattleyas*, and *Lælias* in spring ; *Calanthe*, *Cælogyne*, *Phaius*, and *Zygopetalums* in summer. When any plant grows in winter (except *Odontoglossums*) it should be placed in a warm house. *Odontoglossums* do best at a temperature of fifty-five to seventy degrees ; never hotter, if possible.

Cattleya Trianiæ, *Lælia anceps*, and *Cypripedium in-*

signe bloom during the resting period, which is from December to January. *Phalænopsis* and *Vandas* grow all the year; and during the short dark days of fall and winter less food is given by withholding water. *Calanthe*, *Cælogyne*, and *Phaius* bloom with the maturity of the growth, then lay dormant until spring.

The best shading for an Orchid house, when ground glass is not used, is canvas raised eighteen inches above the roof; or, if that is not convenient, thin paint, made of turpentine and whiting or white lead. Lay it on in the middle of March and brush it off in the middle of October. Ground glass is too dark from October to March for plants, and nothing does well with me under it in winter. I use first quality clear French glass. When the glass is shaded with canvas it should be done from March to October, from nine o'clock in the morning to four o'clock in the afternoon, except on cloudy days.

Orchids when grown by a florist to pay would have to be grown in quantity, each species with a house to itself; but when grown by amateurs, of course nearly all species are usually grown in one house. The most of the twenty-four species named could be had in flower from November to April. All plants with a tendency to early maturity should be placed at the warm end of the house, or, in the fall, partition off the space necessary at the warmer end for the most forward. The plants would have to be imported from the woods at first cost, when grown to sell (established plants at present prices would be too expensive), and the flowers sold cheap to become popular. Orchid growing to-day is where Rose growing was thirty-five years ago. To sum up: In the cultivation of Orchids all plants, when newly potted or mounted, should be made firm or wired, otherwise, if the plants move by syringing, or other cause, the rootlets will be destroyed. The atmosphere of an Orchid house should always be moist, winter and summer, in winter allowing the pot-

tery, cork, or other material to become more dry. Light and air are essential to vigorous growth, deluging with water when in active growth, but never closing top ventilation; never having a stagnant atmosphere; gradually withholding water as the growth approaches maturity, and then only enough to keep from shriveling. As to time for re-potting, the cultivator is guided by the commencement of growth. Plants should always be under-potted as long as the plant is not top-heavy, such as *Cattleyas*, *Lælias*, *Dendrobiums*, etc.; a top dressing is all that is needful. *Calanthe*, *Phaius*, etc., are re-potted annually.

Insects, such as thrips and aphids, are kept under by filling the evaporating pans, or other vessels, with chopped tobacco stems covered with water. Slugs are kept down by placing lettuce leaves, sliced potatoes or carrots on the pots, which examine daily, and destroy. Roaches and water bugs may be killed by mixing roach poison with molasses, and placing it on oyster shells at convenient points in the greenhouse. These same remedies will be found effective against insects attacking any kind of greenhouse plant.



CHAPTER XIX.

UNHEALTHY PLANTS—THE REMEDY.

WHENEVER plants begin to drop their leaves, it is certain that their health has been injured. This may be due to over-potting, over-watering, over-heating, too much cold, or the application of such stimulants as guano, or to some other cause which has destroyed the fine rootlets by which the plant feeds, and induced disease that may lead to death. The case is not usually important enough

to call in a “plant doctor,” so the amateur begins to treat the patient, and the practice is, in all probability, not unlike that of some of our household physicians who apply a remedy that increases the disease. Having already destroyed the, so to speak, nutritive organs of the plant, the “stomach” is gorged with food by applying water, or with medicine by applying guano or some patent “plant food.” Now the remedy is nearly akin to what is a good one when the animal digestion is deranged—give it no more food until it re-acts. We must then, if the roots of the plant have been injured from any of the above-named causes, let the soil in which it is potted become nearly dry; then remove the plant from the pot, take the ball of soil in which the roots have been enveloped, and crush it between the hands just enough to allow all the hard outer crust of the ball of earth to be shaken off; and then re-pot in rather dry soil, using a new flower pot, or the old one, thoroughly washing it, so that the moisture can freely evaporate through the pores. Be careful not to over-feed the sick plant. Let the pot be only large enough to admit of not more than an inch of soil between the pot and ball of roots. After re-potting, give it water enough to settle the soil, and do not apply any more until the plant has begun to grow, unless, indeed, the atmosphere is so dry that the moisture has entirely evaporated from the soil, and then, of course, water must be given, or the patient may die from the opposite cause—starvation. The danger to be avoided is, in all probability, that which brought on the sickness, namely, saturation of the soil by too much water. Other causes may induce sickness in plants, such as an escape of gas in the apartment, or smoke from a flue in the greenhouse; but in all cases, when the leaves fall from a plant, withhold water, and if there is reason to believe that the soil has been poisoned by gas, or soddened with moisture, shake it from the roots as before advised, and re-pot in a fresh

flower pot. Many years ago, when I used smoke-flues in my greenhouses, some kindling wood, carelessly thrown on the top of one of them, ignited, and the smoke caused the leaves of every plant to drop. There were some 3,000 plants, mostly Tea Roses, in the greenhouse. It would have been too much of a job to re-pot all, but by withholding water for some ten days, they started a new growth again, and very few plants were permanently injured.



CHAPTER XX.

PLANTS SUITED FOR SUMMER DECORATION.

QUITE a number of winter-blooming plants can also be used for flowering in the open borders in summer. Among these are Carnations, Heliotropes, Fuchsias, Geraniums, and particularly the monthly varieties of Roses; but if these have been forced to produce flowers in winter they will not give as much satisfaction for summer flowering as young plants will, and whenever they look sickly by the time they should be set in the open ground, they had better be thrown away, as they will do little good. The following, not strictly winter-flowering, are such as will give a continuous bloom during the whole season, from June until October or November. Antirrhinums (raised either from seeds or cuttings), Ageratums, Anthemis, Abutilons, Chrysanthemums, Dwarf Dahlias, Erythrina or Coral Plant, Gladiolus, Geraniums of all kinds, particularly the class known as "Zonal," double and single, Fuchsias in shade, Feverfew (cuttings), Hollyhocks (seeds only), Heliotropes, Hibiscus (cuttings), Lantanas, Lobelias, Petunias, single and double (seeds or cuttings), Pansies (seeds only), Pent-

stemous, Passion Flowers, Rondeletias, Salvias, Tropæolums, Verbenas (seeds or cuttings), Veronicas, Zinnias (seeds only). All of the above have their principal attraction in their flowers. The following are only useful for the brilliant coloring or other peculiarities of foliage. Alternantheras, Achyranthes, Artemisias, Cerastium (cuttings), Centaureas (seeds), Caladiums, Coleus (cuttings), Cinerarias (seeds), Dracænas, Echeverias, Geraniums (silver, gold, or bronze), variegated Ivies, Lysimachia, variegated Grasses, Peristrophe, Sanchezia nobilis, Vinca major, etc. (For descriptions, see florists' catalogues.) All of the above can be raised from slips or cuttings taken from plants (or by seeds where noted), during the winter or early spring months (January, February, March, or April), either from plants that have been kept for flowering in winter, or from large plants that have been preserved for the purpose of propagation. The young plants raised from slips are in nearly every instance preferable to the old plants. Our practice is, to grow the old or "stock" plants simply to make cuttings, until we get enough from them, and then to throw the old plants away, reserving the young ones only for selling, or for our own planting in the open borders. Cuttings are rooted in the way described in the chapter on "Propagation of Plants by Cuttings," or if by seeds, as in chapter on "Propagation by Seeds." The young plants should first be potted in two-inch pots, and if early in the season, they will require to be shifted into three or four-inch pots before it is time to plant them out in the open ground, which it is not safe to do in this latitude until the middle of May; nor in any other latitude before the time when Tomatoes or Egg Plants can safely be planted out.

Nothing is more satisfactory to the lover of flowers than raising his own plants, no matter how able he may be to purchase. Those of his own raising, whether for his own use or to present to his friends, are always more

valuable than anything that money can buy. One of the most common mistakes made by purchasers of plants in our city markets, is that of almost invariably choosing large plants, *forced* into flower. Such plants are usually grown under a high temperature to get them in bloom early, and many a housewife has found that the beautiful, full-blooming plant of a Rose, Fuchsia, or Pelargonium, which she so tenderly carried home, will in forty-eight hours drop its flowers and leaves in the cooler and drier atmosphere of her greenhouse, parlor, or garden. But the florist is hardly to blame for this, though I know he is often severely censured. Not one in a score of those who purchase plants in spring will buy any plant unless it is in bloom. The florist grows plants to sell, and must suit the wants of his customer. This little divergence from the subject in hand, is to show that the small slips or cuttings that the amateur may raise himself, or which he can buy from the florists in small plants at one-fourth of the price of the forced plants sold in market, are in most instances better than full-blown forced plants, costing fifty cents or a dollar each. This is particularly so with monthly Roses, Verbenas, Geraniums, Fuchsias, Petunias, Carnations, etc. Young plants of these, set out in May, if not more than three or six inches high, will grow and bloom in profusion the entire summer, while those which have been forced, if they recover at all, will be greatly inferior.

We plant our young Roses in May, usually in beds four feet wide, setting the plants twelve inches apart each way. They begin to bloom by the middle of June, and continue without interruption until checked by frost in the fall. And so with most other kinds here named; nearly all of which are from young plants, propagated during the winter and spring months. The product of cuttings or slips from a "stock" plant varies greatly, according to the kind. A good healthy plant of Fuchsia,

say eighteen inches high, will easily give forty cuttings ; while a Rose or Geranium of the same size will not afford half that number. A fair average for medium sized plants of those named would be ten cuttings or slips to each plant, so that, starting with 100 plants in the fall, by May 1,000 would be no unreasonable increase to expect ; or in that ratio, be the number more or less.

If large quantities of plants are wanted for summer decoration by those who have neglected to propagate them, or did not wish to do so, they should purchase *young plants* in March or April, at which time the florists, to make room in their houses, sell them at very low rates, usually not more than one-fourth of the price that the same plants forced into bloom in May would cost. Such plants at that season are grown mainly in two and three-inch pots. If taken from these pots, say by 1st of April, and kept in any cool room or greenhouse, where the temperature will average forty-five or fifty degrees at night, by the time of setting out in May they will have formed far better plants than those pushed rapidly into flower in May. Or, in other words, \$10 expended in March or April will buy plants which, if cared for as above described, will by the middle of May be of more value than the plants \$50 would buy at that date from the same florist. There are tens of thousands of lovers of flowers spread over the land so situated that they have neither the means nor the opportunity to get the greenhouse or bedding plants above described for the decoration of flower borders in summer ; but by the use of annual flower seeds properly selected, a blaze of flowers may be kept through the entire months with very little care and at a trifling cost.

The list of annuals here given embraces nearly all the best leading kinds, though there are hundreds more, de-

scriptions of which and of these will be found in the seed catalogues.

Abronia.	Cypress Vine.	Oenothera.
Acrocliniun.	Datura.	Pansy.
Alyssum.	Delphinium.	Petunia.
Amaranthus.	Dianthus.	Phlox Drummondii.
Angelonia.	Everlasting Flowers.	Poppy.
Aster.	Globe Amaranthus.	Portulaca.
Balloon Vine.	Godetia.	Rhodanthe.
Balsam.	Helichrysum.	Salpiglossis.
Bartonia.	Ice Plant.	Saponaria.
Cacalia.	Larkspur.	Scabiosa.
Calendula.	Loasa.	Schizanthus.
Calliopsis.	Lobelia.	Senecio.
Campanula.	Lupinus.	Solanum.
Canary Bird Flower.	Malope.	Stocks.
Candytuft.	Marigold.	Sweet Peas.
Castor Oil Bean.	Marvel of Peru.	Sweet Sultan.
Celosia.	Mignonette.	Thunbergia.
Chrysanthemum.	Mimosa.	Verbena.
Clarkia.	Morning Glory.	Vinca.
Cockscomb.	Nasturtium.	Virginian Stock.
Collinsia.	Nemophila.	Whitlavia.
Convolvulus.	Nigella.	Zinnia.

ANNUAL SEEDS—HOW TO SOW.

To produce the best results where annual seeds are to be sown in the open border, the soil should be enriched with stable manure or other fertilizer, just as for a crop of vegetables or fruits (see Chapter on Manures), thoroughly dug, and raked level and smooth. The location for nearly all kinds of annual flowers should be free from shade; although some kinds, such as Pansies, will do quite well in some shade, that is, where for half of the day only they get sunlight. The seed catalogues usually distinguish the different species of annual flowers by attaching the words "hardy annuals" to such as are hardy. All such may be sown in the open ground as soon as the soil is dry enough in spring to work. All the others, not so designated, are of tropical origin, and are known as tender annuals, and should not be sown in the vicinity of New York until the first week in May. The rule best to give for all sections of the country is, not to sow the tender kinds until such time as the farmers begin to plant

corn, melons, or cucumbers. This rule, if kept in view, will apply to all sections of the country, from Maine to Florida.

Many seeds of annuals may be sown thickly and transplanted so as to make the most of them ; but, as a general thing, this is not done. They are usually sown in rows from six to twenty-four inches apart, according to their kind, or in circular patches of from one to two feet in diameter, each circle being from one to two feet apart from the other, according to the growth of the variety. But whether sown in rows or in circular patches, first stir up the soil so that the seed can be readily covered from a quarter of an inch to one inch in depth. After the seed is sown, shake over it fine soil sufficient to cover the seeds, lighter or heavier, according to the size of the seeds. The covering is best done by sifting the soil over the seed, using a sieve made of mosquito wire netting, which covers the seed more regularly than can be done by the hand, and, besides, it brings the soil to the proper condition of fineness, so important in the covering of small seeds. After the soil has been sifted over the seeds to the proper depth, take a smooth board or the back of a smooth spade, and gently pat down the covering over the seeds. It is a good plan to place a label or piece of stick in the center of each circular patch, or, if in rows, at each end of the row, so as to mark where the seed has been sown ; for it must not be forgotten that in nearly all soils there are the seeds of weeds, which spring up often quicker than the flower seeds do ; therefore it becomes necessary to know exactly the spot where the seeds have been sown, so that the weeds can be pulled out or hoed up, and not crowd and smother the flowers. Seedsmen have hundreds of complaints every season from their customers that only weeds come up from flower seeds sown, while the facts are, that the weeds came up around the flower seedlings, and, not being pulled out, enveloped and smoth-

ered the flowers. After weeds have been removed, if the annuals come up thickly, which they usually do, they should be thinned out, leaving the strongest plants, so that they shall stand at from two to six inches apart, according to their kind. Some few annuals are not strong enough to stand without support, and for such twigs or stakes twelve or eighteen inches high should be used. For all climbing plants, such as Sweet Peas, brush, stakes, or strings proportioned to their height, must be used at an early stage of their growth, or they may be trained on the Tomato trellis described in chapter on Implements.

Our seed catalogues are nearly all defective in not giving more specific directions for the culture of annual plants. If the space used for description of form and color were devoted to telling the time and manner of sowing, it would be of far more benefit to the amateur buyer; but nearly all follow the English practice of giving descriptions of varieties only. There the necessity for such information is less, the people being better informed as to flower culture, and the climate is also more congenial for the germination of most seeds.



CHAPTER XXI.

HANGING BASKETS.

BASKETS in which to grow plants are now made in a great variety of styles and of different materials. What are known as "rustic" baskets (figure 37) are made with the receptacle for the earth covered mostly with laurel roots, which assume an endless variety of grotesque shapes, well fitted for giving a rustic appearance to the outer covering of the hanging basket. Then there are

the different forms of wire baskets, which, when used, are lined with moss, and being thus very open, and allowing of complete drainage, are best suited of all for the well being of the plants. Many beautiful forms are made from pottery ware, colored so as to imitate stumps of wood and other objects. Thousands of these baskets are used in some of their different forms, and many grow their plants in no other way, as plants are not only more easily managed in these, but many varieties so cultivated make a more graceful growth than is possible when they are in pots. In hanging baskets, the fall or Dutch bulbs, of all kinds, can be grown, giving them exactly the treatment recommended for growing in pots on page 44. When hanging baskets are hung on the veranda or porch in summer, a great quantity of water is usually required, as the dry air surrounding the basket on all sides generally dries up the soil. The simplest way of watering them when dry, in summer, is to immerse the basket in a pail or tub of water, so that the earth is thoroughly soaked through. How often this immersion will be necessary will depend on the weather, the condition of the plants, and the quantity of earth. If the bowl of the basket is full of roots, and the weather hot and dry, then once each day may be necessary ; while, if the weather is damp and cool, it might not require watering more than once a week. The rule with these, as with all plants, is, never water unless they are dry, and then water *thoroughly*. Just what this condition of being "dry" is, is not quite so easy to describe. As a rule, most

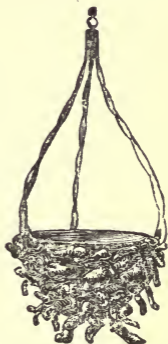


Fig. 37.

RUSTIC HANGING BASKET.

soils, when dry, become lighter in color and crumble freely between the fingers, and are free from the putty-like consistency they have when wet. The bowls of "rustic" and "terra cotta" forms of hanging baskets are usually without any means of drainage. When such is the case, the purchaser should have a few holes, say one-fourth of an inch in diameter, made in the bottom of the bowl, else there is danger that the earth around the roots may become saturated with water, unless unusual care is taken in watering. There is great diversity of taste displayed in the material with which these baskets are filled, and no special list of plants can be given that will not require to be annually changed and amended as new plants are introduced. When hanging baskets are wanted for use in shady rooms, or on shaded verandas, mosses (*Selaginellas*) are used, and sometimes exclusively. Then for the same conditions, *Ivies* of all sorts, *Cissus*, *Tradescantias*, *Sedums* or *Stone Crops*, *Fittouias*, *Lysimachia* or *Moneywort*, *Vincas*, *Ivy-leaved Geraniums*, *Smilax*, *Impatiens Mariana*, *Lygodium scandens* (*Climbing Fern*), etc., as plants to droop over the sides; or to be trained to climb on the trellis work or supports of the basket, while in the center there are used upright plants, such as *Dracaenas* of sorts, *Caladiums* (if for summer), *Marantas*, *Centaureas*, *Echeverias*, *Ferns*, *Sanchezia nobilis*, and other plants of striking form or foliage. For baskets to be placed in the sun, or in good light, an entirely different class of plants is needed, for with the light we get flowers and greater brilliancy of leaves. As drooping plants for the edges of these may be named *Alternantheras*, *Peristrophe angustifolia* var., *Lobelias*, *Tropæolums*, *Mesembryanthemums*, *Petunias*, single and double, *Passifloras*, *Rondeletias*, *Torenias*, etc., while for upright or center plants, *Achyranthes*, *Coleus*, *Begonias*, *Geraniums* (*Zonal*), double, single, and variegated leaved, or any plant of not too large a growth,

and which has brightness of foliage or flower. If hanging baskets are exposed to the full rays of the sun, or even partly so, covering the surface of the soil with moss from the woods will protect it from drying too quickly, and will also give the basket a neater appearance. The soil used for hanging baskets need in no way differ from that for plants grown in pots. Nothing adds so much to the elegance of the verandas of our summer hotels, as to have hanging baskets and climbing or drooping vines judiciously interspersed throughout. A most

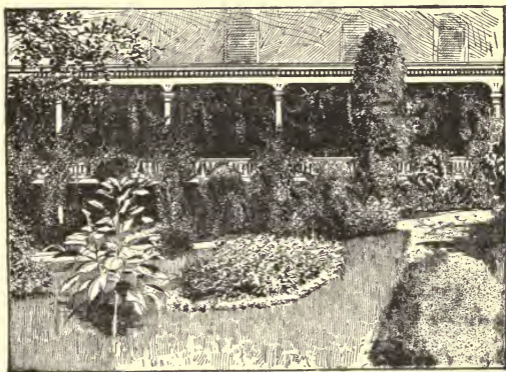


Fig. 38.—A VERANDA GARDEN.

excellent example of this was seen at the Delaware Water Gap House, in Pennsylvania, where, in 1886, the finest example of this kind of work was shown that could well be done, and all, too, by the hands of the wife of the proprietor, *Mrs. L. W. Broadhead*. It was a never-failing source of enjoyment to the guests of the hotel, giving a graceful and cooling shade in the hot summer months.

CHAPTER XXII.

WINDOW GARDENING.

WINDOW gardening during the summer months is much more successful in England than with us, owing to a more temperate climate, and hence is there almost universally practiced. In the cities especially, where space is economized by placing story upon story, and the buildings are so close that there is often no room for even a spear of grass to be grown, the only garden that is possible is one formed in a box on the window-sill. This is limited in its extent, as the space afforded is only some four or five feet in length, and from eight to ten inches



Fig. 39.—PLAIN WINDOW-BOX.

wide, with a depth for the soil of about six inches. These boxes are made of a great variety of materials, such as wood, terra cotta, iron, etc., according to the taste or means of the owner. As the boxes are usually too high up to allow of a close examination, and the sides soon become draped with drooping plants, an ordinary box of pine, as in figure 39, will answer as well as a more expensive one. As it is exposed to the weather, and the weight of the earth is considerable, it should be put together very firmly. Having procured the box, let a tin-smith make a lining or box of zinc that will exactly fit inside of it. This needs only a few tacks at the upper edge to hold the zinc to the wood. Usually spaces are left in the bottom to admit of the water passing freely through. When this is not done greater care is required

in watering. A more expensive box (figure 40) is made of wood, lined with zinc, and the exterior covered with ornamental tiles, which are kept in place by a proper molding at the margins. A box of this kind may be covered with floor oil-cloth, and if a proper pattern be selected, it cannot, at a few yards off, be told from the much more costly tiles. Many of the streets of London and Edinburgh, during the summer months, present a pleasing appearance, that cannot fail to interest even those who have no taste for flowers. The plants used are mainly such as we recommend for hanging baskets, those designated for shady positions being used on the shady sides of the streets, and those for flowering on the sunny sides. These window gardens in summer produce the

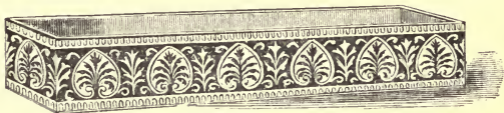


Fig. 40.—WINDOW-BOX ORNAMENTED WITH TILES.

finest effect when planted with some drooping plants. For our climate, during the summer months, when exposed to full sun, strong, vigorous-growing plants must be selected, such as *Tropæolums*, *Petunias*, *Passifloras*, etc.; while for the same position, the upright plants may be double and single *Geraniums*, *Heliotropes*, *Begonias*, and the like. For window boxes on the shady side, use the plants recommended for hanging baskets in the shade. The simplest use of window boxes is to sow them with annual seeds, such as *Mignonette*, *Sweet Alyssum*, *Phlox Drummondii*, *Portulaca*, etc., all of which should have a southern exposure. For the manner of sowing, see “Annual Seeds—How to Sow.” The soil may be such as is used for pots. Watering must be given as recommended for hanging baskets, only, in the case

of the window box, it would not be practicable to immerse it, nor is there the same necessity for doing so, as the box is less exposed than the hanging basket, which is suspended and surrounded by drying air upon all sides. These remarks refer to window gardening outside of the windows, or on the outer sill. If the boxes are placed inside in winter, which they may be, the treatment recommended in the chapter on "Winter-Flowering Plants" will be applicable.

CHAPTER XXIII.

CULTURE OF WATER LILIES AND OTHER AQUATIC PLANTS.

THE following pages have been written by E. D. Sturtevant, now of Bordentown, N. J., who makes an exclusive business of growing aquatic plants, and who is acknowledged as the highest authority on the subject that we have in this country.

THE WATER LILY TANK.

Although Water Lilies may be cultivated in tubs, they may be grown to much better perfection if allowed plenty of room, especially the larger-growing tropical species. Those who wish to cultivate a number of kinds, and have complete success, should build a tank about twenty by thirty feet, and two feet deep, out doors. If sunk entirely in the ground it would be more easily protected from frosts in cold climates. But it may be partly sunken, and the soil which is taken out used as an embankment around the outside, sloping it up to the top. I prefer that it should be sunk to the level of the surrounding surface, for the reason that the banks can be

made more ornamental. It may be built of either brick or stone. The bottom may be laid with rough stone and grouted with cement. Or, if the soil is of a firm nature, a thick coat of cement alone may be spread upon it. This latter plan has been perfectly successful with us, though we consider a concrete bottom preferable. The walls should be nine inches thick, laid in cement, and in cold climates made to slope outward from the bottom. If it is desired to grow *Nymphaea Devonensis*, or similar kinds, to full size of leaf and flower, then it will be necessary to sink a pit in the center, one foot deep and four feet square, to hold soil for them. Provide means for emptying the tank of water, when desired; also, a waste pipe, near the top, for overflow. After the walls have been built, and the bottom laid and grouted, the whole must receive an additional coat of cement. About four feet from each end of the tank, build a partition wall about ten inches high. Bricks laid on edge will do, if laid in cement. These spaces can be cut in two by another partition. The compartments thus formed are for the purpose of confining the roots of the different kinds of Lotus within proper limits, and for planting out those kinds of *Nymphaea* which do better in such a position. The remaining portion of the tank can be taken up with pots and large shallow boxes, which will be movable at will. After the cement has properly hardened, fill the compartments and boxes with soil, and cover with an inch or two of clean sand. Fill the tank with water, and let it get well warmed before planting anything tender. As warm weather approaches, run a stream of fresh water in, for an hour or two each day, to prevent stagnation. When the surface of the water is covered with leaves, there is less tendency in this direction; and all that seems to be necessary is to replace what is lost by evaporation.

The Lily tank must be placed in a warm and sunny

position, for these plants will not do their best unless the water is thoroughly warmed. On the north side may be a border filled with Musas, Cannas, Bamboos, Ornamental Grasses, Caladiums, etc., which form a fine background for the Water Lilies, and give the whole a tropical appearance.

In such a tank as above described, the tenderest species named may, in this latitude, be planted out by the 10th of June, and remain until the frosts of autumn appear. If it is desired to enjoy the longest possible season of bloom in the open air, then the Lily pond may be located near a greenhouse, and some connection made with the hot-water boiler. My manner of doing this is to extend the hot-water pipe (both flow and return) from the boiler to the tank, and reaching a few inches inside of the wall. The ends of these pipes are left open, and when extra heat is wanted a fire is kept in the boiler. The circulation being constant between tank and boiler, the water in the tank may thus be warmed early in the spring, the tender Lilies planted out earlier, and thus earlier bloom be the result. Fire heat can be discontinued as soon as the summer sun begins to do its work. The season of bloom can be prolonged in the autumn in the same manner. As soon as frosty weather arrives the tender species should be taken under glass, and kept in water at fifty-five to sixty degrees, according to the variety.

For the protection of the tank in winter, place planks or boards around the edge in such a manner as to cover a space two or three feet in width, that is, over the water, and cover them with a thick layer of leaves or litter. This will help to keep the ice from forming at the edge, and, consequently, from expanding too much and cracking the walls. Another plan is to drain the water entirely from the pond, and cover with twelve or fifteen inches of leaves. Any one having a large factory could place a

Lily pond near it, so that the waste steam or hot water (if free from chemicals or filth) might be utilized for keeping the water warm, and from freezing in winter. It may be asked, "Why all this trouble and expense? Why not grow the Lilies in ponds with a bottom of natural earth?" We answer, that for the hardy kinds this is undoubtedly a good plan, and very fair success may be had in the same way with the tender kinds; but in a pond with a cement bottom the water is more readily heated by the sun, and retains its heat better.

THE WATER LILY GARDEN COMPLETE.

I will add here a few words upon the "possibilities" of aquatic gardening. One argument in favor of cultivating tropical Lilies in the open air is, that larger leaves and flowers are obtained, and in case of the colored kinds, greater depth of color than under glass. Another argument is, the grand effect which may be produced on the lawn or in any part of the pleasure ground. Let us suppose that you wish to have an aquatic garden, fifty, sixty, or a hundred feet in diameter. We will not build it in the stiff form of a circle or oval, but the outline shall be irregular, with here and there a small bay, across which we will throw a rustic bridge to a miniature peninsula. Somewhere on the margin we will build a rustic summer-house. It shall be a two-story affair, for sometimes we shall want to view our pets from an elevated position; for, unlike our fellow-creatures, they smile upon us when we look down upon them. If we have a rocky ledge in our grounds, let us place our pond near it. Now, let us suppose that all has been planted, established, and come to midsummer perfection. Some morning, before the night-blooming Lilies have begun to take their midday sleep, let us ascend the low tower and take a view of the picture. There, beneath us, is the noble *Nymphaea dentata*, covering a space twenty feet

in diameter, some of its leaves two feet across, and its milk-white flowers twelve inches across; there is the grand *N. rubra*, with its immense cups of glowing carmine; and there, queen of them all, is *N. Devoniensis*, surpassing in brilliancy of flower, if not in size of leaf, the famous *Victoria regia*. Then come groups of these same Lilies, planted more thickly; and though the flowers are smaller, yet they are more numerous and just as brilliant. Yonder, a little bay is filled with Egyptian Lotus, its pink and white flowers, on stalks three feet above the water, looking like immense tulips. Next is a mass of the American Lotus, with its sulphur-yellow flowers; some of its floating leaves have strayed out into an open space, and are thirty inches in diameter. Let us descend and walk along the border of our little lake. Here is a plantation of the lovely blue *N. scutifolia*; you perceive its fragrance before you come near it. Next is the beautiful Yellow Lily from Florida; and our own sweet Water Lily is not forgotten, for it is here in masses. Associated with it are its charming new, rose-colored variety, *N. odorata rosea*, and the delicate pink-tinted one. Here are *N. candidissima* and *N. alba rosea*, with their waxy petals, similar in color to some of the others, but having their own distinctive merits and attractions. The favorite Calla of our winter gardens lifts its white trumpets towards the sky, and numerous smaller flowered aquatics are found in profusion along the edge of the water. Coming around to the Lotuses again, we find growing near them, in shallow water, great clumps of the Egyptian Papyrus, with its plummy heads on stalks six feet high. Now let us look at some of the plants which associate well with water, and help form a background for our picture. Scattered along the margin we find groups of ornamental grasses, Eulalias, Erianthus, and Pampas Grass. Yonder, on our little peninsula, stands a noble Banana (*Musa Ensete*), twelve feet high. Farther on is

a clump of the tall Bamboo (*Arundo Donax*), and its variegated variety. There are groups of Cannas, and a large Palm, brought from the greenhouse to spend the summer in the open air. Another stately plant is *Alocasia arborea*, with a tree-like trunk and fine, large leaves. What is this great-leaved plant near the water's edge? It is *Gunnera scabra* (the Giant Rhubarb), with leaves six feet in diameter. Now do you wish to give your friends a glimpse of fairyland? Then illuminate your grounds, and invite them to an evening fête or garden party. The Lotuses and hardy Lilies have closed their flowers, but the night-blooming Water Lilies offer us a feast for the eyes at night. Place large lamps, with reflectors, in such a position as to throw a powerful light directly upon the flowers; or, perhaps, Edison's magic lamps are available, and you suspend a number of them in midair over the water. Now the red Lilies fairly glow with color, and are far more beautiful than by daylight. The water is like a mirror, and in its depths you behold another glorious picture—a perfect image of the flowers themselves. The large, star-like white ones keep company with the red in their night watches, and are not unworthy companions for them. Look around at the floating leaves, the numerous buds which will open with to-morrow's sun, the tall shields of the Lotus, the rich, tropical foliage on the banks, the rustic arbor covered with myriads of the silvery blossoms of the Moon Flower (*Ipomœa grandiflora*), and tell me if this is not a fairy scene. And having taken a view of the Water Lily Garden by daylight and by lamplight, will you not acknowledge that in all that is really beautiful it far surpasses the most elaborate exhibition of carpet bedding?

Perhaps you will say that this is a fancy sketch. Our answer is, that it has been so far realized that we do not hesitate to place such a garden as we have described among the list of "possibilities of horticulture" in America.

[My readers will be pleased to learn that the superintendent of the government grounds and buildings at Washington proposes to add a collection of aquatics to



Fig. 41.—VIEW OF AQUATIC PLANTS IN CENTRAL PARK.

the already interesting collection of plants to be seen there. This will, beyond doubt, give an impetus to their cultivation, just as has been done in the Central Park,

New York, where the Water Lilies and other aquatics growing in the ponds there have been such a source of interest and pleasure to the tens of thousands of visitors.—P. H.]

SOIL FOR GROWING AQUATIC PLANTS.

The best soil for growing all kinds of aquatic plants in gardens, we have found to be good, rich loam, and the best decayed stable or cow manure, in equal quantities. Leaf mold or fine black peat can no doubt also be used to advantage. Rich mud from the bed of a pond or sluggish stream will answer in place of the loam, but I do not consider it essential. The compost should be well mixed, placed in the tank, and covered with about an inch of good, clean sand, to keep the manure from rising ; then let in the water several days before putting in the plants.

WATER LILIES IN TUBS AND CEMENT BASINS.

A good degree of success may be attained by planting them in large tubs or half-barrels in the open air, either on the surface or sunk in the ground. They should be placed where they will receive the full benefit of the sun for at least the greater portion of the day. If for the whole day, so much the better. Fill them about half full of the compost recommended for all aquatics. The large growing kinds would do better in half-hogsheads or in tierces sawed in two.

A very effective and inexpensive plan is to arrange the tubs in connection with a rockery, a large tub in the center being placed somewhat higher than the rest, and connected by pieces of rubber hose, so that the overflow from the large tub runs from one to the other, changing the water in all. Oil barrels cut in two make excellent tubs.

The space around the tubs is filled with good rich com-

post, held in place by large stones. in which foliage and flowering plants, such as Tuberous rooted Begonias, Sedums, Caladiums, Palms, etc., are planted. The effect produced in this manner is really beautiful. See fig. 42.

The next best arrangement for growing aquatics is to build of bricks and hydraulic cement a basin two feet deep and six feet in diameter, either round or square. This can be sunk in the lawn in a sunny position, or on the south side of a building or fence. If convenient, provide means for emptying the tank from the bottom, and a waste-pipe near the top for overflow, so that fresh



Fig. 42.—VIEW OF WATER LILY BED.

water can be run in occasionally to prevent stagnation. Such a tank would need to be well protected from severe frost in winter. Aquatics may also be grown in the basin of a fountain, but they will not flourish if the spray is allowed to fall upon the leaves. Water enough to keep that in the basin fresh may be allowed to run in, but no more, as that would lower the temperature too much.

ENEMIES OF AQUATIC PLANTS.

The conditions which we recommend for successfully growing tropical aquatics (*i. e.*, still, warm water and rich compost), favor the growth of a low form of vege-

table life called *confervæ*, or green scum, which becomes very unsightly and troublesome unless eradicated. As the result of several years' experience, we are quite positive that, if abundance of Gold-fish are kept in the tank or pond, there will be no trouble in this direction. Other kinds of fish which are vegetarian in habit might, perhaps, answer as well, but the German Carp is not to be recommended for tanks kept solely for the choicer varieties of aquatics, on account of their propensity for rooting in the mud and feeding upon the fibrous roots which proceed from the rhizomes of the Lilies. Should it be determined to keep a few German Carp in the Lily Garden, it will be necessary to place whole pieces of roofing-slate or large pebbles on the soil around the crowns of the tender *Nymphæas*.

Innumerable kinds of aquatic insects breed in the water, and some of their larvæ prey upon the leaves of the Lilies, but the common water-snail is the greatest enemy of aquatic plants. The Gold-fish assist very materially in destroying these larvæ and snails, but we have found a complete preventive of injury to the foliage from this source by keeping in the tank, in addition to the Gold-fish, some of the common spotted Sun-fish. They are carnivorous in habit and very alert and active. Moreover, it is impossible for mosquitoes to breed in a Water Lily basin in which abundance of the above-named fish, or those of similar habit, are kept. Thus one objection to locating these tanks or ponds in the vicinity of the dwelling-house is removed. Their beautiful appearance, and the ease with which they may be taught to feed from the hand (though it must not be done too frequently), make them charming adjuncts to the Water Garden. If the tank is two feet or more in depth, they can be left in it all winter with perfect safety in this latitude.

Sometimes, toward autumn, brown aphides, or plant

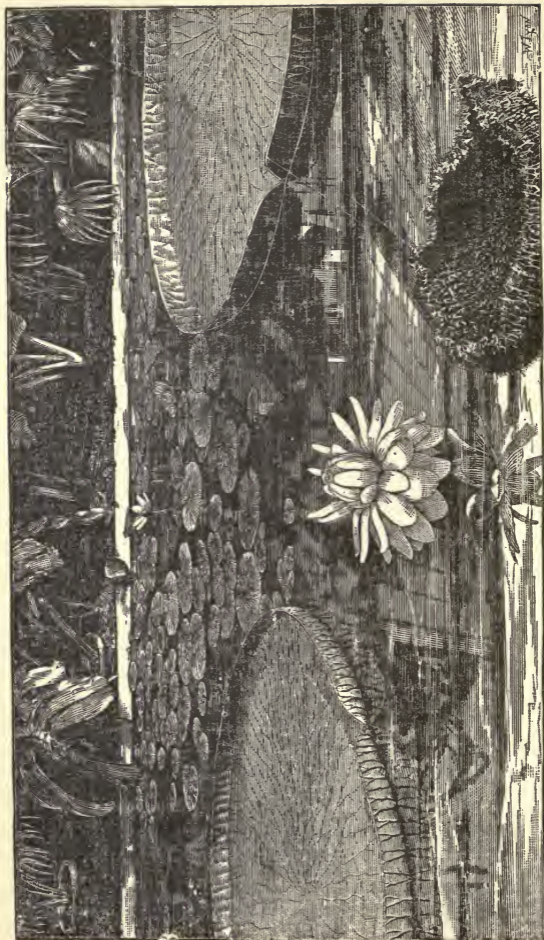


Fig. 43 —AMAZON LILY (*Victoria regia*).

lice, become troublesome on the Lily leaves. A somewhat new insecticide, which any one can prepare, has proved effectual with us. It is called the kerosene emulsion, or kerosene butter, and is prepared as follows: Take two parts of kerosene and one part of thick, sour milk; warm the latter (to blood heat only); put the two liquids together, and agitate violently with a greenhouse syringe or a force-pump. They will soon completely unite and form a white, soapy mass. This kerosene butter mixes readily with tepid water. One part of the butter should be thoroughly mixed with fifteen parts of water, and applied to the infested leaves with a syringe. With us, one application entirely destroyed the insects, without any injury whatever to Nymphæas. A weaker solution of the emulsion must be used on plants which are found to be injured by the proportion above given. Experience will be a guide in this matter. Very few applications of the remedy will be needed during the season. Nelumbium leaves are injured by the application of kerosene. Tobacco water applied with a syringe, or tobacco dust shaken on the leaves, is the best means for destroying aphides, or plant lice, on these.

DESCRIPTION OF VARIETIES.

The Victoria Regia.—This giant Water Lily of the River Amazon is the grandest of all aquatics. See fig. 43. That it may be successfully grown and flowered in the open air in this latitude, we have proved beyond a doubt, having done so for several seasons past. By this plan it is treated as a tender annual. In winter or early spring seeds are placed in water, kept uniformly at a temperature of from eighty to ninety degrees. After germinating they are potted and shifted on, as they require it. Early in June a plant is placed in a bed of very rich soil in a tank, fully exposed to the sun, and which can be

artificially heated until hot weather sets in. It produces leaves six feet across, one plant covering a space thirty feet in diameter. The flowers are from twelve to sixteen inches across. The first night that they open they are a lovely white, and emit a delicious perfume, resembling that of pineapples, which is often perceptible some rods distant. The second night the flowers have changed to pink, and have lost their perfume. In the Southern States it may be grown with complete success in open ponds. The seeds cost fifty cents each, and plants about ten dollars each.

New Crimson-flowered Victoria Regia.—Since the discovery of the original species, many years ago, no new variety has appeared until now. We had the honor of successfully growing and flowering this novelty last season (1886), it being its first appearance in this country. It differs from the original *Victoria* in the following particulars: The whole plant is of more robust habit, and the young leaves of a darker bronzy color. In the old variety the vertical rim of the leaf is seldom more than three inches high. In the new one this vertical rim on well-grown plants is five inches, and sometimes six inches high, giving the plant a most striking and novel appearance. Leaves are produced six to seven feet in diameter. In the old variety the flowers are white on first opening, changing on the second day to rosy pink. In the new variety the flowers are also white the first day, but on the second day they turn to a deep crimson color. The seeds of this wonderful plant cost one dollar each.

Euryale Ferox.—This is the East Indian relative of the Royal Water Lily, but not so gigantic in size. Its flowers are of a deep reddish or violet color. The leaves, in which the plant's chief beauty resides, are purple in color, curiously wrinkled, and covered with long spines on both sides. It is an annual.

NIGHT-BLOOMING WATER LILIES.

Unlike our wild *N. odorata*, the following seven kinds open their flowers at night, beginning about eight o'clock and (excepting *N. ampla*) remaining expanded until about ten the next morning, each flower opening three nights in succession. They stand on strong foot-stalks ten or twelve inches above the surface of the water. If given the right conditions as to soil, temperature, etc., they will begin to bloom in about forty days after being put out, and continue to be constantly in bloom until cold weather. They all require the same culture and treatment. Their tubers are about the size of a hickory nut or walnut, but make a most astonishing growth in a single season. In spring they should be placed in small pots with good loam or ordinary greenhouse potting soil, and immersed in water kept at eighty degrees to start them into growth. If you are satisfied to have flowers from four to six inches in diameter, then, when warm weather arrives, shift them into large earthen pans or tubs, and place them out of doors, or keep them in a greenhouse, according to the latitude in which you live. If the finest specimens are desired, then, as early in summer as the water becomes warm enough for bathing with comfort, plant them out in a Water Lily tank, in large beds or wooden boxes filled with the compost recommended for aquatics. In the autumn, around the old plant may be found hard, nut-like tubers. These are the best for wintering. The plants ripen and shed their leaves, when they may be placed, several together, in a pot of soil or clean sand, and the pots immersed in water kept at a temperature of about sixty degrees the entire winter. Lower than this may do, but we have found this the safest. Large flowering crowns are valueless for wintering over, being sure to decay. If you wish to grow them in a pond with a bottom of natural earth, they

must first be planted in large boxes or half-barrels filled with the prepared compost, and sunk where the water is two or three feet deep. In the Southern States this will not be necessary, but do not put a dormant tuber at once into deep water. Let it first get a good growth in a pot placed in shallow water. The day-blooming tender *Nymphæas* are managed in much the same way as the night-blooming ones, except that they do not increase by suckers, and the old plants may be kept over from year to year. Dormant tubers are easily sent by mail from March to December.

Nymphaea Devoniensis.—This is one of the choicest, if not the very choicest, Water Lily in cultivation. Under



Fig. 44.—*NYMPHÆA DEVONIENSIS*.

the liberal treatment which we recommend for producing the finest specimens, in one season a single plant will cover a circle twenty feet across, with leaves twenty-five inches in diameter, and flowers twelve inches from tip to tip of petals. If confined in pans, tubs, or boxes, the flowers are smaller, but otherwise just as fine. The leaves are rich green, with serrated edges and occasional brown blotches. No person can form an adequate idea

of the beauty of a red Water Lily until he has seen one of these gorgeous blossoms. They are rosy red (with scarlet stamens), glowing by lamplight with indescribable color. They are yet rare, and cost from two to three dollars per tuber.

Nymphæa Sturtevanti (new Semi-Double Red Water Lily).—This variety has foliage of a beautiful bronzy color, sometimes almost crimson. Its flowers are very large, having a greater number of petals than *Nymphæa Devoniensis*, and a more graceful cup-shaped form than that variety. They are of a beautiful, rosy red color. This is a very choice variety, but not so free flowering as the others.

Nymphæa Rubra.—This magnificent species is a native of India, and one of the parents of *N. Devoniensis*. The picture of the latter gives a good idea of *N. rubra*, except that the flowers are a little more cup-shaped, and their petals somewhat broader. Their color is also a brilliant red, sometimes of a deeper shade than *N. Devoniensis*, and both foliage and flowers attain nearly the same size as that variety if given the same treatment. The foliage is quite distinct, being of a rich brown color, turning, when old, to gold and crimson, like autumn leaves.

Nymphæa Dentata.—This species is a native of Sierra Leone, and has white flowers with petals expanding horizontally, making them star-shaped. They have an agreeable odor, but not as sweet as our native Lily. The leaves are rich green, with serrated edges. With ordinary culture, flowers will be produced six or seven inches across; but give them plenty of room and rich soil, and both foliage and flowers will be as large as those of *N. Devoniensis*.

Nymphæa Lotus.—This is supposed to be the typical species of the class of Water Lilies such as *N. dentata*,

N. Devoniensis, etc. It has large and beautiful pure white flowers with broad petals, and is far superior to *Nymphæa dentata*.

Nymphæa Ampla.—A tropical species, with sulphur-white flowers, about six inches across, and strongly scented like the odor of bananas. They open only at night.

DAY-BLOOMING WATER LILIES, AND OTHER TENDER AQUATICS.

Nymphæa Scutifolia (cœrulea or cyanæa).—The Lilies cultivated under these names are of a beautiful shade of lavender blue (not a deep blue), about three or four inches across; but when the plant is given abundance of room and rich soil, the flowers will be much larger and of a decidedly deeper tint. They are very fragrant, the perfume being entirely distinct from that of *Nymphæa odorata*. It may be successfully grown in a natural pond, where the water is still and the mud rich. Probably hardy in the South. Winter temperature, fifty to sixty degrees.

Nymphæa Zanzibarensis (the Royal Purple Water Lily).—This new species, from Africa, was first flowered in this country in the summer of 1882; and in September, 1883, the Massachusetts Horticultural Society awarded it their *Silver Medal*. It is, unquestionably, the deepest colored and finest of all blue Water Lilies known, and some European horticulturists declare it to be the finest of the whole family. It is of a shade of blue so deep that it is not unreasonably called purple. Some parts of the flower are of the color of *Lasiandra macrantha* (a greenhouse plant). It has the same fragrance as *N. cœrulea*, and, even when grown in small tubs or pans, produces larger flowers than that variety. Under the treatment given it in the Water Lily garden, they attain

a diameter of twelve inches, and the leaves a diameter of two feet. It blooms constantly until frosty weather, and requires the same culture and treatment as other blue Lilies.

Nymphæa Zanzibarensis Azurea.—Strong flowering bulbs of this variety, raised from seed of the true *N. Zanzibarensis*, are like the species in every respect, except that the color of the flowers is a shade lighter, being of the richest deep azure blue, far surpassing *N. cœrulea* or any other blue Lily except the true *N. Zanzibarensis*.

Nymphæa Zanzibarensis Rosea.—This is like *N. Zanzibarensis* in every respect, except that the flowers are of a deep rosy pink color.

Limncharis Humboldtii (the Water Poppy).—A charming and easily cultivated plant, with oval floating leaves and flowers of a bright lemon color with black stamens. The flowers stand a few inches out of water, and are produced freely during the entire season. Easily grown in a tub, but better still in the Water Lily garden, planted in a box or a tub, which must be elevated so that the plants may grow in shallow water. Wintered in the greenhouse.

Limncharis Plumieri.—An erect-growing plant, standing one to two feet out of the water, with elliptical leaves four to six inches long, and of a rich velvety green. Flowers straw color.

Sagittaria Montevidiensis.—This new plant has recently been introduced into this country. It is a giant compared with our native Arrowheads, which it resembles in the form of its foliage and flowers. It grows to a height of four feet, with leaves fifteen inches long. The flowers are produced abundantly on spikes three feet high, each bloom being two inches across, pure white, with a purple spot at the base of each petal. It should be wintered in the warmest greenhouse.

Pontederia Crassipes Major.—The typical *P. crassipes* seldom produces flowers under cultivation; but this variety blooms very freely when grown in water about three inches deep, allowing the lower ends of the roots to enter the soil. The blossoms are of a beautiful lilac rose color, each two inches across, and produced in large upright spikes or trusses like a Hyacinth.

Ouvirandra Fenestralis (the Lattice-Leaf Plant).—Though by no means a new plant, it is extremely rare in this country. The following description is from "Stove and Greenhouse Plants," by B. S. Williams: "It is popularly known as the *Lace-Leaf* or *Lattice-Leaf*, and is one of the most singular plants in existence. The leaves are from six to eighteen inches in length, and from two to four inches in breadth; oblong, with an obtuse apex, and spreading out horizontally beneath the surface of the water. They are of a dark olive green color, and consist of a strong midrib and veins that would be called the primary nerves of an ordinary leaf, and thus present the appearance of a beautiful piece of net-work, or of a skeletonized leaf; indeed, it is a veritable living skeleton. The flowers are inconspicuous." Native of Madagascar. It should be grown in a pan filled with a mixture of good loam and leaf mold or fine peat. The pan should be placed in a tub of water, and great care taken to keep the water sweet and the leaves of the plant clean. It is generally kept in the greenhouse in summer, but in this latitude we have found it to do well in the open air. It may be wintered in an ordinary greenhouse temperature. It is a scarce plant, and will always cost from three to five dollars each.

Myriophyllum Proserpinacoides.—This is grown on account of the exquisite beauty of its foliage. It prefers shallow water, sending its stems creeping along on the surface, forming a mass of lovely soft green color. The leaves are arranged in whorls along the stem, and are as

finely divided as the most delicate fern. The ends of these creeping stems stand erect, forming beautiful tufts or tassels. The plant may be hardy, but is better kept in a pan or tub placed in a cool greenhouse, where it forms a very pretty object in winter. It might also be grown in a water-tight hanging basket.

Ceratopteris Thalictroides (the Water Fern).—This is an extremely curious and interesting Fern, growing with its roots entirely submerged in water, either in a pot or planted out in a shallow place in the Water Lily basin. The fronds are from one to three feet high, and beautifully forked. The finest ones are produced on plants kept in a little shade. It is sometimes called the “Floating Stag’s Horn Fern.” It must be wintered in a warm greenhouse.

Hedychium Acuminatum (the Garland Flower). — Hedychiums belong to the family of the Ginger plant. This species grows from four to six feet high, each flower spike producing, for several weeks in succession, lovely snow-white blossoms, over two inches across, resembling an Orchid in form, and deliciously scented. It may be grown as a semi-aquatic by planting it in a tub, and placing it where the soil will be kept wet, but the crowns must not be immersed. If kept warm enough it will flower the whole year round.

Canna Ehemani.—This is the most magnificent Canna ever introduced. It grows to a height of five or six feet, with large, green, banana-like foliage, and the flowers are marvelous in size, being as large as a Gladiolus bloom. They are of a rich, crimson scarlet color, and hang pendant in clusters from the top of the plant. Each stalk produces a succession of these clusters, one after another, for a long time. This Canna may be treated as a semi-aquatic by planting it in a large tub, although it is usually grown as the ordinary garden Canna.

Richardia Æthiopica ("The Calla," or "Lily of the Nile").—This old and favorite plant can be made a charming feature among the Water Lilies. The only way we know for making it bloom in summer is to keep the bulbs entirely dry and dormant during autumn and winter. They can then be potted and grown as an aquatic during summer.

Papyrus Antiquorum.—This is the true Egyptian Paper Plant. From the snow-white pith of its triangular stalks the first paper was made. It grows five or six feet high, and supports at the top a tuft of long, thread-like leaves, which give the plant a graceful and striking appearance. It grows finely in shallow water, with rich soil or mud, and makes a splendid companion for flowering aquatics. It will also flourish and make a fine clump in the garden in ordinary soil.

Cyperus Alternifolius.—This also will grow with its roots submerged in water, its reedy stems, with tufted heads, resembling miniature Palm trees.

Cyperus Strictus.—This is like *C. alternifolius*, but stiffer in outline. It grows to the height of six or seven feet, in rich soil and shallow water, and should be wintered in the greenhouse.

FLOATING PLANTS.

Pistia Stratiotes.—A very curious plant, which floats upon the water, with its long, fibrous roots extending downwards, but having no connection with the soil. It forms a rosette of light green, velvety leaves, about six inches across; likes plenty of heat, and must be shaded from the direct rays of the sun. It does finely in a tub of water, placed in a vinery or greenhouse, in summer, or in the open air, under a tree. It is sometimes called the Water Lettuce.

Pontederia Crassipes.—This is an extremely interesting plant, which floats upon the surface of the water like Water Lettuce. Each crown produces neat rosettes of leaves, the stems of which are enlarged in the middle into curious oval bulbs filled with air cells, which enable the whole plant to swim. It should be wintered in a warm greenhouse.

Salvinia Braziliensis.—A very pretty floating plant something like our native "Duck-meat," but very much larger. Its leaves have a delicate hairy surface. Tender.

Trianœa Bogotensis.—A floating plant, with thick, spongy leaves, from one-half to one inch in diameter. Very curious, but tender.

Azolla Caroliniana (Floating Moss).—A floating plant which produces no flowers, but is exceedingly interesting on account of the delicacy and beauty of its foliage, which resembles a lovely green moss or Selaginella. A small plant placed in a pan of water soon covers the whole surface, and presents an appearance something like a pan of "*Selaginella densa*." If grown out of doors, in full sunshine, the plant assumes a reddish color. It is entirely hardy.

PITCHER PLANTS.

As these are water-loving plants, we have thought best to introduce them here. *Sarracenia purpurea* is perfectly hardy. *S. flava* and *S. variolaris* have stood the winter in the latitude of New Jersey, naturalized in a peat bog. The most of this class, however, are best grown in pots of fine peaty soil, surfaced with live sphagnum, and kept standing in a pan of water in the greenhouse.

Sarracenia Drummondii Alba.—The pitchers of this are two feet high, slender at the base and widening at

the top like an ordinary tin horn. They are of a fine green, except that towards the top they become pure white, netted with crimson veins. The flowers are crimson. This is the most beautiful of the family.

Sarracenia Flava (Trumpets).—This is the largest of all, producing, in its native swamp, handsome green, trumpet-like pitchers, often three feet high. Flowers large, yellow.

Sarracenia Purpurea.—This hardy northern species is not unworthy of a place in any collection. By giving it peaty soil and moss, it may be naturalized on the margin of a pond or stream. Flowers purple.

Sarracenia Variolaris.—Pitchers from twelve to eighteen inches high, very curiously hooded at the top, these hoods being spotted with white. Flowers yellow.

Sarracenia Rubra.—A small growing species, with slender, trumpet-shaped leaves of a reddish color. Very neat when grown several together in a pot. Flowers crimson purple.

Darlingtonia Californica (the California Pitcher Plant).—This has the most curiously-formed pitchers of any of the tribe. They grow to the height of from fifteen inches to two and a half feet, and have some resemblance to those of the *Sarracenias*, but differ from them in having the upper part arch over, like an inflated hood, and having a large triangular appendage hanging loosely from it. They are beautifully mottled with white and veined with red. Flowers straw-color and pale purple.

Dionæa Muscipula (Venus's Fly-trap).—A most wonderful little plant, called "Venus's Fly-trap." It has strange, trap-like arrangements at the ends of the leaves, which, owing to the hair-like, sensitive organs on the inner surface, will close instantly when touched by an insect or any light substance. It is grown like the Pitcher Plants.

Drosera Filiformis and *D. Rotundifolia*.—Rare, curious, and hardy little bog plants, with pretty lilac and white flowers.

[Some of the Pitcher Plants, together with the *Drosera* and *Dionæa*, are the plants claimed by Darwin as “insect-eating plants,” and on which he wrote a large volume to prove that these plants caught and absorbed insects as food. His belief has been severely questioned, and at present writing the discussion is far from being settled. My own experiments, which have been very elaborate, have all gone to prove that Mr. Darwin’s theory is an error.—P. H.]

HARDY AQUATICS.

The roots of the native American Water Lily will not endure actual freezing, but still it is commonly called hardy. When we speak of an aquatic as being hardy, we do not mean that it is so in the same sense that *Pæonias* are, but that it will endure the winter when placed in the water below the reach of frost.

THE BEST TIME TO PLANT.—The hardy *Nymphæas* and *Nelumbiums* should invariably be planted during spring and early summer. It may be done up to the first of August, but never in the fall, if it can be avoided.

Nymphæa Odorata.—The praises of our fragrant native Water Lily can never be too highly sung. Its lovely white flowers are worthy of a place beside the most costly exotics. It can be successfully grown in a tub, and wintered in a cellar. It does well in one of the beds in the Lily tank, but a more satisfactory way than either is to naturalize it in a pond or slow-running stream. Do not tie a stone to it and sink it, as many recommend, but push it carefully into the mud with the hands or feet. Where the mud is very rich, it will produce flowers six inches and leaves thirteen inches across.

Nymphæa Odorata Minor.—A variety of our native Water Lily, possessing the same qualities of hardiness and fragrance, but producing flowers only one and a half or two inches across. Color, white, tinted with pink on the outside.

Nymphæa Odorata Rosea (Cape Cod Water Lily).—This is the famous Pink Water Lily of Cape Cod, and is the grandest acquisition ever made to our list of hardy Nymphæas. It possesses all the desirable qualities of the white-flowered species, hardiness, freedom of bloom, and delicious fragrance, with the added charm of a deep pink color, a shade somewhat like the Rose called “Hermosa.” The flowers average a larger size than the white, and are in great demand in the large cities and at watering-places during their season. We unhesitatingly pronounce this the most lovely and desirable of all the hardy Water Lilies. It is yet scarce, roots costing from three to five dollars each; but as it becomes more grown it will be sold much lower.

Nymphæa Tuberosa.—This is quite distinct from *N. odorata*, having flowers from four to seven inches in diameter, pure white, with a faint odor like that of ripe apples. The petals are broader and less pointed than those of *N. odorata*. The leaves are sometimes fifteen inches wide.

Nymphæa Alba.—The native Water Lily of England, possessing the same early and late blooming qualities as *N. candidissima*, but with smaller flowers.

Nymphæa Alba v. Candidissima.—This is a large-flowered variety of the Water Lily of England and other parts of Europe. Though not a tropical species, it does not object to a warm climate, and does finely under the same conditions as the tender ones. When naturalized in still water, with a very rich soil, it will produce leaves thirteen inches wide and flowers six inches in diameter.

The latter are pure white, the petals being very broad and much more waxy than those of *N. odorata*. It begins to flower earlier than that species, and continues in bloom for a much longer time. It is a great favorite.

Nymphaea Alba v. Rosea (*N. alba v. sphærocarpa rosea*).—A variety which was first discovered in Sweden, and has received great praise in Europe. It is like *N. alba*, except that the flowers are deep pink, shaded to lighter pink at the edge. Still rare and very costly.

Nymphaea Flava (the Yellow Water Lily).—A charming addition to any collection, having leaves variegated with brown, and flowers nearly as large as those of *N. odorata*. They are of a bright golden yellow color, and deliciously scented, something like Locust-tree blossoms, but more delicate. Perfectly hardy at the North, but should have a warm position in summer.

Nymphaea Pygmæa (the Dwarf Chinese Water Lily). A little gem, producing leaves from two to three inches across, and deliciously scented white flowers no larger than a silver half dollar, which open at noon and close at sunset. It has the additional merit of being hardy.

Nelumbium Speciosum (Egyptian Lotus).—This was cultivated in Egypt in most ancient times, where its seed was known as the "Sacred Bean." It is the "Sacred Lotus" of India and China, and is also cultivated in Japan. This wonderful plant, though coming from such tropical and semi-tropical regions, has proved to be entirely hardy in this country, enduring any degree of cold short of actual freezing. I have for many winters kept it in water, upon the surface of which ice formed from four to eight inches thick. No aquatic plants have a more tropical aspect than the *Nelumbium*. It has been naturalized in one corner of a mill-pond at Bordentown, N. J., where the mud is very rich, and where, in summer, could have been seen, among abundance of noble leaves from one to two

feet in diameter, a hundred buds in all stages of development, and one hundred expanded flowers at one time. *N. luteum* is a beautiful plant, and well worthy of a place in any collection, but *N. speciosum* far surpasses it in ease of culture, rapidity of growth, and freedom of bloom. It will flower the first season it is planted, which is seldom the case with *N. luteum*, and is constantly in bloom from July till late in October. In the "Water Lily Garden," *N. speciosum* has produced some leaves thirty inches across, on foot-stalks five and six feet in length, and flower-stalks of a total length of from five to seven feet. The first day the flowers appear like gigantic Tea Rose buds, of a bright rose color. The second day they open like a Tulip, the base of the petals being creamy white, most beautifully and delicately shaded off toward the end into bright pink. In their last stages of expansion they measure from ten to thirteen inches from tip to tip of petals. They are also delightfully fragrant. The plant is of a rambling nature, and spreads rapidly when placed in a pond. If grown in a Lily tank, along with a general collection, it should be planted in the separate compartments specially arranged for it. It may be grown in a large tub, but better in basins such as I have described. It should not be planted till the growing season has fully arrived. (See fig. 41). The tubers cost from two to four dollars each, according to size.

Nelumbium Luteum (American Lotus).—Though a native of this country, it is not common. There is scarcely any difference between this and *N. speciosum*, except in the color of the flowers, which are of a rich sulphur yellow. They are as large as a quart bowl, and have a strong fragrance, entirely unlike that of a Nymphæa. Still, warm water and very rich soil are the conditions for success with these noble plants. A large patch of them, with hundreds of flowers and buds, is a sight never to be forgotten.

New Japanese Nelumbiums.—Their habit and general appearance are the same as *N. speciosum*, but some have larger and bolder flowers, of a more globular form, and distinct fragrance. They are also hardy, like the others. *Nelumbium nuciferum album striatum*.—The flowers are white, with the edge of each petal irregularly marked and splashed with crimson. A magnificent and distinct variety. *Nelumbium nuciferum roseum*.—This grand new Japanese variety has flowers of a uniform deep rosy pink color, something like *Nymphæa Devoniensis* or the Cape Cod Lily, and much darker than *N. speciosum*. One of the finest yet introduced. *Nelumbium nuciferum album* (White Lotus).—I have been lavish in praise of the pink Lotus (*N. speciosum*), and have nothing to retract. Here we have an exceedingly beautiful white variety without a tinge of pink color. The stamens are yellow, and the receptacle shaded green and yellow, forming a novel combination of colors. It is at present the rarest variety now in cultivation in this country, and is still costly.

Japanese Nelumbium Seeds.—*Nelumbium nuciferum* (mixed varieties). Those who wish to have Lotus flowers the first season will, of course, plant tubers; but for those who are willing to wait a year or two for bloom, seeds can be used. Each nut should have a hole the size of a pin drilled in its shell with the point of a penknife, or by using a file, to allow the moisture to penetrate the kernel, or otherwise it will not germinate. The nuts should then be planted in warm water in a greenhouse, or, if it is desired to plant them in a pond, it should not be done until warm weather, and then in water about one foot deep. They may be either dropped in the water and allowed to sink, or pressed into the soil two or three inches. The seeds cost about one dollar per dozen.

Limnanthemum Nymphaeoides (Villarsia).—This European relative of our American Floating Heart is perfectly

hardy. Its *Nymphæa*-like leaves are variegated with brown. The flowers, which are freely produced, are about an inch across, of a golden yellow color, beautifully fringed, and stand erect like the Water Poppies. Should be grown in shallow water.

Limnanthemum Lacunosum (Floating Heart).—A native species, which at first sight appears to be a miniature Water Lily. Its leaves are from one to two inches in diameter, beautifully blotched with brown, giving them an appearance similar to those of the Cyclamen. The flowers are white, about half an inch across, and very curiously borne upon the same stem which bears the leaves. The plant blooms freely all summer, and will grow in either shallow or deep water, and would make a charming plant for the aquarium.

Aponogeton Distachyon.—A highly interesting tuberous-rooted water plant, which seems to like a long period of rest. It may be entirely dried off in May and kept dormant until fall, when it should be replanted in good soil, in a tub or large pan. It may then be placed in a greenhouse, where it will flower profusely all winter. It is hardy if planted in a pond. Its leaves are oblong, about six inches by two. The pearly-white flowers, with black anthers, are produced in curious fork-shaped spikes, and are deliciously scented.

Trapa Natans (the Water Chestnut).—This is a hardy annual aquatic, bearing, from the midst of a rosette of green leaves, small white flowers, which are followed by good-sized nuts with several sharp thorns. These nuts are edible, and taste something like a coconut. After once being planted in a pond it will reproduce itself from year to year.

Juncus Tabernæmontana, usually known as *J. Zebra* (the Porcupine Plant).—This is a true rush, growing from one and a half to three feet high, produc-

ing leaves variegated in exactly the same manner as a porcupine quill, with alternate bands of green and pure white. It may be grown either as an aquatic or as a garden plant, but should never be grown with the crowns of the plant under water, for then the leaves lose much of their variegation. Perfectly hardy.

Sagittaria Sagittifolia Fl. Pl. (Double Flowered Arrow-Head).—The foliage of this plant is similar to our native species, but the flowers are an immense improvement, making it one of the most charming additions to any collection of aquatics. The flowers are borne on spikes two feet high; are as large, full, and double as the finest Carnation or double Balsam, and as white as the driven snow. Perfectly hardy.

Sagittaria Variabilis (the Arrow-Head).—A native plant suitable for shallow water, growing about two feet high, bearing arrow-shaped leaves and pearly-white flowers.

Pontederia Cordata.—Another interesting plant for shallow water, with heart-shaped leaves and spikes of blue flowers, produced all summer.



CHAPTER XXIV.

THE CHRYSANTHEMUM.

NEXT to the Rose, no plant is now so popular as the Chrysanthemum. It is only some ten or twelve years since, in this country, its great value as an ornamental plant for the fall and early winter months has been fully realized, although it has been long valued in Europe, where it forms the great attraction in all the floral exhibitions of autumn. The first great Chrysanthemum Show was given in New York some five years ago, and

since then, every November, Philadelphia, Boston, and other large cities have vied with New York in getting up these exhibitions, which have attracted tens of thousands of visitors. The fashion is now spreading into the smaller cities and towns, so that the day is not far distant when this most beautiful of all autumn flowers will be found in every hamlet on the continent, whose occupants have any taste for flowers.

It is the floral emblem of Japan, just as the Thistle is of Scotland or the Fleur de Luce of France, and there is hardly a home in that flowery land so poor that it is not ornamented with one or more varieties of the "Autumn Queen." In the gardens of the Mikado, which contain marvelous varieties of this plant, they are trained on wire frames to represent animals of all descriptions. White elephants, yellow cows, and crimson dogs are by no means rarities in the grounds of the Mikado. The Chrysanthemum, too, is put to another use in Japan. When a rural swain makes up his mind to sue for the hand of some rustic belle, his first advance is to place on her doorstep as fine a specimen of a Chrysanthemum as he can procure. If it is watered, tended, and cared for, he knows he may "call again;" but if neglected, and allowed to wither and die, so dies out the hope of the unfortunate "Jap," so far as that particular damsel is concerned.

The cultivation of the Chrysanthemum is exceedingly simple. If the plants are wanted to flower only in the open ground, all that is necessary is to plant them in the open border in any good ground, well enriched with manure. If possible, plant them in a warm, sheltered spot, particularly in any section north of Baltimore; for, being the latest of all flowers of autumn, a better development will be had if they are planted in a place sheltered by a fence, hill, or shrubbery. As they are all sold grown in pots, they can be planted

out any time from April to July, though preference may be given to May. They form an average width by October of two feet in diameter, if the tops are pinched off so as to make them bushy. They should be set out about two feet apart each way. The "topping" or "pinching" back, as it is called, should not be done later than the first of August; for, if much later, it might destroy the flowering to some extent.

House Culture.—When wanted to be grown for greenhouse or house culture, the best plan for amateurs is to put each plant, when received, in a flower pot six, seven, or eight inches wide and deep. Plunge these pots to the rims in the open ground, level with the soil, treating them exactly the same as recommended for planting in the open border, by pinching, etc. Care should, however, be taken to turn the flower pots round every eight or ten days, so as to prevent the roots from getting through the bottom of the pot, the object being to confine all the roots within the pot. This same plan is the best for amateurs who cultivate any kind of plant to grow in the house or greenhouse in winter. Although the Chrysanthemum is entirely hardy, so that even the flower buds will stand quite a freeze without injury, yet, to get the best effect from the plants designed for house culture, they should be taken indoors by October 1st.

How to Grow for Spring Flowering.—Although the Chrysanthemum is generally only grown for the fall and early winter months, yet, by taking the first young shoots that start from the root of the old plants which are flowering in the fall (say by the middle of November), and placing them in the propagating bed, they will root in a few days. If grown on in the ordinary greenhouse temperature during winter, shifting them into larger pots as their necessities require, by April they make fine flowering plants. The past season we grew a few hundred in this manner, that made grand plants for church decora-

tion at Easter, on the 10th of April. They were grown in six-inch pots, and averaged fifteen expanded flowers to a plant.

The large Chrysanthemum flowers which are seen at the exhibitions are obtained by pinching off all the buds



Fig. 45.—CHRYSANTHEMUM MRS. BRETT.

but one on each shoot, just as soon as the buds can be seen. This is called “disbudding.” In this way, many kinds of Chrysanthemum flowers can be obtained six inches in diameter. This is the method used to obtain

all the fine flowers seen at the exhibitions. It is deceiving, however, to those unacquainted with the plan, because a flower so obtained, six or seven inches in diameter, if grown with half a dozen flowers on the same shoot, would not be half the size. Hence amateurs, who have selected special kinds from the cut-flower tables at exhibitions, must not be disappointed at finding them half the size when they flower, unless they use the same process of disbudding to obtain large flowers.

I give here a list of varieties, such as are esteemed the best at the date at which this is written (1887), though it is likely that in ten years some of them will be superseded by better kinds; but a list is necessary to show to our amateur readers the range of color and style embraced by the Chrysanthemum.

Early Varieties.—Although *all* of the Chrysanthemums are early enough to perfect their flowers in the open ground south of Baltimore, yet, in the vicinity of New York and further north, many of the late kinds sometimes do not; hence we name this *early collection* for the benefit of residents of extreme Northern States. *Bouquet Nationale*, fine large double flower; pure white, with lemon center. *Bouquet Fait*, delicate rosy lilac, shaded silvery white. *Elaine*, beautiful waxy white; perfect form; extra fine. *Red Dragon*, dark yellow, streaked bronze and crimson. *Gloriosum*, bright sulphur yellow; very free flowering. *Geo. Glenny*, a fine old early yellow, incurved. *J. Collins*, salmon maroon, shaded bronze. *Mrs. Brett* (figure 45), sulphur yellow, forming a complete ball. *M. Lemoine*, dark yellow, streaked bronze and crimson. *Mad. Grame*, pure white; fine incurved flower. *Mrs. S. Lyon*, large single white, golden center. *Sonce d'Or*, intense yellow, shaded old gold.

Late or "Christmas."—Under this heading we name the very *latest* flowering varieties; such kinds as perfect their

flowers in the house about the "holiday" season. Most of these kinds would be too late in flowering for any section north of Baltimore in the open air, but would bloom freely out of doors south, some of the kinds lasting up to Christmas. *Bend d'Or*, pure golden yellow. As



Fig. 46.—CHRYSANthemum CULLINGFORDI.

the flowers mature, the petals lap over, forming ribbon-like bells. *Cullingfordi* (figure 46), crimson, shaded maroon. *Count of Germany*, bronze and old gold. *Christmas Eve*, pure snow white. *Fantasie*, pink, shading to

white. *Fair Maid of Guernsey*, clear dazzling white ; immense ball-like flowers. *Golden Dragon*, very large ; dark golden yellow ; broad, heavy petals. *Jupiter*, brilliant reddish crimson. *James Salter*, clear light yellow ; beautifully incurved as the flower opens. *Lord Byron*, dark, rich crimson, shaded old gold. *Lady Slade*, delicate purple pink ; beautifully incurved. *Mrs. C. L. Allen*, carmine, yellow center. *Moonlight*, immense size ; beautiful lemon white. *Mrs. C. H. Wheeler*, upper part of petals deep yellow, under vermilion. *Maid of Athens*, very large ; pure snow white. *Talford Salter*, dwarf, compact grower ; rich crimson, streaked golden bronze. *Yellow Eagle*, very large ; dark golden yellow ; ribbon-like petals.

CHAPTER XXV.

PARLOR GARDENING, OR THE CULTIVATION OF PLANTS IN ROOMS.

PARLOR GARDENING has, to some extent, been treated of under the head of "Winter-Flowering Plants," but a few additional general directions for plants not specially designed for winter flowering may be acceptable. One of the conditions essential to success is to start with healthy plants. Even all the professional skill of the florist, with all his appliances, will often fail to get a sickly plant into a healthy condition. What, then, can the amateur florist expect to do in the often unequal temperature and dry atmosphere of a sitting-room or parlor ? If the plants are purchased from the florist in autumn, to grow in the house, they are likely to be healthy, and are usually in a condition to shift into a pot one size larger ; instructions for doing which are given in the chapter on "Winter-Flowering Plants." But if the

plants to be cultivated in the house are such as have been growing in your own flower borders, plants that were set out in spring, and have now the full summer's luxuriant growth still on them, then proper precaution must be taken in lifting them and placing them in pots, or the result is certain to be most unsatisfactory. What may seem to the novice a little singular is, that the more luxuriant the growth of the plant in the open border, the more danger there is that it will wilt or die when lifted in the fall, and placed in a pot. The reason of this is obvious, when it is known that just in proportion to the top growth of a plant is the wide-spread development of roots, and, therefore, when you lift a finely-grown Geranium or Rose in October, it is next to impossible, if it is to be got into a suitable sized flower pot, to do so without such mutilation of the young roots as will certainly kill it, if precaution is not taken to cut off at least two-thirds of its branches. If the plant is thus potted, and kept as dry as it will stand, without actually withering, until it starts into growth, you may hope to have a fairly healthy specimen by December, if the lifting was done in October. But this practice, though often one of necessity, is never satisfactory. If the plants that have done service in the borders in summer are to be used as ornaments for the parlor in fall, winter, and spring, they must have a different treatment.

All plants that are intended for future culture in rooms should be potted in the usual way, in five or six-inch pots, when set out in May or June. These pots should be set in the flower borders, but planted or "plunged," as it is called, so that the rim of the pot is level with the surface of the ground. The plants will flower in these pots, if so desired, nearly as well as if set directly in the open ground ; but if wanted for flowering in winter, they will bloom much better to have the flower buds picked off as fall approaches. It is also indispensa-

bly necessary that the hole in the bottom of the pot be entirely stopped, so that the roots cannot get through while growing in the open border in summer. The object is to confine the roots completely within the bounds of the pot, so that, when taken up in the fall to be shifted into a larger pot, the roots will be undisturbed, and the plant will grow on unchecked. If this is not done, and the roots find their way through the bottom of the pot, there will be the same difficulty with the roots as if they had not been potted. About the best time to take plants in-doors in this latitude is the middle of October; in colder localities, earlier, of course, and in warmer, later; always bearing in mind that the longer they can be kept in the open air, provided they are safe from frost, the better. Plants suited for parlor culture, requiring a temperature of from forty-five to fifty-five degrees at night, with an average of ten to twenty degrees higher during the day, are as follows. These are known as greenhouse plants. For descriptions see catalogues of florists and nurserymen.

*Abutilons.	Holland Bulbs of all kinds.
Acacias.	Hoyas (Wax Plant).
*Agapanthus.	Ivies, parlor and hardy.
Ageratums.	Jessamines, Cape.
Anthemis.	*Jessamines, Catalonian.
Asparagus, Climbing.	Lily of the Valley.
Azaleas.	Lobelias.
Calceolarias.	*Mahernias.
*Callas.	Marguerites, white and yellow.
Camellias.	*Mesembryanthemums (Wax Pink).
*Carnations.	Mimulus (Musk).
Chorizema.	*Myrsiphyllum or Smilax.
Chrysanthemums.	Oleanders.
Cinerarias.	Oranges.
Cupheas.	Oxalis.
Cyclamens.	Petunias.
Daphnes.	*Primulas, double and single.
*Ferns, Climbing.	*Roses.
Feverfews.	Stevia.
*Fuchsias.	Vincas.
Geraniums (Pelargoniums).	Violets.

What are known as hothouse or tropical plants require a higher temperature than the preceding, and cannot be well grown unless with a night temperature of from sixty to seventy degrees, and a day temperature of from ten to fifteen degrees higher. The following, of most of which there are several varieties, can be found described in the catalogues of dealers :

Allamandas.	Ferns, tropical.
Allocaſias. -	Heliotropes.
Begonias.	Hibiscus.
Bouvardias.	Impatiens.
Caladiums.	Marantas.
Cissus.	Orchids (of all kinds).
Clerodendrons.	Passifloras.
Cobæas.	Peperonias.
Coleus.	Poinsettia.
Crotons.	Salvias.
Dracænas.	Sanchezias.
Epiphyllums (Cactus).	Toreniaſ.
Eranthemums.	Tropæolums.
Euphorbias.	Tuberoſes.

This matter of temperature has everything to do with the ſucceſſful cultivation of plants in rooms, or, in fact, anywhere. If you attempt, for example, to grow Bouvardias or Begonias in an average temperature of forty-five degrees at night, the plants will barely live, and will not flower, nor be healthy. On the other hand, if you ſubject your Camellias or Geraniums to an average of ſixty-five degrees at night by fire heat in winter, you are almoſt certain to have the flowers drop prematurely. As a rule, there are more of the plants known as greenhouse that will endure the high temperature neceſſary for the hothouſe plants, than there are of the hothouſe plants that can ſtand the low temperature, ſo that, when no diſtinction can be made, and a high temperature only can be had, all in the liſt of greenhouse plants I have marked with a * may be grown fairly well in the high temperature, though they would do better in the low one.

The culture of plants in rooms is already described in the chapter on "Winter-Flowering Plants," so that I need not further allude to it, except to hint in regard to the manner of placing the plants. One of the cheapest and neatest contrivances is the "folding plant stand" (figure 47). The sizes are from three to six feet wide and eight feet high, having from four to six shelves, and capable of holding from twenty-five to one hundred plants. It is hinged so as to fold up like a camp stool, the shelves fitting in between the frames, and it can be thus shipped or stowed away when not wanted, with great convenience. Rollers can be attached to the feet, so that it may be moved about as easily as a table; a great advantage in cold nights, when it can be drawn away from the window to a warmer part of the

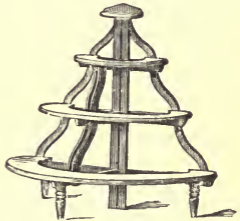


Fig. 47.—FOLDING PLANT STAND.

room or to another room. Plants, when placed on this, or similar stands, may be provided with saucers, so that the floor or carpet need not be injured while watering. It is not a good plan, however, to keep water in the saucers. It is always a safer way of feeding the plant to water the soil on the top, giving only enough for it to reach the bottom, where, if any water pass through, it will be held by the saucer. If no saucers are used, and we think plants are generally grown more safely without them, the best plan is to take down the plants from the stand (three times a week will usually be enough), to some place where the water will not do any injury, and give a good soaking to all such as appear to be dry; those not so dry, water more sparingly, and give those in which the soil shows that it is wet, none whatever. Let the water drain off, pick off any dead leaves, and replace the pots

again on the stand, being careful to change them as far as possible, so that each side of the plant may get its fair share of light. If the same part is always placed to the light, the plant will soon become drawn to one side.

ARE PLANTS IN ROOMS INJURIOUS TO HEALTH ?

The question whether plants may be safely grown in living rooms is now settled by scientific men, who show that, whatever deleterious gases may be given out by plants at night, they are so minute in quantity that no injury is ever done by their presence in the rooms and by being inhaled. Though we were glad to see the question disposed of by such authority, experience had already shown that no bad effects ever resulted from living in apartments where plants were grown. Our greenhouses are one mass of foliage, and I much doubt if any healthier class of men can be found than those engaged in the care of plants. But timid persons may say that the deleterious gases are given out only at night, while our greenhouse operatives are only employed in daylight. This is only true in part. Our watchmen and men engaged in attending to fires at night make the warm greenhouses their sitting-room and their sleeping-room, and I have yet to hear of the first instance where the slightest injury resulted from this practice. Many of our medical practitioners run in old ruts. Some Solomon among them probably gave out this dogma a century ago ; it was made the convenient scapegoat of some other cause of sickness, and the rank and file have followed in his train. A belief in this error often consigns to the cellar, or to the cold winds of winter, the treasured floral pets of a household.

CHAPTER XXVI.

WARDIAN CASES, FERNERIES, AND JARDINIERES.

THE forms of plant cases for the growth of such plants as require a moist, still atmosphere, a condition impossible to obtain in a room in a dwelling-house, nor even in a greenhouse, unless it is specially erected for the purpose, are numerous. The form commonly known as the Wardian Case (figure 48) has a base or tray, usually of black walnut, about six inches deep, and lined with zinc, and glass sides and top. These differ in size, some



Fig. 48.—WARDIAN CASE.



Fig. 49.—FERNERY WITH GLASS SHADE.

being as large as three feet on the sides. Another neat and cheaper form is made of terra cotta (figure 49), or other earthen ware. These are usually round in shape, and of various sizes, from nine to eighteen inches in diameter. In all these the plants must be covered with glass. In the Wardian Case there is glass all around the sides and top, the top being hinged to allow the escape of excess of moisture. In the Jardinieres, or circular

form, the plants are covered by a bell-glass, which is tilted up a little at the side when there is an appearance of excess of moisture. This condition of excess is known by the glass becoming dimmed by moisture, and the water trickling down the side. Usually, when this appearance is seen, by raising the glass lid of the Wardian Case an inch or so for a day, it will relieve it enough to enable it to be kept close, which is the proper way to keep it for the well-being of the plants. The plants grown in this way are of kinds valued for the beauty of their foliage rather than for their flowers, and should be such as are of a somewhat slow growth. All rampant growing plants, such as *Coleus*, are unsuited. The effectiveness of these Cases depends a great deal on the arrangement of the plants. The tallest and most conspicuous things should be in the center, with smaller ones towards the edges, varying the interest by contrasting the different colorings and forms of leaves. Among the plants best suited for growing under these glass coverings are *Dracænas*, *Gymnostachiums*, *Marantas*, *Caladiums*, some of the ornamental leaved *Eranthemums*, and dwarf-growing *Begonias*, *Peperomias*, etc., and Ferns and Lycopods of the finer sorts. The most of these are plants whose natural habitat is shady woods or marshes; and for their well being, the nearer that the Wardian Case or Jardiniere can be made to imitate such, the better.

The soil used in these cases should be light and porous. The most convenient, and a very suitable material, is leaf mold, which can be got in any piece of woodland. After planting, the soil should be watered freely, to settle it around the roots. To allow evaporation, ventilation should be given for a few days after the watering, when the glass may be put down close, only to be opened, as before directed, when an excess of moisture shows on the glass. Other than this there is no trouble whatever in the management. The watering given on planting will

be sufficient to keep it moist enough for six or eight weeks. In winter the temperature of the room in which the Wardian Case or Fernery is kept may run from fifty to seventy degrees at night. These closed Cases of either kind are particularly well adapted for growing Hyacinths in winter, if desired; but they must first be placed in some cool, dark place, so that the roots may be formed before being brought into the light. (See special instructions on this head under "Fall or Holland Bulbs.") When the Cases are brought into the room they will require daily ventilation. The Lily of the Valley can also be grown finely in a Wardian Case. (See "Fall or Holland Bulbs.")



CHAPTER XXVII.

GREENHOUSES ATTACHED TO DWELLINGS.

THE taste engendered by growing plants in rooms often results in a desire to have more appropriate quarters for the plants, and a greenhouse follows. This always affords the most satisfaction when it is so attached to the dwelling, that opening a door or window from the dining-room or parlor reveals the glories of the greenhouse. The greenhouse, when attached to the dwelling, should be always on the east, southeast, south, or southwest sides, never on the north, if *flowering* plants are to be grown; though Ferns, Lycopods, Palms, and other plants grown for the beauty of their form or foliage, will do quite well in the shade of a northern aspect. It may be of any length or width desired. If of ten feet width, it will cost for erection from forty to sixty cents per square foot of the glass surface, according to the character of the work. If twenty feet wide, from forty to

fifty cents per square foot. This is exclusive of heating, which, if done by hot-water pipes, will cost for ten feet wide, about forty cents per square foot of the glass surface; if twenty feet wide, about the same. Thus, to complete a conservatory, with heating apparatus, shelves, etc., ten feet wide by forty feet long, would cost about

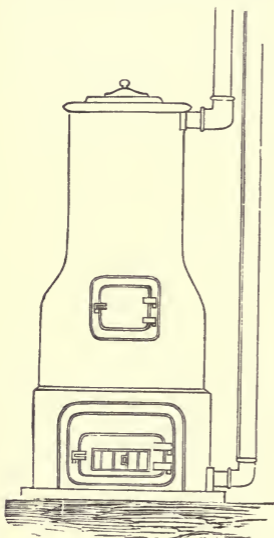


Fig. 50.—BASE-BURNER.

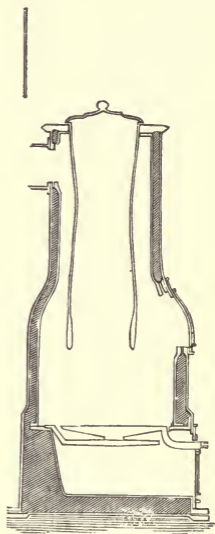


Fig. 51.—SECTION.

\$400; if twenty by forty feet, about \$700. In this estimate it is assumed that the heating is to be done by the Base-burning Water-heater of Hitchings & Co., or other similar heater. This heating apparatus is of comparatively recent invention, and is exceedingly well adapted for the purpose, as the fire requires no more at-

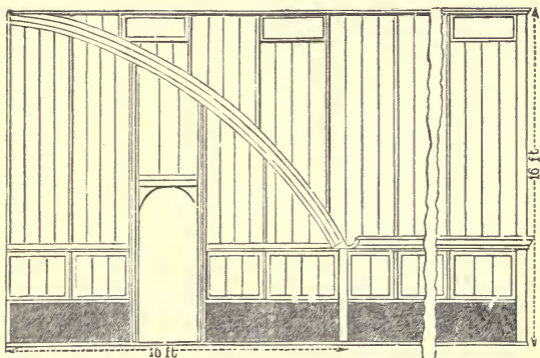


Fig. 52.—ELEVATION OF CONSERVATORY ATTACHED TO DWELLING.

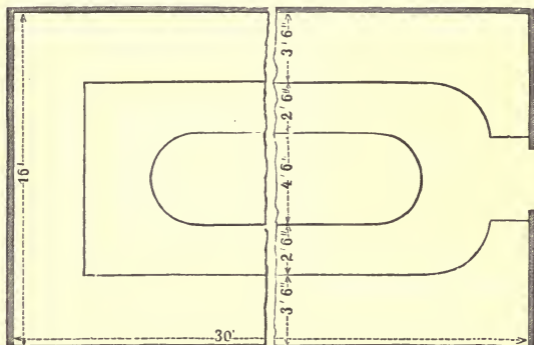


Fig. 53.—GROUND PLAN OF CONSERVATORY, FIG. 52.

tention than any base-burning stove. The boiler takes up no more room than an ordinary stove, and requires no setting. It is shown in figure 50, and in section in figure 51. It is fed by coal from the top, and can be left with safety ten or twelve hours without any attention.

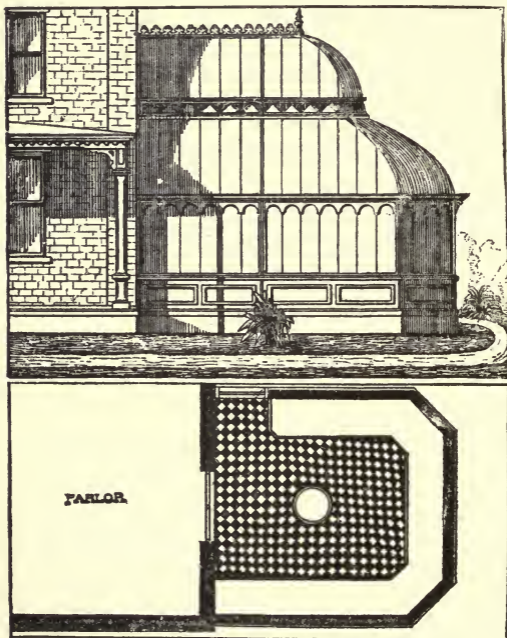


Fig. 54.—CONSERVATORY ATTACHED TO DWELLING.

It must be borne in mind that, in constructing the conservatory, it must be built where a chimney is accessible by which to carry off the smoke from the boiler or water

heater, just as would be necessary for an ordinary stove. If the greenhouse is small enough to be heated by a register from the furnace or steam boiler that heats the dwelling, much of the cost may be saved, as it will be seen that nearly half of the cost of construction is the heating apparatus. Figure 52 shows a front elevation of a conservatory suitable to attach to dwellings. It is sixteen feet wide and thirty feet in length. Its ground plan, showing the arrangement of the benches and walks, is given in figure 53. Such a structure in every way complete, heated with the Hitchings Base-burning Water-heater, should not exceed one dollar and twenty-five cents per foot of glass surface, or \$600.

Figure 54 shows a more elegant style of conservatory attached to a dwelling. The size is sixteen by sixteen; high, twelve feet. The estimated cost complete, with heating apparatus included, for every square foot of glass surface covered, at four dollars per foot, would be \$1,024. If heated from the boiler or furnace used to heat the dwelling, perhaps one-third less. This design is given by Lord & Burnham, horticultural architects.



CHAPTER XXVIII.

DETACHED GREENHOUSES, MODES OF HEATING, ETC.

When more extended glass structures are desired they must, of course, be detached from the dwelling or other buildings; and if shelter, *without shade*, can be had from hills, woods, or buildings from the north or north-west, so much the better. When greenhouses, graperies, rose houses, or other greenhouse structures are wanted for forcing flowers or fruits in the winter months, they should always be built after what are called "three-

quarter spans ;" that is, having nearly two-thirds of the roof long on one side and the other one-third on the other.

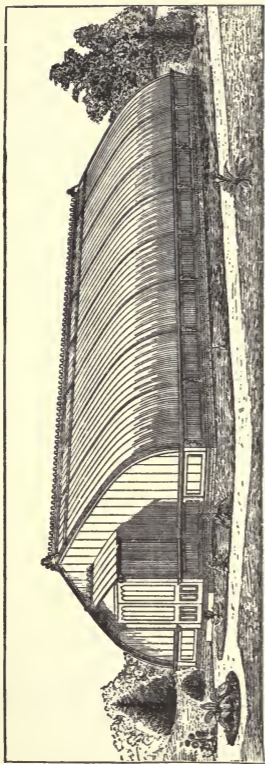


Fig. 55.—GREENHOUSE WITH EQUAL SPANS.—*Design by Lord & Burnham.*

The long or two-thirds side should in all cases, as near as possible, slope directly south, the object being to obtain, during the dull days of winter, as much sunlight as possible ; and for the same reason the wood work of the frames should be as light as possible, and the glass of the largest size that can be economically used. The average size now in use for this purpose is twelve by twenty inches, put in the twelve inch way. The brand of glass mostly used is what is known as "second quality double thick French." It is of the utmost importance that the glass be clear and without flaws ; otherwise the flaws will concentrate the sun's rays, forming lenses, and burn the foliage. When greenhouse structures are not wanted specially for winter flow-

ers or fruit, they may be formed of equal spans, as in figure 55. In this case the ends should face north and

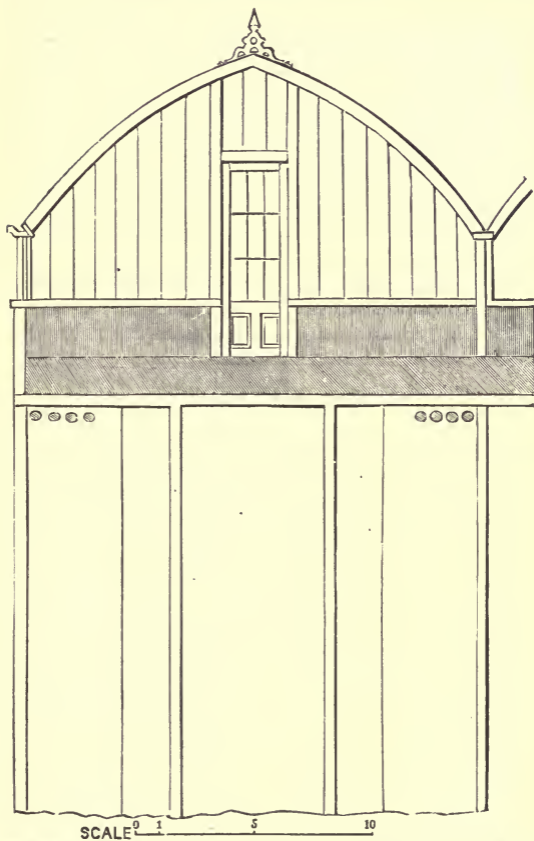


Fig. 56.—END-VIEW AND PLAN OF DETACHED GREENHOUSE OR GRAPERY.

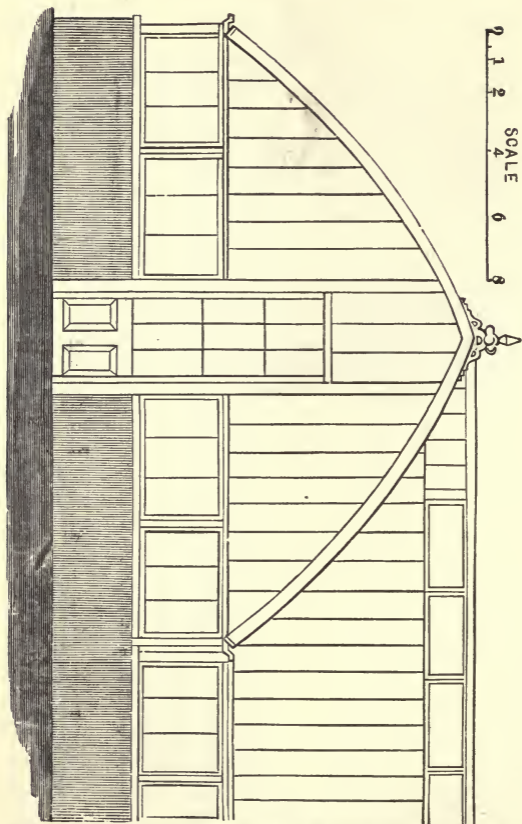


Fig. 57.—ELEVATION (IN PART) OF DETACHED GREENHOUSE OR GRAPERY.

south, so that the distribution of light will be equal on each side: the east side in the morning and the west in the afternoon.

All the walling from the surface of the ground to the glass of a greenhouse had better be made of wood, unless the walls are made very thick when built of brick or stone. The continued warfare in winter between a zero temperature outside and sixty to seventy degrees inside, will in a few years destroy brick or stone walls. When the walls are formed of wood, the best way is to place locust posts at distances of four feet apart, and nail to these a sheathing of boards. Against the boards tack asphaltum or tarred paper, and again against that place the weather-boarding. This forms a wall which, if kept painted, will last for fifty years, and is equally warm as a twelve-inch brick wall, and costs less than half. A common error is to board on each side of the post and fill in with sawdust or shavings. This should never be done, as this filling soon decays, besides forming a resort for mice and other vermin. We have had just such a structure (as figure 57) in use fifteen years as a cold grapery, that has no heating apparatus, the forwarding being done only by the action of the sun on the glass, and it has proved a cheap and satisfactory luxury. A conservatory or grapery of this style (figures 56 and 57) costs from fifty to sixty cents per square foot, without heating apparatus. Heated by hot water, it would cost one dollar to one dollar and twenty-five cents per square foot. If heated by a horizontal flue in the manner here described, the cost would be about seventy-five cents per square foot.

GLASS AND GLAZING.

If for winter forcing of either fruit or flowers, the glass should be not less than ten by twelve in size, laid in the twelve way, and if twelve by twenty all the better. Even with the greatest care, some flaws in

the glass will escape detection, and more or less burn the leaves after the sun becomes strong, to counteract which a slight shading had better be used on the glass from April to September. We use naphtha, with just enough white lead mixed in it to give it the appearance of thin milk. This we put on with a syringe, which sufficiently covers up all flaws in the glass to prevent burning, and at the same time tends to cool the house from the violence of the sun's rays. This is by far the cheapest and best shading we have ever used. It can be graded to any degree of thickness, and costs only about twenty-five cents per thousand square feet of glass, for material and labor.

In glazing, the method now almost universally adopted is to bed the glass in putty, and tack it on top with glazier's points, using no putty on the top. The glazier's points are triangular, one corner of which is turned down, so that, when it is driven in, it fits the lower edge of each pane and prevents it from slipping down. A great mistake is often made in giving the glass too much lap. It should only be given just enough to cover the edge of the pane (from one-eighth to one-fourth of an inch). If given too much, the water gets in, and when it freezes it cracks the glass.

All who have had experience with greenhouses know that, no matter how well the glazing has been done by bedding the glass in putty, the water gets in at the crevices sooner or later, rotting the putty, and, consequently, loosening the glass. A simple plan to obviate this (which has recently been introduced) is to pour along the junction of the bar with the glass a thin line of white lead in oil from the slender spout of a machine oil can, over which is shaken dry sand. This at once hardens, and makes a cement which effectually checks all leakage. This, carefully done, will make such a tight job that no repairs will be necessary for many years.

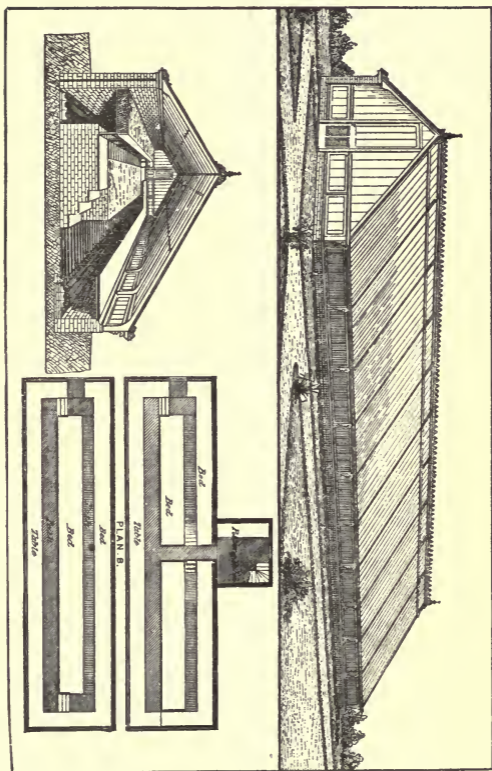


Fig. 58.—THREE-QUARTER SPAN GREENHOUSE.

The following are a few styles of greenhouse structures of finer finish than most of the preceding. It is all important that the heights, angles, etc., be kept as near to the plans given as possible, as each plan we believe to be as near correct as it well can be, to give the best results in culture. No scale is given, but a scale can easily be adapted from any of the accompanying measurements.

Figure 58 is taken from Lord and Burnham's book of greenhouse plans, and represents a three-quarter span house, seventeen by sixty, ridge eight feet, heated by six runs of four-inch pipes for hot water. It is the most useful style of all greenhouse structures, and is used for the model rose house, but can be adapted to the growing of all kinds of flowering plants for winter blooming, or for forcing strawberries, cucumbers, and other fruits or vegetables. The estimated cost of such a structure (if the frame and walls are made of wood, and, as a general thing, we advise them made of wood) would be from one dollar and twenty-five cents to one dollar and fifty cents per foot for the ground area covered by the house; that is, a house seventeen by sixty at one dollar and twenty-five cents would cost \$1,275 for the whole structure complete, including the heating by steam or hot water, ventilating apparatus, etc. Of course, the cost would be lessened in proportion to the size of the buildings. The engraving shows the walls to be formed of brick; but this is not only more costly, but, in our experience, is not so good as wood. (See Greenhouse Structures.)

Figure 59 represents a greenhouse twenty by sixty, ridge eleven feet high, full span. The ground plan shows it to be divided in the center by a glass partition, so that, thus divided, it can, if required, be used for greenhouse and hothouse plants by simply adding two additional pipes to the section used for the hothouse; or one section may be used as a rose house and the other for greenhouse plants. The construction is the same as recommended

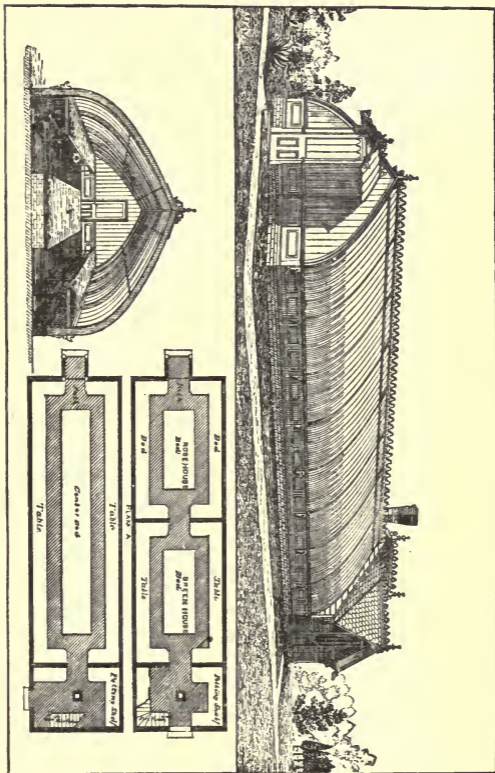


Fig. 59.—GREENHOUSES, EGG HOUSE, AND POTTING ROOM.—From Lord & Burnham's Book of Plans.

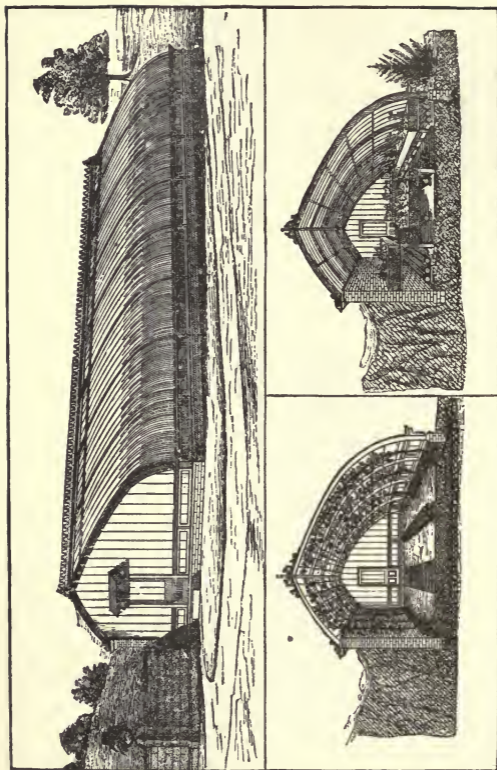


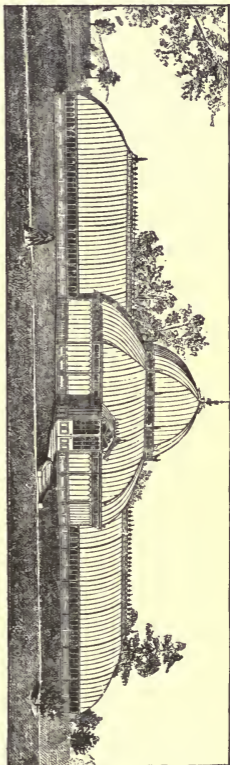
Fig. 60.—GREENHOUSE, ROSE HOUSE, OR VINERY.—From Lord & Burnham's *Book of Plans*.

for the house seventeen by sixty (figure 58). The cost of this structure would be about one dollar and fifty cents per foot, or \$1,800 for a house twenty by sixty complete.

Figure 60 represents a curvilinear, three-quarter span house, eighteen by sixty, with twelve feet ridge, which can be used as a greenhouse, rose house, or grapery. The cost, if built of wood (as advised in the house seventeen by sixty, figure 58), would be about one dollar and fifty cents per foot, or \$1,620.

Figure 61 (center, fifty by fifty, each wing twenty-five by forty-five) shows a beautiful and one of the most useful of glass structures. The center is to be used for a conservatory or show house, where ornamental foliaged or flowering plants may be placed. The wings are to be used for a grapery, greenhouse, or rose house, as desired. Such a building as is shown in the engraving would cost, with iron frame, brick foundations, and heating and ventilating apparatus complete, about two dollars and fifty cents per foot, or \$11,875, if of the above dimensions. This is the

Fig. 61.—CONSERVATORY WITH WINGS ATTACHED.—From *Lord & Burnham's Book of Plans*.



favorite style of greenhouse structure in the vicinity of New York on well-appointed places, varied somewhat in size or architectural details, according to the taste of the owner.

HEATING BY HOT WATER AND STEAM.

These methods are in almost universal use, though many, who do not wish to go to the expense, still use smoke flues. In heating by hot water it is important that the work be given to some reputable firm, whose knowledge is such as will enable them not only to judge what is the proper capacity of the boiler for the number of pipes to be used, but also how many pipes are necessary to be used for the surface of glass to be heated. Men who have done a large business in heating greenhouses have far better opportunities for knowledge in this matter than the average gardener or florist; and if those erecting greenhouses have not had extensive and varied practice, they had better be guided by the men who make a business of heating, as the want of the requisite knowledge of these matters often works serious mischief. Of course, the size of the greenhouse or greenhouses 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, used in our own establishment, may be useful. In our houses, which are twenty feet wide and one hundred feet long, when a night temperature of seventy degrees is required in the coldest weather, ten runs or rows of four-inch pipe, five on each side; when sixty degrees are wanted, eight runs of pipe, four on each side; when fifty degrees are wanted, six runs of pipe; and when only thirty-five or forty degrees are wanted, four runs 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 esti-

mated 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 greenhouse. We now place all our pipes under the side benches, as that enables us to use the space under the middle for stowing away many plants safely, which otherwise could not be done if the pipes were there.

Heating greenhouses by steam is rapidly coming into use, and, in my opinion, whenever the extent to be heated is over five thousand feet of glass surface, steam should be used in preference to hot water, for the reason that it ought to be cheaper to put up, one foot of steam pipe costing ten cents being equal to the hot-water pipe costing twenty cents; and, in addition, in a thorough comparative trial we find it to be a saving of about twenty-five per cent. in coal. As far as the well-being of the plants is concerned, it makes no difference whatever whether the greenhouse is heated by hot water or by steam. There is an impression that the heat given off from hot-water pipes is more moist than that from steam; but this is an error, as experiments show there is no difference whatever.

USING GAS TAR ON STEAM OR HOT-WATER PIPES.

Every season some one is led into the grievous blunder of painting the hot-water or steam pipes with gas tar. This never fails to result in the almost complete destruction of the plants as soon as the necessity for heating the pipes begins. The heat evolved from the pipes so painted gives out a gas destructive to all species of plant life. When the blunder has been committed, there is no remedy but to take out the pipes and burn the gas tar off by a red heat. All kinds of remedies have been tried again and again, and all have failed, for the reason that

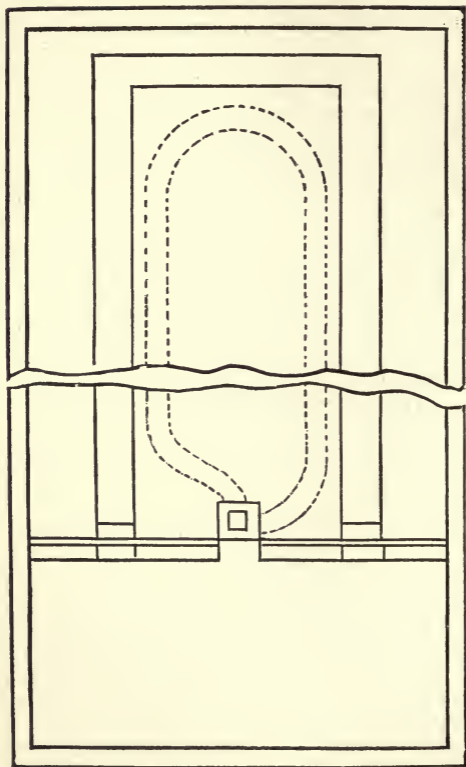


Fig. 62.—Shows a house 20 x 60, heated by a flue run under the center bench.
(Scale $\frac{1}{8}$ of an inch to the foot.)

the gas tar eats right into the grain of the metal, often half through it, so that all surface applications are useless. Better let all painting of the pipes alone, as a rather better radiation of heat is got if left unpainted.

HEATING BY FLUES.

When personal attention can be given to the fires, by heating greenhouses with flues a great saving in cost can be made; in fact, nearly half the cost of construction; for we find that the hot-water heating apparatus usually is half the cost of building greenhouses, while, if heated by flues, the cost would not be more than ten per cent. of the whole. A new method of constructing flues (or rather a revived method, for it originated in 1822,) has been in use for the past few years, which has such manifest advantages that many now use it who would no doubt otherwise have used hot-water heating. Its peculiarity consists in running the flue back to the furnace from which it starts and into the chimney, which is built on the top of the furnace. As soon as the fire is lighted in the furnace, the brick-work forming the arch gets heated, and at once starts an upward draft, driving out the cold air from the chimney, which puts the smoke flue into immediate action and maintains it; hence there is never any trouble about the draft, as in ordinary flues having the chimney at the most distant point from the furnace. It will be understood that the chimney into which the flue is returned is placed on the *top* of the arch of the furnace, and not *in* it, as some might suppose.

By this plan we not only get rid of the violent heat given out by the furnace, but at the same time it insures a complete draft, so that the heated air from the furnace is so rapidly carried through the entire length of the flue, that it is nearly as hot when it enters the chimney as

when it left the furnace. This perfect draft also does away with all danger of the escape of gas from the flues into the greenhouse, which often happens when the draft is not active. Although no system of heating by smoke flues is so satisfactory as by hot water or steam, yet there are many who do not want to go to the expense of hot-water heating, and to such this revived method is one that will, to a great extent, simplify and cheapen the erection of greenhouses.

Figure 62 (one-eighth of an inch to the foot scale) shows a greenhouse twenty feet wide by fifty feet long, with furnace room, or shed, ten by twenty feet. Here

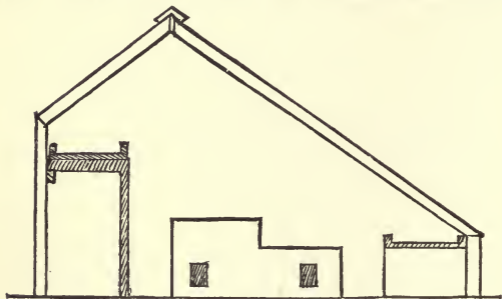


Fig. 63.—(Scale $\frac{1}{8}$ of an inch to the foot.)

the flues are so disposed as to avoid crossing the walks, being placed under the center bench, but as near as possible to the walk on each side, so that the heat may be evenly diffused throughout. If a difference in temperature is required in a house of this kind, it may be obtained by running a glass partition *across* the house, say at twenty-five feet from the furnace end, which will, of course, make the latter end the hottest. It will be observed that the plan (figure 62) shows by dotted lines this new or revived plan of flue heating. Figure 63 (the

same scale) is a section, showing the arrangement of the benches, etc.

In constructing the furnace for flue heating, the size of the furnace doors should be, for a greenhouse twenty by fifty, about fourteen inches square, and the length of the furnace bars thirty inches. The furnace should be arched over, and the top of the inside of the arch should be about twenty inches from the bars. The flue will always "draw" better if slightly on the ascent throughout its entire length. It should be elevated in all cases from the ground, on flags or bricks, so that its heat may be given out on all sides. The inside measure of the brick flue should not be less than eight by fourteen inches. If tiles can be conveniently procured, they are best to cover with; but, if not, the top of the flue may be contracted to six inches, and covered with bricks.

After the flue has been built of brick to twenty-five or thirty feet from the furnace, cement or vitrified drain pipe, eight or nine inches in diameter, should be used, as they are not only cheaper, but radiate the heat quicker than the bricks; they are also much easier constructed and cleaned. Care should be taken that no wood work is in contact with the flue at any place. It should be taken as a safe rule, that wood work should in no case be nearer the flue or furnace than eight inches. In constructing, do not be influenced by what the mechanics will tell you, as few of them have any experience in such matters, and are not able to judge of the dangers resulting from wood work being in close contact with the heated bricks. There are scores of greenhouses burned every year owing to carelessness or ignorance in allowing the brick work to be too close to the wood. The cost of such a greenhouse (twenty by fifty feet), at present prices, heated by flue, would be about six hundred dollars, or about sixty cents per square foot covered by the greenhouse.

HEATING BY HOT-BEDS.

There is no better artificial heat used for the starting of seeds or growing of plants than that obtained from the hot-bed. The material used is manure fresh from the horse-stable, and when they can be procured, it is better to mix it with about an equal bulk of tan bark or leaves from the woods, or refuse hops. If the weather is very cold, the bulk of manure must be of good size, from five to six wagon loads, thrown into a compact round heap, else the mass may be so chilled that heat will not generate. If a shed is convenient, the manure may be placed there, especially if the quantity is small, to be protected from cold until the heat begins to rise. The heap should be turned and well broken up before being used for the hot-beds, so that the rank steam may escape, and the manure become of the proper "sweetened" condition. It is economy of the heating material to use a pit for the hot-bed. This should be made from two to three feet deep, six feet wide, and of any required length. When a hot-bed is made on the surface of the ground the heating material should not be less than thirty inches deep, and should be at least two feet wider and longer than the frame on which the sashes are placed. Thus, if the hot-bed is for three three-by-six sashes, the actual space covered by the frame would be nine by eighteen; and for this the hot-bed on which it rests should be twelve by twenty.

After the heating material has been packed in the pit to the depth of twenty to twenty-four inches, according to the purpose for which it is wanted, or the season of the year (the earlier in the season, the deeper it is needed), the sashes should be placed on the frame, and kept close until the heat generates in the hot-bed, which will usually take twenty-four hours. Now plunge a thermometer into the manure, and if all is right it will

indicate one hundred degrees or more ; but this is yet too hot as bottom heat for the growth of seeds or plants, and a few days of delay must be allowed until the thermometer indicates a falling of eight or ten degrees, when four or five inches of soil may be placed upon the manure, and the seeds sown or plants set out in the hot-bed. Amateurs are apt to be impatient in the matter of hot-beds, and often lose their first crop by sowing or planting before the first violent heat has subsided. Another very common mistake is in beginning too early in the season. In the latitude of New York nothing is gained by beginning before the first week in March, and the result will be very nearly as good if not begun until a month later.

There are two or three important matters to bear in mind in the use of hot-beds. It is indispensable for safety to cover the glass at night with shutters or mats until all danger of frost is over ; for it must be remembered that the contents of a hot-bed are always tender, from being forced so rapidly by the heat below, and that the slightest frost will kill them. Again, there is danger of overheating in the daytime by a neglect to ventilate when the sun is shining. As a general rule, it will be safe in all the average days of March, April, and May, to have the sash of the hot-bed tilted up from an inch to three inches at the back from 9 A.M. to 4 P.M. Much will, of course, depend upon the activity of the heating material in the hot-bed, the warmth of the weather, and the character of the plants in the bed, so that we can only give a loose general rule. Numbers of inexperienced amateur cultivators often lose the entire contents of their hot-beds by having omitted to ventilate them, and on their return home from business at night find all the plants scorched up ; or the danger of the other extreme is, that the plants are frozen through neglect to cover them at night. A hot-bed requires a certain amount of attention, which must be given at the right time, or no

satisfactory results can be expected. Careful attention must be given to watering, which should be increased in quantity as the season advances. In all cases, as the tiny hot-bed plants are always tender, tepid water is preferable to use, and it should be put on very gently with a fine rose watering pot.



CHAPTER XXIX.

GREENHOUSES OR PITS WITHOUT ARTIFICIAL HEATING.

THE directions given for heating greenhouses by hot water or by flues apply, of course, only to sections of the country where the temperature during the winter months makes heating a necessity. In many of the southern states there is no need of artificial heat. A greenhouse tightly glazed, and placed against a building where it is sheltered from the north and northwest, will keep out frost when the temperature does not fall lower than twenty-five degrees *above* zero ; and if light wooden shutters are used to cover the glass, all those classed as "greenhouse" plants will be safe even at ten degrees lower, provided the conservatory is attached to the south or southeast side of a dwelling or other building. Another cheap and simple method of keeping plants during winter in mild latitudes is by the use of the sunken pit or deep frame, which affords the needed protection even more completely than the elevated greenhouse. This is formed by excavating the soil to the depth of from eighteen to thirty-six inches, according to the size of the plants it is intended to contain. A convenient width is six feet, the ordinary length of a hot-bed sash, and of such length as may be desired. Great care must be taken that the ground is such that no water will stand

in the pit. If the soil is moist it should be drained, and the bottom covered with an inch or two of cement. The sides of the pit may be either walled up by a four or eight-inch course of brick work, or planked up, as may be preferred; but in either case the *back* wall should be raised about eighteen inches and the front about six inches above the surface, in order to give the necessary slope to receive the sun's rays and to shed the water. A section of such a pit is shown in figure 64. If a pit of this kind is made in a dry and sheltered position, and the glass covered by light shutters of half-inch boards,

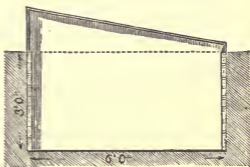


Fig. 64.—SUNKEN PIT.

it may be used to keep all the hardier class of greenhouse plants, even in localities where the thermometer falls to zero. After all danger of severe weather is past, which, in the latitude of New York, is usually by the last week of April, greenhouses or pits without artificial heat can be safely used for keeping all kinds of greenhouse plants, unless the very tender kinds, such as *Coleus*, as we rarely have frost sufficiently severe after that date to penetrate into the cold pit or cold greenhouses. In the hands of inexperienced cultivators, plants can always be grown better without artificial heat, which is often very difficult to properly adjust, particularly when the greenhouse is small.

A new covering for plants has recently come into use, under the name of "Protecting Cloth." It can be bought for eight or ten cents per yard, so that two yards of it tacked to a light frame will make a "sash" covering to protect plants, at a cost of twenty-five cents each, which will answer nearly as well as a glass sash, costing ten times as much, for all protection that plants require after danger of severe freezing is past. Often, during

the early part of May, we have from four to six degrees of frost, which would be fatal to all tender plants, which, if covered by the protecting cloth, could be saved. I have frequently been asked since the introduction of the protecting cloth, whether it can be used instead of glass for small greenhouses in winter. In very mild climates, where there is but a few degrees of frost, it would answer fairly well. The only objection would be in case of continued wet weather, as, of course, the cloth would not shed the rain unless placed at a very sharp angle.



CHAPTER XXX.

COMBINED CELLAR AND GREENHOUSE.

IN connection with the description of the cold pit or greenhouse without fire heat, may be mentioned the combined cellar and greenhouse. Many years ago an accidental circumstance gave me an opportunity of testing the utility of such a structure. An excavation, twenty by forty feet, and seven feet deep, had been made, walled up with stone, and beams laid across preparatory to placing a building upon it, when the owner changed his plans, and found himself with this useless excavation within a dozen yards of his costly residence. There seemed to be no alternative but to fill it up or plank it over; but both plans were objectionable, and in discussing how to get out of the difficulty, I suggested erecting a low-roofed greenhouse over it, as the owner had a taste for cultivating plants. This suggestion was followed, and the walls were raised two feet above the surface, and a span-roofed greenhouse erected over it.

My idea (which was found to be nearly correct) was, that the large volume of air in the excavation would at

no season go below forty degrees, and be sufficient to keep the upper or greenhouse portion of the structure above the freezing point in the coldest weather. This it did completely when the glass was covered at night with shutters; and the plants with which it was filled, of a kind requiring a low temperature, kept in better health than if they had been grown in a greenhouse having fire heat.

Under favorable circumstances such a structure might be made of great utility, and at a trifling cost; for as it dispenses with heating apparatus, which usually is more than half of the whole cost in all greenhouses, the use of a cellar and greenhouse could be had at probably less than the cost of an ordinary greenhouse; and for half-hardy plants—plants that will do well in winter if kept only above the freezing point—such a structure will be better for many of them than any kind of greenhouse heated by fire heat. All kinds of Roses, Camellias, Azaleas, Zonal Geraniums, Violets, Cape Jessamines, Carnations, Abutilons, Verbenas, Primulas, Stevias, and, in short, all plants known as cool greenhouse plants, will keep in a healthy, though nearly dormant condition, during the winter months; but they will flourish with greatly increased vigor at their natural season of growth and flowering as spring advances. Besides, the cellar may be used for the ordinary purposes of such a place; or, if exclusively for horticultural purposes, no better place can be had for keeping all deciduous hardy or half-hardy plants, Hyacinths in pots to start to flower, or any bulbs of similar nature. The great point to be observed is, that the soil where such a structure is to be erected is entirely free from water, or, if not so naturally, it must be made entirely dry by draining.

The style that I think would suit best for general purposes would be twelve feet in width, and of any length desired. The excavation should not be less than seven

feet deep, walled up to about one foot above the surface. When complete it would show something like the section in figure 65. If desired, the walls might be raised two feet above the surface level, which would admit of a few windows in the wall to give light in the cellar, if so desired. If the glass roof is made fixed, it should have ventilating sashes three by three, at intervals of six or nine feet on each side of the roof; if of sashes, they should be seven feet long by three feet wide, every alternate one being arranged to move for ventilation in the usual way. The position of the structure would be best with its ends north and south. The shutters for cover-

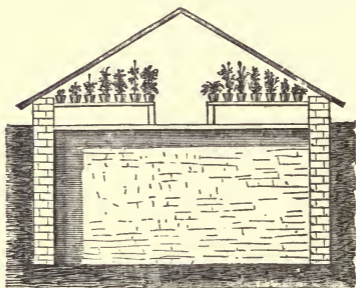


Fig. 65.—GREENHOUSE AND CELLAR COMBINED.

ing the glass at night should be made of light half-inch pine boards, three feet wide by seven feet long.

It will be understood that the advantage of this combination of cellar and greenhouse over the ordinary cold pit is, that the air of the greenhouse is warmed or equalized by mixing with the atmosphere of the cellar, which will rarely be less than forty degrees. For the same reason, if a high temperature by fire heat were wanted, say seventy degrees, this large body of air from below of forty degrees would make it difficult to obtain

it. If the flooring above the cellar is made water tight, which could easily be done, even if covered by plank, by cementing over the plank, the cellar could be used as a mushroom house, as no light is necessary for the growth of mushrooms. (For instructions, see "Mushroom Culture.")

CHAPTER XXXI.

HARDY SHRUBS, CLIMBERS, AND TREES.

A PLACE is seldom so small that a few choice shrubs cannot appropriately find room, and in which climbers are not desirable, while in the larger places these become important to its proper ornamentation. Whether its size admits of the use of trees or not, both deciduous and evergreen shrubs, climbers as well as evergreen trees of low growth, are indispensable. We here append a list of the leading kinds in each class, but which by no means exhausts the number of desirable varieties; and for the others reference may be made to the catalogues of the principal nurseries, where also will be found descriptions of those here named.

HARDY DECIDUOUS SHRUBS.

<i>Æsculus parviflora</i>	Dwarf Horse-Chestnut, rosy white.
<i>Azalea Pontica</i> , hybrids.....	Belgian Azaleas, rose, yellow, etc.
<i>Berberis vulgaris</i>	Barberry, yellow.
" " <i>var. purpurca</i> ...	Purple-leaved Barberry, yellow.
<i>Calycanthus floridus</i>	Sweet-scented Shrub, chocolate color.
<i>Cercis Japonica</i>	Japan Judas Tree, rose-purple.
<i>Chionanthus Virginica</i>	Fringe Tree, white.
<i>Clethra alnifolia</i>	Sweet Pepper Bush, greenish, scented.
<i>Cotoneaster microphylla</i>	Small-leaved Cotoneaster, white.
<i>Crataegus Pyracantha</i>	Pyracanth Thorn, white.
" <i>ozyacantha fl. pl.</i>	Hawthorn, double white.
" " <i>coccinea fl. pl.</i>	Hawthorn, double scarlet.
<i>Cydonia (Pyrus) Japonica</i>	Japan Quince, scarlet, white, etc.

<i>Cytisus elongatus</i>	Laburnum, yellow.
<i>Deutzia scabra</i>	Rough Deutzia, white.
“ <i>crenata</i> fl. pl.	Double Deutzia, white.
“ <i>gracilis</i>	Slender Deutzia, white.
<i>Euonymus atropurpureus</i>	Burning Bush, fruit orange-scarlet.
“ <i>latifolius</i>	Broad-leaved B. B., fruit orange-scar't.
<i>Exochorda</i> (<i>Spiræa</i>) <i>grandiflora</i>	Large Flowering Spiræa, white.
<i>Forsythia viridissima</i>	Golden Bell, yellow.
<i>Halesia tetraptera</i>	Silver Bell, white.
<i>Hibiscus Syriacus</i> fl. pl.	Rose of Sharon, double, all shades from white to crimson.
<i>Hydrangea paniculata grandiflora</i>	Great-panicked Hydrangea, white.
“ <i>Hortensia</i>	Common Hydrangea, blue or pink.
“ <i>Japonica</i>	Japan Hydrangea, white.
<i>Kerria Japonica</i>	Japan Globe-flower, yellow.
<i>Lonicera Tartarica</i>	Tartarian Honeysuckle, pink and white.
<i>Magnolia glauca</i>	Sweet Bay Magnolia, greenish-white.
“ <i>conspicua</i>	Yulan Tree, shaded carmine.
“ <i>Soulangeana</i>	Soulange's Magnolia, white and purple.
<i>Philadelphus coronarius</i>	Mock Orange, white.
“ <i>nanus</i>	Mock Orange, Dwarf, white.
<i>Prunus Japonica flore alba plena</i>	Double-flow'g Almond, pink or white.
<i>Prunus triloba</i>	Japan Flowering Plum, blush-white.
<i>Ribes aureum</i>	Missouri Currant, yellow.
“ <i>sanguineum</i>	Crimson.
<i>Spiræa prunifolia</i> fl. pl.	Plum-leaved Spiræa, white.
“ <i>callosa</i> and var. <i>alba</i>	Flat-topped Spiræa, pink and white.
“ <i>Reevesii</i> fl. pl.	Lance-leaved Spiræa, white.
“ <i>Douglasii</i>	Douglas's Spiræa, white.
“ <i>hypericifolia</i>	St. Peter's Wreath, white.
<i>Stuartia pentagynia</i>	Stuartia, white.
<i>Symphoricarpus racemosus</i>	Snowberry, white fruit.
<i>Syringa vulgaris</i>	Common Lilac, purple, lilac, and rose.
“ “ <i>alba</i>	White Lilac.
“ <i>Persica</i>	Persian Lilac, purple.
“ “ <i>alba</i>	Persian Lilac, white.
<i>Viburnum Opulus</i>	Snowball, white.
“ <i>plicatum</i>	Dwarf Snowball, white.
<i>Weigela rosea</i>	Bush Honeysuckle, rose.
“ “ <i>fol. var.</i>	Bush Honeysuckle, variegated foliage.
“ <i>nivea</i>	Bush Honeysuckle, white.
“ <i>amabilis</i>	Bush Honeysuckle, rose and white.
“ <i>Desboisiana</i>	Bush Honeysuckle, rose and white.

HARDY EVERGREEN SHRUBS.

<i>Andromeda floribunda</i>	Free-flowering Andromeda.
<i>Biota Orientalis</i>	Eastern Arbor Vitæ.

<i>Buzus sempervirens arborea</i>	Tree Box.
<i>Cephalotaxus Fortunei</i>	Fortune's Cephalotaxus.
<i>Daphne Cneorum</i>	Garland Flower.
<i>Ilex opaca</i>	American Holly.
<i>Juniperus communis</i> var. <i>Suecica</i> ..	Swedish Juniper.
“ “ “ <i>Hibernica</i> ..	Irish Juniper.
“ <i>oblonga pendula</i>	Weeping Juniper.
“ <i>squamata</i>	Scaled Juniper.
“ <i>prostrata</i>	Prostrate Juniper.
<i>Kalmia latifolia</i>	American Laurel.
<i>Podocarpus Japonica</i>	Japan Yew.
<i>Rhododendron Catawbiense</i> , <i>hyb's</i> ..	Rhododendrons.
<i>Taxus baccata</i>	English Yew.
“ <i>Canadensis</i>	American Yew.
“ <i>erecta</i>	Upright Yew.
<i>Thuja Occidentalis</i>	American Arbor Vitæ.
“ “ var. <i>Sibirica</i> ..	Siberian Arbor Vitæ.
“ “ “ <i>plicata</i> ..	Plicate Arbor Vitæ.
“ “ “ <i>nana</i> ..	Dwarf Arbor Vitæ.
“ “ “ <i>Geo. Peabody</i> ..	Golden Arbor Vitæ.

HARDY EVERGREEN TREES.

<i>Abies Canadensis</i>	Hemlock Spruce.
“ “ var. <i>Sargentii pendula</i> ..	Sargent's Pendulous Hemlock Spruce.
“ <i>excelsa</i>	Norway Spruce.
“ “ var. <i>Gregoryana</i> ..	Gregory's Spruce.
“ “ “ <i>pygmæa</i> ..	Dwarf Spruce
“ “ “ <i>inverta</i> ..	Inverted Spruce.
“ <i>nigra pumila</i>	Dwarf Black Spruce.
“ <i>Fraseri</i> var. <i>Hudsonica</i> ..	Hudson's Bay Fir.
“ <i>pectinata</i>	European Silver Fir.
“ “ var. <i>fastigiata</i> ..	Erect Silver Fir.
“ <i>Pichta</i>	Siberian Silver Fir.
<i>Juniperus Virginiana</i>	Red Cedar.
<i>Pinus Strobus</i>	White Pine.
“ <i>Cembra</i>	Swiss Stone Pine.
“ <i>pumilio</i>	Dwarf Pine.
“ <i>Austriaca</i>	Austrian Pine.
<i>Retinospora obtusa</i>	Obtuse-leaved Retinospora.
“ <i>plumosa aurca</i>	Golden-plumed Retinospora.

HARDY CLIMBERS.

<i>Akebia quinata</i>	Akebia, purple, fragrant.
<i>Ampelopsis quinquefolia</i>	Virginia Creeper, leaves grandly colored in fall.
“ <i>Veitchii</i>	Leaves grandly colored in fall.
“ <i>Royalii</i>	Leaves grandly colored in fall.

<i>Aristolochia sipho</i>	Dutchman's Pipe, greenish-brown, curious.
<i>Clematis flammula</i>	Virgin's Bower, white.
“ <i>coccinea</i>	Virgin's Bower, scarlet.
“ <i>azurea</i> , and various hyb's.....	All shades from white to deepest purple and blue, double and single.
<i>Hedera Helix</i>	European Ivy.
This in its many varieties is scarcely hardy at New York.	
<i>Lonicera sempervirens</i>	Trumpet Honeysuckle, scarlet, yellow.
“ <i>Halliana</i>	Hall's Honeysuckle, white and buff.
“ <i>Japonica</i>	Japan Honeysuckle, pink and white.
“ “ <i>var. aurea reticulata</i>	Golden-leaved Honeysuckle.
“ <i>Periclymenum</i>	English Woodbine, crimson, shaded white.
“ “ “ <i>var. Belgica</i>	Dutch Honeysuckle, monthly, rose and white.
<i>Roses</i> embrace Yellow, Crimson, White, etc.	
<i>Tecoma (Bignonia) grandiflora</i>	Large-flowered Trumpet Vine, orange-scarlet.
“ (<i>Bignonia</i>) <i>radicans</i>	Trumpet Creeper, orange.
<i>Wistaria frutescens</i>	American Wistaria, purple and white.
“ <i>Sinensis</i>	Chinese Wistaria, purple.
“ “ <i>var. alba</i>	White Wistaria.
“ “ “ <i>Alleni</i>	Allen's Wistaria, violet.
“ <i>magnifica</i>	Magnificent Wistaria, dark purple, large.

For a proper understanding of where to plant the different kinds of climbing plants, it is necessary to divide them into two classes. The “twining” kinds, such as are adapted to twine around wire, strings, trellis-work, or limbs of trees, which comprise the largest class; and the “climbing” kinds, in which is included the Clematis, the grandest and most varied of all climbing plants. The “twining” kinds can be trained on poles eight or ten feet high as individual specimens, or on the trellis-work of verandas, or on wire fences, or on any material which they can twine around. The Loniceras or Honeysuckles require similar treatment; and though by no means so varied or brilliant in coloring as the Clematis, they are all deliciously fragrant, while, so far, there is only one variety of Clematis that is fragrant, *C. flammula*. Of the hardy

climbing plants that "cling" rather than twine there are the *Ampelopsis* (known as Virginia Creeper, Boston Ivy, etc.) and the *Hedera Helix*, the true European Ivy. Both of these attach themselves, in climbing, to walls of brick, stone, or rough wood, trees, etc., by throwing out rootlets or suckers from the stem as they climb, which are firmly attached to whatever they are climbing on. The *Ampelopsis Veitchii* and *Royali* are comparatively new plants, but hundreds of thousands of them are now sold annually, and grand specimens are seen in nearly every section of the country. When once established they will climb against walls ten feet in a season, and attain to a height of fifty feet in three or four years. Many buildings in Boston, New York, and elsewhere, are covered to the roof with these beautiful climbers. The leaves, which are green in summer, overlap like a coat of mail; but it is in autumn that they are seen in their glory. No "autumn leaves" surpass in beauty the *Ampelopsis*; shaded crimson, scarlet, and orange, they can be seen, in a clear day, nearly a mile distant. The *Ampelopsis* has been largely planted by the Pennsylvania and other railroad lines against the rocks where cuts have been made, and it is in contemplation to use this plant to cling to embankments to prevent sliding.

Climbing Roses can be trained on wire or wooden fences, verandas, dead trees, or to poles; but in all cases they require to be tied or tacked to the support to keep them in proper shape.



CHAPTER XXXII.

HARDY HERBACEOUS PERENNIALS.

HERBACEOUS perennials include those hardy plants, the stems of which die down at the approach of winter, or earlier if they have completed their growth. The roots

being hardy, they remain in the same place for many years in succession. Plants of this class were formerly more popular than they have been of late years, the taste for brilliant bedding effects having caused these former favorites to be neglected. Recently the taste for perennials has revived, and while they cannot serve as substitutes for what are known as bedding plants, they are exceedingly useful for those who wish to have flowers with but little trouble, as most of them can remain for eight or ten years without requiring any other care than to keep them clear of weeds. It will renew their vigor, however, when the clumps become too large, to lift, divide, and re-set them in fresh soil. For the best results it is advisable to re-set most of them every third year, while some may remain in place indefinitely, taking care to give them a yearly manuring, as the vigorous growing ones soon exhaust the soil immediately around them. In setting out these plants, the taller kinds should be placed at the back of the border, or in the center if the bed is to be seen from both sides, while those of the lowest growth are to be placed at the edge, and those of intermediate size between.

A proper selection of these plants will give a succession from early spring until frost stops all bloom. Many of these perennials remain unchanged from their natural state, but bloom in our borders just as they appeared in their native woods and hills in different parts of the world, and seem to show no disposition to "break" or deviate from their normal form, notwithstanding they have been in cultivation for a century or two. On the other hand, many have, by "sporting," or by hybridizing and crossing, as in the case of *Pæonies*, *Phloxes*, *Irises*, and others, produced many florists' varieties, which show forms and colors not found in the native state of the plants, and the frequent occurrence of double flowers among them shows that cultivation has not been without

its influence. As many of the hardy herbaceous perennials are natives of shady woods and swamps, they suffer greatly if exposed to the scorching rays of our summer suns, unless mulched with manure, leaves, or some such material to protect the roots. Most of them also do rather better in a little shade than when exposed to full sunshine.

With such a number to select from, it is difficult to make a list of twenty-five, or even fifty, and not leave out many desirable kinds. Those in the following list are all of generally admitted excellence, and are usually to be obtained from florists and nurserymen.

It may be added here, that there is no part of the country which does not afford wild flowers of sufficient beauty to merit a place in the garden, and most of them, except, perhaps, those which naturally grow in deep shade, will grow larger and bloom finer in a rich border than in their native localities.

Perennials are propagated by division of the clumps, by cuttings of the stems, and sometimes of the roots, and by seeds. In many cases the seeds are very slow of germination unless sown as soon as ripe. As most of them do not bloom until the seedlings have made one year's growth, the seeds should be sown in a reserve bed, from which, at the end of the first summer, or in the following spring, they may be transplanted to the place where they are to flower. It is well to give the seedlings some protection the first winter, not because they are not hardy, but to prevent them from being thrown out of the soil by frequent freezing and thawing. A covering of evergreen boughs is most suitable; but if these are not at hand, use coarse hay or other litter, first laying down some brush, to keep the covering from matting down upon them.

<i>Aconitum Napellus</i>	Monkshood.
“ “ <i>variegatum</i>	Variegated Monkshood.
<i>Anemone Japonica</i>	Japan Windflower.
“ “ <i>var. Honorine Jobert</i>	White Japan Windflower.
“ <i>Pulsatilla</i>	Pasque Flower.
<i>Aquilegia alpina</i>	Alpine Columbine.
“ <i>cærulea</i>	Rocky Mountain Columbine.
“ <i>chrysantha</i>	Golden-spurred Columbine.
“ <i>vulgaris</i>	Garden Columbine.
<i>Asperula odorata</i>	Woodruff.
<i>Astilbe Japonica</i>	(Incorrectly Spiræa.)
<i>Baptisia australis</i>	False Indigo.
<i>Campanula Carpatia</i>	Carpathian Harebell.
“ <i>persicifolia</i>	Peach-leaved Harebell.
“ <i>grandiflora</i>	Great-flowered Harebell,
and others.	
<i>Cassia Marilandica</i>	Wild Senna.
<i>Clematis erecta</i>	Upright Clematis.
“ <i>integrifolia</i>	Entire-leaved Clematis.
<i>Colchicum autumnale</i>	Meadow Saffron.
<i>Convallaria majalis</i>	Lily of the Valley.
<i>Chrysanthemum, Chinese and Japanese</i>	

The grand hybrid varieties of the *Chrysanthemum* now run into thousands, of almost every shade except blue and bright scarlet. They are hardy in nearly all sections south of Baltimore, and on light, well-drained soils, in nearly all sections of the country, if covered with four or five inches of leaves or litter late in the fall.

<i>Delphinium elatum</i>	Bee Larkspur.
“ <i>nudicaule</i>	Scarlet Larkspur,
and others.	
<i>Dianthus plumarius</i>	Garden Pink.
“ <i>superbus</i>	Fringed Pink.
<i>Dicentra eximia</i>	Plumy Dicentra.
“ <i>spectabilis</i>	Bleeding Heart.
<i>Dictamnus Fraxinella</i>	Fraxinella.
<i>Dodecatheon Meadia</i>	American Cowslip.
<i>Eranthis hiemalis</i>	Winter Aconite.
<i>Erica carnea</i>	Winter Heath.
<i>Funkia ovata</i>	Blue Plantain Lily.
“ <i>Japonica (subcordata)</i>	Japan Plantain Lily.
<i>Gypsophila paniculata</i>	Panicked Gypsophila.
<i>Helleborus niger</i>	Christmas Rose.
<i>Hepatica triloba</i>	Liver-leaf.
“ “ <i>fl. pl.</i>	Double-flowered Liver-leaf.
<i>Iberis Gibraltaria</i>	Gibraltar Candytuft.
“ <i>sempervirens</i>	Perennial Candytuft.
<i>Iris Germanica</i>	German Iris.

Iris Iberica Iberian Iris.

“ *Kämpferi* Japan Iris.

“ *pumila* Dwarf Iris,

and many others of a great range of colors.

Lathyrus, perennialis Flowering Pea.

Liatris spicata Blazing Star.

“ *squarrosa* Blazing Star,

and others.

Lilium auratum Gold-banded Lily.

This, with many other Japanese species in the catalogues, is perfectly hardy, and there should be a good collection of them in every garden.

Linum perenne Perennial Flax.

Lobelia cardinalis Cardinal Flower.

This native (also its hybrids) does perfectly well in the soil of the garden.

Lupinus polyphyllus Many-leaved Lupine.

Lychnis Chalcedonica Scarlet Lychnis,

and several others.

Lysimachia nummularia Moneywort.

Mertensia Virginica Virginia Lungwort.

Myosotis palustris Forget-me-not.

“ *Azorica* Azorean Forget-me-not.

“ *dissitiflora* Early Forget-me-not.

Narcissus biflorus Twin-flowered Narcissus.

“ *poeticus* Poet's Narcissus.

“ *Jonquilla* Jonquil.

“ *Pseudo-Narcissus* Daffodil,

in double and single varieties.

Oenothera Missouriensis Missouri Evening Primrose.

Peonia officinalis Common Pæony,

and the various hybrids of this and other species, of which there are many fine named sorts.

Peonia tenuifolia Fennel-leaved Pæony.

“ *Moutan* Tree Pæony,

of which there are many named varieties.

Papaver Orientale Oriental Poppy.

Pentstemon grandiflorus Large-flowered Pentstemon.

“ *barbatus* var. *Torreyi* Torrey's Pentstemon.

“ *Pulmeri* Palmer's Pentstemon,

and several other hardy species.

Phlox, herbaceous Garden Phlox.

Under this head a great number of named varieties may be had. New ones are offered every year, and a good selection of colors makes a grand show.

Phlox subulata Moss Pink.

Also the white variety.

Pblemonium reptans.....Jacob's Ladder.

" *cæruleum*.....Greek Valerian.

Primula veris.....English Cowslip.

This and the Polyanthus varieties need a moist and shady place.
P. cortusoides is hardy, and *P. Japonica* probably so.

Pyrethrum carneum.....Rosy Pyrethrum,
the new double varieties.

Saxifraga crassifolia.....Thick-leaved Saxifrage.

" *cordifolia*.....Heart-leaved Saxifrage.

Sedum acre.....Stonecrop.

" *Sieboldii* (and *variegata*).....Siebold's Stonecrop.

" *pulchellum*.....Beautiful Stonecrop.

" *spectabile*.....Showy Stonecrop,

and a large number of others, presenting a great variety in foliage and flowers.

Sempervivum arachnoideum.....Cobweb Houseleek.

" *calcareum* (*Californicum*).....Purple-tipped Houseleek.

" *tectorum*.....Common Houseleek.

Of these curious plants there are more than fifty species in cultivation, and all perfectly hardy; useful on rock work.

Spiræa filipendula (and double).....Dropwort.

" *palmata*.....Palmate Spiræa.

" *Ulmaria*.....Meadow Sweet.

" *lobata*.....Queen of the Meadow.

Symphytum officinale var.Variegated Comfrey.

Thalictrum minus.....Maiden-hair Meadow Rue.

Tritoma uvaria (and vars.).....Red-hot Poker,
needs covering in winter with litter.

Tunica Saxifraga.....Rock Tunica.

Yucca filamentosa.....Adam's Thread or Needle.

PERENNIAL ORNAMENTAL GRASSES.

1. *Arundo Donax*.....Great Reed.

2. " " *versicolor*.....Variegated Reed.

3. " *conspicua*.....Silvery Reed.

4. *Erianthus Ravennæ*.....Ravenna Grass.

5. *Eulalia Japonica variegata*.....Japan Eulalia.

6. " " *zebrina*.....Japan Zebra Eulalia.

7. *Festuca glauca*.....Blue Fescue Grass.

8. *Gyncrium argenteum*.....Pampas Grass.

9. *Panicum virgatum*.....Wand-like Panic.

10. *Phalaris arundinacea picta*.....Ribbon Grass.

11. *Stipa pennata*.....Feather Grass.

In the climate of New York, Nos. 1, 2 and 8 need protection; Nos. 1 and 2 by litter over the roots, and No. 8 by covering it with a cask or box. In the order of their height, No. 7 is 6 inches, 10 and 11 a foot, 5 and 6, 4 to 8 feet, and 1, 2, 3, 4, and 8 from 6 to 12 feet, according to the age of the plants.

CHAPTER XXXIII.

FLOWERS WHICH WILL GROW IN THE SHADE.

THERE are few plants that will flower in places from which sunshine is entirely excluded. Some plants will grow well enough, developing shoots and leaves, but *flowers* of nearly all kinds must have some sunshine. Of those that do well and flower when planted out in the open ground where sunlight only comes for two or three hours during the day, may be named the following: Calceolarias, Fuchsias, Lobelias, Herbaceous Phloxes, Pansies, Forget-me-nots, Lily of the Valley, and other herbaceous plants and shrubs whose native habitat is shady woods. Perhaps a better effect is produced in such situations by ornamental leaved plants, such as Coleuses of all kinds, Amaranths, Achyranthes, Caladiums, Cannas, and other plants with highly colored or ornamental leaves. With these may be combined the different styles of white or gray-leaved plants, such as Centaureas, Cinerarias, and Gnaphaliums, plants known under the general popular term of "Dusty Millers." For our own part, we much prefer to devote shaded situations to such plants, rather than to see the abortive attempts to produce flowers made by plants in positions where there is no sunshine. It may be here remarked, that the cultivator of plants in rooms should understand the necessity of sunlight to plants that are to flower, and endeavor to get them as near as possible to a window having an eastern or a southern aspect. The higher the temperature, the more plants suffer for the want of light. Many plants, such as Geraniums, Fuchsias, or Roses, might remain in a temperature of forty degrees, in a cellar for example, away from direct light, for months without material injury, while if the cellar contained a

furnace keeping up a temperature of seventy degrees, they would all die before the winter was ended, particularly if the plants were of a half-hardy nature. If tropical species, they might stand it better; but all plants quickly become enfeebled when kept at a high temperature and away from the light.



CHAPTER XXXIV.

INSECTS AND OTHER PARASITES INJURIOUS TO PLANTS.

WHEN insects attack plants in the greenhouse, parlor, or anywhere under cover, we can generally manage to get them under control; but when they attack plants in the open air, it is, according to our experience, difficult to destroy them. Insects are injurious to plants in the open air in two principal ways: some attack the branches and leaves, and others infest the roots. When insects attack the roots of a plant, we have been able to do but little to stop their ravages. We can manage somewhat better with those attacking the leaves, but even this division of the enemy is often too much for us. As a preventive, we would strongly advise that birds of all kinds should be encouraged. Since the European Sparrows have favored us with their presence in such numbers, insects of nearly all kinds have much decreased. Most people will remember the disgusting "measuring worm" that festooned the shade trees in New York, Brooklyn, and other cities twenty years ago. These made their exit almost in proportion to the increase of Sparrows, and they are certainly lessened from what they were before the introduction of the Sparrow. The same is true of the Rose Slug. In my Rose grounds, a few years ago, we were obliged to employ a number of boys for weeks

during the summer to shake off and kill the Rose Slug, in order to keep the plants alive; but since we have had the Sparrows in such numbers, hardly one of these pests is now seen. An examination of the crop of a Sparrow killed in July showed that it contained Rose Slugs, Aphis, or green fly, and the seeds of chickweed and other plants, proving beyond question the fact that they are promiscuous feeders. The Rose Slug (*Selandria rosæ*), referred to above, is a light green, soft insect, varying from one-sixteenth of an inch to nearly an inch in length. There are apparently two species or varieties, one of which eats only the cuticle of the lower side of the leaf, the other eats it entire. The first is by far the more destructive here. In a few days after the plants are attacked they appear as if they had been burned. The Rose Chaffer (*Macrodactylus subspinosus*) gets its name from the preference it shows for the buds and blossoms of the Rose, though it is equally destructive to the Dahlia, Aster, Balsam, and many other flowers, and especially grape blossoms.

An excellent application for the *prevention* of the ravages of the Rose Chaffer or the Rose Slug, which attack the hardy or June Roses, is whale-oil soap dissolved in the proportion of one pound to eight gallons of water. This, if steadily applied twice a week with a syringe on Rose plants, before the leaf has developed in spring, will entirely prevent the attacks of the insects. Another remedy is to mix an ounce of Paris green in one hundred gallons of water, and syringe as advised with the whale-oil soap. It will be observed that the quantity of Paris green advised is very small to be mixed in such a quantity of water; but it is found to be ample. We find, however, that if the Slug once gets fairly at work, either remedy is powerless unless used so strong as to injure the leaves.

The *Rose Bug*, so called (*Aramigus Fulleri*), is the

most destructive of all insects attacking the Rose while forcing in winter ; for its ravages are so insidious that often the whole Rose house is ruined before it is known, by inexperienced hands, what is the matter. The perfect insect somewhat resembles a small cockroach, but is of a grayish brown color. It is not easily observed, as it keeps always under the leaves or close to the stems of the plant, and its presence is usually first noticed by half circular pieces being bitten from the edges of the leaves; but it does comparatively little harm in that way. It is when it deposits its eggs in the soil close to the roots that the danger begins. The eggs in a few weeks hatch out into larvæ, which at once attack, and, if in sufficient numbers, entirely destroy the roots of the Rose. So far there is no known remedy against the Rose Bug, unless it be to carefully search for and destroy the perfect insect on the plant. In our own establishment we have got entirely free from it by persistent care in destroying the insect by picking it from the plants. When the soil has become infested by the larvæ or maggots of the Rose Bug, there is no remedy. The plants, soil, and even the benches of the greenhouse had better be taken out and burned if the insect is there in great numbers. Before we understood how to manage it, on one occasion we threw out and destroyed the plants, soil, and benches in a Rose house three hundred feet long by twenty feet wide. Hundreds of amateurs, and even professional florists, fail in growing Rose buds in winter from no other cause than the ravages of this insect.

Green Fly, or *Aphis*, is one of the most common, but, fortunately, most easily destroyed, of any insect that infests plants, either in-doors or out. In our greenhouses, as already stated, we fumigate twice a week, by burning about half a pound of refuse tobacco stems (made damp) to every five hundred square feet of glass surface ; but in private greenhouses, or on plants in rooms, fumigating is

often impracticable. Then the tobacco stems can be used by steeping one pound in five gallons of water, until the water gets to be the color of strong tea. This liquid, applied over and under the leaves with a syringe, will destroy the insect quite as well as by fumigating, only in either case the application should be made before the insects are seen, to prevent their coming rather than to destroy them when established ; for often by neglect they get a foothold in such legions that all remedies become ineffectual to dislodge them. Another means of preventing the green fly is to apply tobacco in the shape of dust, or the sweepings of tobacco warehouses, which can be found for sale in most seed or agricultural establishments, at a cost of five to ten cents per pound. This, applied once or twice a week to an ordinary sized private greenhouse, would effectually prevent any injury from green fly. No special quantity of this need be prescribed, as all that is necessary is to see that it is so dusted on that it reaches all parts of the plant and on both sides of the leaves. It is best to slightly syringe the plants beforehand, so that the dust will adhere to the leaves. When applied to plants out-doors, it should be done in the morning when the dew is on. Fruit-trees of many kinds, shrubs, Roses of all kinds, Chrysanthemums, and many other plants grown out of doors, are particularly liable to injury from some species of *Aphis* ; but the application of tobacco dust, if made in time, will be found a cheap and effectual remedy.

Ground or *Blue Aphis* is a close relative of the preceding, but it gets its living from the roots down in the soil, while the Green and Black *Aphis* feed in the air on the leaves. The Blue *Aphis* attacks a great many varieties of plants, particularly in hot, dry weather ; and whenever Asters, Verbenas, Petunias, Centaureas, or such plants begin to droop, it will be found on examination, in three cases out of four, that the farthest extremities of their

roots are completely surrounded by the Blue Aphis. The only remedy we have ever found for this pest is a strong decoction of tobacco, made so strong as to resemble black coffee in color. The earth around the plants must be soaked with this, so that the lowest roots will be reached. The tobacco water will not hurt the plants, but will be fatal to the insect, and, if it has not already damaged the roots to too great an extent, may prove a remedy.

Ants.—These are not usually troublesome in the open ground, unless on lawns. (For remedies there see Chapter on “Lawns.”) In greenhouses, however, they are one of the worst pests, not so much from the injury they do themselves as by their carrying mealy bug, green fly, and other insects, so that from one plant thus affected the ants will soon distribute them over all the plants in the greenhouse. A simple method we have found to get rid of them, is to lay fresh bones around the infested plants. They will leave everything to feed on these, and when thus accumulated may be easily destroyed. Another method is to blow *Pyrethrum* or Persian Insect Powder over them with a bellows. They are killed at once if the powder strikes them in a dry state; but it has no effect if damp, for, when strewed in their haunts, they run over it with impunity.

The *Red Spider* is one of the most insidious enemies of plants, both when under glass and in the open air in summer. It luxuriates in a hot and dry atmosphere, and the only remedy that I can safely recommend to amateurs is copious syringings with water, if in the greenhouse, so that a moist atmosphere can be obtained. This, of course, is not practicable when plants are grown in rooms, and the only thing that can then be done is to sponge off the leaves. It is this insect, more than anything else, that makes it so difficult to grow plants in the dry air of the sitting-room, as it may be sapping the life blood from a plant, and its owner never discover the

cause of his trouble. It is so minute as hardly to be seen by the naked eye, but its ravages soon show; and if the leaves of your plants begin to get brown, an examination of the under surface of the leaf will usually reveal the little pests in great numbers. When they get thus established there is no remedy but to sponge the leaves thoroughly with water or weak soapsuds.

The *Mealy Bug*, as it is generally called, is a white mealy or downy-looking insect, which is often very troublesome among hothouse plants, but rarely does any harm among those that can live in a cool room. It is a native of some tropical latitudes, and can only exist in such a temperature as is required by plants of that class. There are various remedies used by florists, but the safest is to use Cole's Insect Destroyer, a remedy that never fails to destroy this insect, without injury to the plant, when sprayed on the plants by a barber's atomizer. On a large scale we find a certain remedy in the use of one pint of Fir Tree Oil to ten gallons of water, applied by the syringe once a week. In fact, we find the use of Fir Tree Oil in this proportion a safe and sure remedy against all insect life; but its application must be continuous, and at least once a week.

Brown and White Scale Insects.—These appear as if lifeless, and adhere closely to the stems of such plants as Oleanders, Ivies, etc., and, like the Mealy Bug, are best destroyed by being washed or rubbed off. Remedy, when on a large scale, is Fir Tree Oil.

Thrips.—This is an insect varying in color from light yellow to dark brown, and much more active in its movements than the Green Fly, and more difficult to destroy. When it once gets a foothold it is very destructive. It succumbs to tobacco in any of the forms recommended for the destruction of Green Fly, but not so readily. It luxuriates in shaded situations, and generally abounds where plants are standing too thickly together, or where

ventilation or light is deficient. It may be safely asserted, that in any well-regulated place where plants are kept, no injury from this or Green Fly will ever become serious if due attention has been given to keeping the atmosphere of the place moist, and using tobacco freely in any of the forms we have recommended.

The Angle Worm.—This is the common worm seen in every soil in pots and in the open ground. It is harmless so far as feeding goes, for it seems never to touch plants as food; but it bores and crawls around in a way by no means beneficial to pot-grown plants. It is, however, easily dislodged. By slaking a quart of lime and adding water to make up ten gallons of the liquid, and watering the plants with it after it has become clear, the caustic qualities of the lime will be quickly fatal to the worm. When troublesome in the open ground, sow slaked lime on the dug or plowed surface about as thickly as sand is strewn on a floor, and rake or harrow it in, so as to mix it with the soil. Some writers have asserted that the Angle Worm benefits the soil by its movements through it. Few practical gardeners will believe this, as they are usually destroyed on sight by all workers in the soil.

MILDEW.

Mildew is a parasitical fungus, often seen on greenhouse and other plants, and is quickly destructive to their health. But, as with all other plant troubles, it is best to prevent it rather than cure. Care should be taken, particularly where Roses or Grapevines are grown under glass (as both of these are especially liable to be attacked), to avoid a rapid change of temperature, or a long exposure to sudden chill by draughts in ventilating. As soon as spots of grayish-white appear on the leaves of Roses or Grapevines, either out-doors or under glass, it is certain that mildew is present; but if it has not been

neglected too long, the following preparation will usually be found a prompt remedy : Take three pounds each of flowers of sulphur and quick-lime, put together and slake the lime, and add six gallons of water ; then boil all together until the liquid is reduced to two gallons, allow it to settle until it gets clear, and bottle for use. One gill only of this is to be mixed in five gallons of water, and syringed over the plants in the evening, taking care not to use it on the fruit when ripe, as it would communicate a taste and smell which would render it useless. Applied in this weak state, it does not injure the leaves, and yet has the power to destroy the low form of vegetable growth which we call mildew. We apply it just as we do tobacco, once or twice a week, as a preventive, and we rarely have a speck of mildew. Another remedy, not quite so good, but easier to get, is to mix one pound of virgin sulphur with ten pounds of tobacco dust, and throw this mixture with a bellows on the leaves of Grapevines or Roses outside when the dew is on, so that it shall adhere ; or, if in the greenhouse, after syringing. If this is done once or twice a week the mildew or aphid will never get much of a foothold, the sulphur being the specific against the mildew and the tobacco dust checking the aphid.

These remedies are such as are employed at seasons when there is no artificial heat used in the greenhouse or the grapery ; but when fire heat is applied to the flue, steam, or hot-water pipes, then the most certain preventive of mildew is to mix lime and sulphur with water to the consistency of thick whitewash, and apply it to the upper surface of the hot-water pipes. This can be done with perfect safety to hot-water pipes, and it had better be done two or three times during the winter. It can also be safely applied to steam pipes heated by low pressure steam, if one-fourth of the surface of the pipe only is covered. With flues it should only be applied at the cold end.

The fumes of sulphur thus slowly evolved by the water or steam pipes is certain destruction to mildew, and there is no danger whatever to the foliage if the precautions given are taken. It is our own practice to wash our hot-water and steam pipes four or five times during winter with this sulphur wash.

CHAPTER XXXV.

FROZEN PLANTS.

WHEN by any mishap the plants, whether in parlor or greenhouse, become frozen, either at once remove them (taking care not to touch the leaves) to some place warm enough to be just above the point of freezing; or, if there are too many to do that, get up the fire as rapidly as possible, and raise the temperature. The usual advice is to sprinkle the leaves and shade the plants from the sun. We have never found either remedy of any avail with frozen plants, and the sprinkling is often a serious injury if done before the temperature is above the freezing point. In our experience with thousands of frozen plants, we have tried all manner of expedients, and found no better method than to get them out of the freezing atmosphere as quickly as possible; and we have also found that the damage is in proportion to the succulent condition of the plant and the intensity of the freezing. Just what degree of cold plants in any given condition can endure without injury, we are unable to state. Plants are often frozen so that the leaves hang down, but when thawed out are found to be not at all injured. At another time the same low temperature acting on the same kind of plants may kill them outright if they happen to be growing more thriftily, and are full of sap. Much depends on the temperature at which plants have been

growing ; for example, we find, if we have a warm spell in fall when, for a week or so, the temperature has been at sixty-five or seventy degrees at night with ten to fifteen degrees more in the open air, that a slight frost will kill or greatly injure such half-hardy plants as Carnations, Geraniums, or monthly Roses ; but should the weather be such as to gradually get colder, so that the temperature has been lowered twenty to twenty-five degrees, a slight frost then coming will do little or no injury to such plants. When the frost is penetrating into a greenhouse or room in which plants are kept, and the heating arrangements are inadequate to keep it out, the best thing to do is to cover the plants with paper (newspapers) or sheeting. Thus protected, most plants will be enabled to resist four or five degrees of frost. Paper is rather better than sheeting for this purpose.



CHAPTER XXXVI.

MULCHING.

LITTER of any kind placed around newly-planted trees to prevent evaporation from the soil was the original meaning of mulch ; but it is at present extended to include a covering of the soil applied at any time, and for very different purposes. Good cultivators apply hay, straw, or other litter to the surface of the soil to protect the roots of certain plants against the action of frost, it being useful, not so much against freezing as to prevent the alternate freezing and thawing that is apt to occur in our variable and uncertain climate, even in mid-winter. As stated under "Strawberry Culture," the mulch applied in the fall protects the roots during winter. It is allowed to remain on the bed, where, if thick enough, it keeps down weeds, and prevents the evaporation of

moisture from the soil during the dry time we are apt to have between the flowering and the ripening of the Strawberry. Besides all this, it makes a clean bed for the fruit to rest upon, and should a driving shower come up as the fruit is ripening, there is no danger that the berries will be splashed with mud and spoiled. The utility of a mulch is not confined to the Strawberry among fruits. Raspberries and Currants are much benefited by it, and by its use a gardener of my acquaintance succeeds in growing fine crops of the choice varieties of English Gooseberries, a fruit with which very few succeed in our hot summers. Newly-planted trees, whether of fruit or ornamental kinds, are much benefited by a mulch, and its application often settles the question of success or failure. We have known a whole Pear orchard to be mulched, and the owner thought its cost was more than repaid by saving the fallen fruit from bruises. The rooting of a layer is by some gardeners thought to be facilitated by placing a flat stone over the buried branch; the fact being that the stone acts as a mulch, and prevents the soil around the cut portion from drying out, and greatly favors the rooting process. Even in the vegetable garden mulching is found useful, especially with Cauliflowers, which find our summers quite too dry.

The material of the mulch is not of much importance, the effect being mainly mechanical, and one kind of litter will answer as well as another. The material will be governed in great measure by locality. Those living near salt water will find salt hay, as hay from the marshes is called, the most readily procured. Those who live near pine forests use the fallen leaves, or pine needles, as they are called. In the grain-growing districts straw is abundant, and nothing can be better. It can be applied more thoroughly if run through a cutter, though the thrashing machine often makes it short enough. Leaves are nature's own mulch, and answer admirably. If there is

danger of their being blown away, brush laid over them, or even a little earth sprinkled on them, will keep them in place. Tan-bark and sawdust may serve for some uses, but they are very bad for Strawberries, their finer particles being about as objectionable as the soil. One of the best materials to use for Strawberry mulching is the green grass mowed from lawns. This, applied to the thickness of two or three inches around the roots of Strawberries or other small fruits, will be found not only to greatly benefit the crop, particularly in dry weather, but will save greatly in labor by preventing the growth of weeds. One of our best private gardeners in the vicinity of New York has adopted this summer mulching with the grass from the lawn for nearly twenty years, and has succeeded in growing all kinds of small fruits in the highest degree of perfection.



CHAPTER XXXVII.

SHADING.

IN mulching the object is to prevent evaporation from the soil, as well as to shield the roots from sudden changes of temperature. It is often necessary to protect the whole plant in this respect, and this is accomplished by shading. Although, on a large scale, we can do little in the way of shading plants in the open ground, yet the amateur will often find it of great utility, as screening will frequently save a recently transplanted plant, which without it would be quite ruined by a few hours' exposure to the sun. For shading small plants in the border, such as transplanted annuals, a few shingles will be found very useful. One or two of these can be stuck in the ground so as to completely protect the deli-

cate plant, and yet not deprive it of air. Six-inch boards of half-inch stuff nailed together to form a V shaped trough are very useful in the garden. They are handy to place over small plants during cold nights, and may be turned over and set to make a screen against strong winds, or used for shading plants in rows.

Seedlings often suffer from the heat of the sun in the middle of the day; the seedlings of even the hardiest forest trees are very delicate when young. The seeds of such trees when sown naturally almost always fall where the young plant will be shaded, and the amateur who experiments in this very interesting branch of horticulture, the raising of evergreen and deciduous trees and shrubs from seed, will find it necessary to imitate Nature, and protect his young seedlings from the intense heat of the sun. There are several ways of doing this. If the seeds have been sown in an open border, let him take twigs about a foot long, evergreen if they can be had, but, if not, those from any deciduous tree, and stick them a few inches apart all over the bed. This will give the seedlings very much such a protection as they would naturally have had in the shade of other plants; and though evergreens will look better for a while, the dead leaves of deciduous twigs will give quite as useful a shade.

It is always safer to sow seeds in a frame, as the young plants are then under more complete control. Frames are easily shaded by means of a lattice made of common laths. Strips of inch stuff, an inch and a half or two inches wide, are used for the sides of the lattice, and laths are nailed across as far apart as their own width. One lath being nailed on, another is laid down to mark the distance, the third one put down and nailed, and the second lath is moved along to mark the distance for the fourth, and so on. With a screen of this kind there is abundant light, but the sun does not shine long at a time on one spot, and the plants have a constantly chang-

ing sun and shade. This lath screen may be used for shading plants in the open ground, if supported at a proper height above them. In a propagating house, where it is necessary, as it often is, to shade cuttings, a lattice laid upon the outside of the glass answers a good purpose. The laths are sometimes tied together with strong twine, the cord answering the place of slats, and serving as a warp with which the laths are woven; the advantage of a screen of this kind being that it can be rolled up. Another and excellent screen to shade is to make frames three by six feet of the "Protecting Cloth" already alluded to in the chapter on "Greenhouses or Pits without Artificial Heat." Plants kept in windows during summer months will, if in a sunny exposure, require some kind of a shade, and if the one provided to keep the sun from the room shuts out too much light, or excludes air as well as sun, something must be provided which will give protection during the heat of the day, and still allow sufficient light and an abundant circulation of air. Any one with ingenuity can arrange a screen of white cotton cloth to answer the purpose.

The old practice of stripping the greenhouse in summer is falling into disuse. By a proper selection of plants and sufficient shade, it is made as attractive then as at any other season; but even for tropical plants the glass must be shaded. For a small lean-to, a screen of light canvas, muslin, or the "Protecting Cloth," arranged upon the outside, so that it may be wound up on a roller when not wanted, will answer; and if it be desired to keep the house as cool as possible, this should be so contrived that there will be a space of six inches or so between that and the glass. But upon a large house, or one with a curvilinear roof, this is not so manageable, and the usual method is to coat the glass with some material which will obstruct a part of the light. The most common method is to give the outside of the glass a coat

of lime whitewash made very thin. This makes a sufficient shade, and is gradually dissolved by the rains, so that by autumn the coating is removed, or so nearly so that what remains may be readily washed off. A more pleasant effect is produced by spattering the glass with a preparation of naphtha and white lead, made so thin as to resemble skimmed milk. This can be put on by a syringe at a cost not to exceed twenty-five cents for every thousand square feet of glass. It is best to put it on gradually, beginning in May by lightly covering the glass in numerous fine drops, like rain drops, and increasing its thickness as the season advances.

Whatever may be the means of effecting it, we find that in this latitude shading of some kind is required from about the first of May to the middle of September by nearly all plants grown under glass. Ferns, Lycopods, Caladiums, Primulas, Fuchsias, Begonias, Gloxinias, Achimenes, Lobelias, Smilax, and plants of that character require the glass to be heavily shaded, while Roses, Carnations, Bouvardias, Poinsettias, Geraniums of all kinds, and nearly all succulent plants, do not need so much. The method of spattering the glass outside with the preparation of naphtha and white lead, allows the shading to be light or heavy, as required. When first done, it is spattered very thinly, merely to break the strong glare of the sun, just about thick enough to half cover the surface. As the season advances, the spattering should be repeated to increase the shade, but at no time for the plants last mentioned do we entirely cover the glass. In England, especially for Fern houses, Brunswick green mixed with milk is used, to give a green shade, which is thought to be best suited to these plants. The blue glass for greenhouses which was so highly lauded a few years ago has not met with much favor; but recent experiments in glazing with ground glass have given such results as to warrant the use of it

on houses in which nearly all kinds of plants are grown, except Roses, Grapes, Strawberries, or other plants the flowers and fruit of which are wanted in midwinter. At that season all the light possible is required; and although ground glass but slightly obscures the light, yet it is found that it does not answer so well as clear glass from the middle of December to the middle of January. Before or after these dates it can be used to advantage for any greenhouse purpose.

CHAPTER XXXVIII.

THE LAW OF COLOR IN FLOWERS.

I REFER to this matter in the hope that it may be the means of saving some of my readers, not only from being duped and swindled by a class of itinerant scamps that annually reap a rich harvest in disposing of impossibilities in flowers, but that I may assure them of the utter improbability of their ever seeing such wonders as these fellows offer, thereby saving them from parting with money for worthless objects, and from the ridicule of their friends who are already better advised. This subject cannot be too often brought before our amateur horticulturists. Warnings are given year after year in leading agricultural and other journals devoted to gardening, yet a new crop of dupes is always coming up, who readily fall victims to the scoundrels who live upon their credulity. Not a season passes but some of these swindling dealers have the audacity to plant themselves right in the business centers of our large cities, and hundreds of our sharp business men glide smoothly into their nets. The very men who will chuckle at the misfortunes of a poor rustic when he falls into the hands of a mock

auctioneer, or a pocket-book dropper, will freely pay ten dollars for a rose plant of which a picture has been shown them as having a blue flower ; the chance of its coming blue being about equal to the chance that the watch of the mock auctioneer will be gold. It has long been known among the best observers of such matters, that in certain families of plants particular colors prevail, and that in no single instance can we ever expect to see *blue, yellow, and scarlet colors in varieties of the same species*. If any one at all conversant with plants will bring any family of them to mind, it will at once be seen how undeviating is this law. In the Dahlia we have scarlet and yellow, but no approach to blue, and so in the Rose, Hollyhock, etc. Again, in the Verbena, Salvia, etc., we have scarlet and blue, but no *yellow* ! In the Hyacinth we have blue and a fairly good yellow, but no scarlet. Some have contended that in this family we have the combination, for of course we have crimson ; but crimson is not scarlet any more than blue is purple. If we reflect it will be seen that there is nothing out of the order of Nature in this arrangement. We never expect to see among our poultry, with their varied but somber plumage, any assume the azure hues of our spring Blue-bird or the dazzling tints of the Oriole ; why, then, should we expect Nature to step out of what seems her fixed laws, and give us a blue Rose, a blue Dahlia, or a yellow Verbena ?

CHAPTER XXXIX.

HUMBUGS IN HORTICULTURE.

A PAPER under this head was read by me at a meeting of the National Association of Nurserymen and Florists held at Chicago, Ill., June 16th, 1880; and although it has already in part been published in my work, "Garden and Farm Topics," yet I take the liberty of again repeat-

ing the main parts of it here, in the hope that it may be the means of preventing my amateur readers (those who are "gardening for pleasure") from falling into the many traps set for them by those who make a business of swindling in trees, plants, seeds, or fertilizers.

The lifetime experience of any man is not too short to be imposed upon by many of the hundreds of old varieties of fruits, flowers, or vegetables that are sent out annually under new names. Any well-posted nurseryman can easily detect when a Bartlett Pear or a Baldwin Apple appears under a new name; or a florist, making a specialty of Roses, knows, as, for example, when, some years ago, the old Solfaterre Rose was sent out under the name of "Augusta" (claiming it to be hardy in every State of the Union, and sold as a great bargain at five dollars apiece), that the venders thereof were either swindlers or entirely ignorant of the business they had embarked in; or when the confiding market gardener is induced to buy a new and superior Cabbage or Tomato seed at five dollars an ounce, and finds them identical with varieties that he can buy at half that price per pound, he has good reason to come to the conclusion that the man from whom he purchased was either a humbug or else unfitted, from his ignorance, to engage in the business of a seedsman.

But, unfortunately, from the varied nature of these impostures, it is exceedingly difficult to mete out justice to those who, knowingly or otherwise, place such swindles on the horticultural community; for the man who grows fruit trees is as likely to know as little about Roses as the man who grows Roses is to know about fruit trees, and either is less likely to be posted on the merits of vegetables. So, then, if the partly experienced horticulturist may be imposed upon in such a way, how safe is the field when the swindler tries his tricks upon the general public?

The sharp man of the city falls as quickly into the

trap of the horticultural swindler as the veriest rustic, because his city experience of impostures in other matters helps him nothing in this. He may not be much troubled when he sees a bootblack fall off the dock into the river, particularly if his companion plays off the heroic *rôle*, and plunges in after him to the rescue. He understands it all, for both can swim like ducks, and there was no more danger for the first than for the second, and none for either. A well-stuffed pocket-book snatched from under his feet is an incident that does not in the least arouse his cupidity, for he has long been conversant with the trick of the pocket-book dropper. The mock auctioneer may scream himself hoarse, offering gold watches at five dollars apiece, and it hardly elicits a smile of derision. The tears of the benighted orphan in search of his uncle does not bring a dime from his pocket, for he understands it all, together with a score more of the tricks of the great city. But in the springtime, when his garden instincts begin to bud, and he sees in some window in Broadway flaming representations of fruits and flowers, he falls into the trap and is ready for the spoiler.

Some years ago I had occasion to act as an amateur detective in one of these horticultural swindling shops, the owners of which are now known in New York as the "Blue Rose Men." When I arrived, there were at least a dozen ladies and gentlemen engaged in buying seeds, bulbs, and plants, the flowers and fruits of which were represented by the pictures on the walls: for example, Asparagus was shown as having shoots as thick as a broom handle, the seeds of which were selling rapidly at one cent apiece, warranted to produce a crop in three months from the time of sowing. An old lady had just become the possessor of five dollars' worth, and seemed delighted with her bargain.

One of the most attractive pictures on the wall was

an immense colored engraving, showing a tree, on which Strawberries were growing, and as big as Oranges. My gaze was attracted to a handsome plate of Blue Moss Roses, and I modestly asked the price of the plants. The polite Frenchman (who was doing the principal selling for the concern) whisked out from beneath the table three plants, representing them to be Moss Roses (which, by-the-way, were all alike, and were all our common Prairie Rose), and said, "This one, he bloom only once, I tell you the truth, so I sell him for two dollar. This one, he be the Rémontant, he bloom twice—just twice—I sell him for three dollar; but this one, he be the ever-blooming, perpetual Blue Moss Rose, he bloom all the time, he cheap at five dollars." I quietly remarked, if it bloomed all the time, why was it not blooming now? He looked at me pityingly, and said, "My dear sir, you expect too much. These Moss Rose just come over in the ship from Paris. You take him home and plant him, and he bloom right away, and he keep on blooming." I did not take him home, but I took the story, something in the shape it is now told, and had it published in one of the leading New York papers, and in less than a week the "Blue Rose Men" had pulled up stakes, but, no doubt, to pitch their camp somewhere else, and set their traps for fresh victims. The "Blue Rose Men" are very impartial in their wanderings, and rarely omit a city of any size, beginning usually in New Orleans in January, running northward, and ending up with Philadelphia, New York, and Boston through April and May.

These humbugs in horticulture have their comical side. A few years ago, in passing St. Paul's Church (Broadway), New York, I saw an old negro squatted on the pavement with a great bundle of plants, carefully mossed up, lying alongside of him. On inquiring what they were, he said they were Rose bushes; Rose bushes having all the good

things wanted in a Rose, fragrance, hardiness, and ever-blooming, and the price but fifty cents apiece. He had got them, he said, from the boss, and was selling them on a commission. The poor darkey was only an innocent agent. He no doubt believed he was selling Rose bushes, but the boss, whoever he might be, undoubtedly knew better, for the plants were not Roses at all, but the common Cat Brier (*Smilax sarsaparilla*), one of the worst pests of our hedgerows, but the plant of which is near enough in appearance to a Rose to deceive the ordinary city merchant.

That same season at every prominent street corner could be seen the venders of the "Alligator Plant," which some enterprising genius cut by the wagon load from the Jersey swamps, and dealt them out to those who retailed them on the street.

The "Alligator Plant" was sold in lengths of twelve to twenty inches, at from twenty-five to fifty cents apiece, according to its straightness and length; and by the number engaged in the business, hundreds of dollars' worth must have been sold. The "Alligator Plant" is the rough, triangular branches of the Sweet Gum Tree (*Liquidambar styraciflua*), common in most parts of the country. There is no doubt whatever that these pieces of stick have been planted by thousands during the last six years in the gardens in and around New York, with about as much chance of their growing as the fence pickets or paving stones.

The bulb peddlers, a class of itinerant swindlers, deserve brief attention. They have always some wonderful novelty in bulbs; and their mode of operating, to the uninitiated, has a semblance of fairness, as they are liberal fellows, and frankly offer to take one-half cash on delivery, and if the goods do not come up to the representation, the other half need not be paid. For example, when the Gold-banded Japan Lily was first introduced,

bulbs the size of hickory nuts sold at two hundred and fifty dollars per hundred. About that time one of these worthies came along with samples of a Lily of fine size and appearance, which, he said, he had just received from Japan. There was no doubt of its genuineness, for he had seen it in flower. He had a large stock, and would sell at one hundred dollars per hundred, but he was willing to take half that amount down, and the other half when the bulbs flowered and had proved correct. They did not prove correct, and he never called. The bulb he sold was the common White Lily (*Lilium candidum*), which is sold everywhere at five or six dollars per hundred. These same scamps flood the rural districts every year with blue Gladiolus, scarlet Tuberoses, and other absurdities in bulbs and seeds, usually on the same terms of one-half cash down, the other half when the *rara avis* has feathered out. The present season (1887), one of these worthies found out that the flowers of Tuberoses and Lily of the Valley, by being placed in red or blue ink, would in an hour or two absorb enough of the ink to make them a beautiful blue or red. Carrying the colored flowers with him, having the shape, fragrance, and general appearance of the actual flowers of these bulbs, he was successful in selling hundreds of dollars' worth of these wonderful novelties, at ten times their actual value. It is needless to say that they never try it twice on the same victim, but avail themselves of our broad continent to seek out new fields for their operations.

One of the most successful swindlers of this type was Comanche George, whose fame became almost national. George made his advent in New York in 1876. He was, he said, a Texas scout, and for years his rifle, revolver, and bowie knife had been the terror of the red men; but one day, in his rambles on the lone Texas prairies, his eye was arrested by a flower, whose wonderful coloring eclipsed the rainbow, and whose delicate perfume was

wafted over the Brazos for leagues ; in short, never before had eye of mortal rested on such a flower. The man of war was subdued. He betook himself to the peaceful task of gathering seed, and turned his steps to the haunts of civilized man to distribute it. We first heard of him in Washington, where he wished to place it in the hands of the government, and accordingly offered it to Mr. William Smith, Superintendent of the Botanic Gardens there ; but the government, being short of funds, so Smith said, was not just then in a position to buy, and with his advice George trimmed his "sales" for New York and a market. His success in Baltimore and Philadelphia was so great (where he started the sale of the seeds at two cents apiece) that it induced him, when he struck New York, to advance the price to five cents a seed. He put up at one of the best hotels, and claimed that for a month his sales of the seed of the Cockatelle—the beautiful Texas flower—reached fifty dollars a day. But his success threw him off his balance. He took to fire water, and in an unguarded moment fell into the hands of a newspaper man, who extracted from him all the facts connected with the enterprise. George never was a scout, had never been in Texas, but he had been a good customer to the various seedsmen of the different cities, where his purchases of Okra or Gumbo seed, at about fifty cents a pound, had made nearly a dearth of the article. His victims (whose names he gave by the score, and which were duly chronicled in the newspaper article referred to) were from all classes : the enterprising florist, who secretly went into it in a wholesale way, with a view to outwit his less fortunate fellows ; the grandee of Fifth Avenue, who anticipated a blaze of beauty on his lawn ; the hotel man, whose window boxes were to perfume the air ; all had fallen easy victims to the wiles of Comanche George. George disappeared from New York, though there is but little doubt that his business had been too

successful for him to abandon it. A newspaper paragraph which reads as follows, looks as if it might be the Texas scout in a somewhat different *role* :

“The prepossessing appearance, gentlemanly demeanor, and foreign accent of the man who called himself Carlo Corella, botanist to the Court of Brazil, convinced a number of wealthy San Francisco ladies that he was truthful. He said to each that the failure of a remittance compelled him to sell some rare bulbs of Brazilian Lilies, which he had intended to present to Mrs. R. B. Hayes. ‘The flower,’ says the *Chronicle*, ‘was to be a great scarlet bell, with ecru ruchings on the petals, a solferino frill around the pistil, and a whole bottle of perfumery in each stamen.’ He sold about fifty almost worthless bulbs at four dollars each.”

Nurserymen are no doubt better posted in the swindles practiced in their particular department than I am ; but operators engage in different lines in different parts of the country ; for example, we have never yet seen in the Eastern States any one trying to sell an apple tree bearing blue apples as big as melons, as we were told, at our meeting at Cleveland, had been successfully done in Ohio and Illinois. Still we have men of fair ability in the nursery swindling line, one of whom last winter succeeded in disposing of hundreds of “winter-bearing grapes,” by carrying with him a few good bunches of the white Malaga of the shops.

One great detriment, not only to the florist, but to the purchaser, is begotten of these swindles in horticulture. The purchaser of flowers in our markets must have his plants in bloom, because he has been at times so swindled that he must now see what he buys. In New York, the amateur rarely buys from the grower, but from the agent or middleman who sells in the market stands or street corners. These, whether men or women, are generally entirely ignorant of the nature of plants, and most of

them have no responsibility, and they rarely fail to make their wares accord with the wants of the purchaser : nearly every plant is hardy, ever-blooming, and has all the qualities desired by the buyer.

But now and then these swindles become a serious matter to the victim. Some years ago a typical Englishman, who had been a green grocer in Covent Garden Market, London, found his way to New York. He at once discovered an almost entire absence of Cauliflowers in our markets, and what few there were, were sold at prices four times those of London. He soon made up his mind to make his fortune, and, at the same time, show the Yankees something they did not know. He duly selected and prepared the ground for an acre, and one day in May he sallied into the market to procure his Cauliflower plants. This he found no difficulty in doing, for at Dutch Peggy's (in those days the headquarters for all kind of herbs, plants, and seeds) they were to be seen by the wagon load. Ten thousand were procured (the number required for his acre), and, duly planted, they began to grow apace. He had planted the first of May. If it had been in England, his Cauliflower heads would have been ready about the first of July; but something was evidently wrong in the Yankee climate. His Cauliflowers grew through June, through July into August, only to develop into fine specimens of Drumhead Cabbage, then of hardly the value he had paid for them as Cauliflower plants. He got out of the business thoroughly disgusted ; and in telling his sorrowful tale to me a year afterward, he related that when he went to expostulate with old Peggy about having blasted his prospects, before he could get a word said, she recognized him as a customer, and demanded to know if he did not again want some more early Cauliflower plants.

I have said old Peggy was also a vender of seeds. It is now nearly forty years ago that a young florist pre-

sented himself before her and purchased an ounce of Mignonette. Ever alive to business, Peggy asked him if he had tried the new red Mignonette. He protested there was no such thing, but Peggy's candid manner persuaded him, and fifty cents were invested. The seed looked familiar, and when it sprouted it looked more familiar; when it bloomed it was far too familiar, for it was Red Clover. Peggy has long since been gathered to her fathers, and I have entirely forgiven her for selling me the red Mignonette.

Perhaps there is no swindling that is more extensively practiced, and which so cruelly injures the operators of the soil, as that of adulteration in fertilizers. The great mass of our farmers and gardeners are poor men, who can ill afford even to pay for the pure fertilizers necessary to grow their crops, and to pay money and high freights on adulterations worse than useless, is hard indeed. The ignorance of those dealing in such wares does much to spread the evil. A man came into my office last summer with samples of a fertilizer, nicely put up in cans, which he claimed could be sold in immense quantities by the seedsmen, as it had not only the wonderful properties of invigorating and stimulating all planted crops, but that it at the same time *would kill all noxious weeds*. I need not say that he had waked up the wrong passenger, and that he made a rapid movement toward the door. Yet, notwithstanding the impudence and absurdity of such a claim, the scamp was enabled to prowl around the vicinity of New York for weeks, and, undoubtedly, sold to hundreds. If he had said he had a cannon from which, when grape shot was fired into a crowd, it killed only enemies—never friends—the one claim would have been as reasonable as the other.

There is another species of humbugging, which, though it can hardly be called swindling, is somewhat akin to it. I refer to the men who claim to have secrets by which

they can accomplish extraordinary results in the propagation and culture of plants. I can well remember, in my early days, that the nursery propagator was looked upon as a sort of demi-god, possessing secrets known only to himself and a favored few, whose interest it was to continue to throw dust in the eyes of every young aspirant after knowledge. The door of the propagating house was locked and bolted, as if it were a Bastille, and even the proprietor (if he were unfortunate enough not to have practical knowledge) was allowed entrance only as a special favor; for his propagator was an autocrat, of whom he stood in awe and reverence. But since the advent of horticultural publications in America, particularly during the past fifteen or twenty years, the "secrets" of these pretentious fellows have had such ventilation, that now nearly every operation of the greenhouse is as well understood by the tens of thousands engaged in the business, as the operations of the farm are by the farmer.

The most of these pretenders to this secret knowledge of horticulture are foreigners, though occasionally a native tries it on. Some twenty years ago, when the grape-vine mania was at its hight, an old Connecticut farmer pretended he had discovered a new method of propagating the grape, which he would impart for a consideration to the highest bidder. He issued a profusion of hand bills to the trade, asking for bids, modestly requesting the receiver of the hand bill to hang it up in a conspicuous place.

I sent my copy to my friend Meehan, of the *Gardener's Monthly*, saying that the pages of that magazine were the most conspicuous place I knew of to comply with the wish of the old gentleman. Mr. Meehan not only inserted the advertisement gratis, and in the most conspicuous manner, but he did more, for he appended below the advertisement a few remarks I had ventured to make on the subject. This opened the ball, and for six months

the pages of the *Gardener's Monthly* became the battle ground for the opinions of the "discoverer" and myself. But the gratuitous advertisement did not avail him much, for he and his secret soon passed into oblivion, and were heard from no more. There are no secrets in horticulture. The laws that govern the germination of a seed, the rooting of a cutting, or the taking of a bud or graft, are the same now as they were a thousand years ago, and anyone pretending to have any secret knowledge in the matter is either an ignoramus or an imposter.

Since the above was written several other swindling schemes have been perpetrated. Among others, the bulb man has turned up again. Having for the time being become too well known in the city, he has betaken himself to the rural districts, where he plied his trade last fall most successfully, finding his victims chiefly among confiding women. Taking pattern of the "Blue Rose Man," he has provided himself with gaudy pictures of impossible Lilies, which ought to deceive none but the thoughtless or ignorant. As a matter of precaution, it may be well to describe his methods of operating. His first move is to learn the names of the wealthiest and best known people in the neighborhood. He then begins his canvass, calling at houses where he has reason to believe none of the male members of the family is at home. He has just returned from California, where he had the great good fortune to discover three kinds of the most gorgeous of all Lilies, hitherto entirely unknown, and now for the first and only time offered for sale. Their size is immense, the colors gorgeous, and the fragrance exquisite. No such Lilies have been seen before. He has sold Mrs. Brown, and Mrs. Smith, and Mrs. Jones (naming well-known neighbors) bulbs of each of the three kinds at four and five dollars a bulb; but as he has only a few left, and is anxious to get home, he will sell the remainder at two and three dollars each. His vic-

tims hesitate in doubt a few moments, and then drop into the net. I had the pleasure of blocking this fellow's operations in one instance, appearing on the scene just in time to do so. In one locality, within my personal knowledge, this man sold dozens of these bulbs to confiding victims. I saw some of these "gorgeous" new California Lilies when they came into flower, and they were all neither more nor less than the common white garden Lily (*Lilium candidum*), fine bulbs of which can always be bought for ten or twelve cents each.

Another instance may be mentioned, in which the rogue offered for sale, at a dollar a paper, the seed of a variety of Mignonette even more famous than the red Mignonette of Aunt Peggy before mentioned. This bore magnificent spikes of flowers, nearly two feet long and of delicious fragrance.

A lady friend, one of his victims, carefully sowed the seeds, and waited anxiously for the appearance of the plants. The seedlings proved to be so vigorous that she ventured to separate and transplant them in the open border. They grew and grew till they finally rivaled in growth the famous mustard seed mentioned in the good Book. The reader will probably smile when I tell him that this famous Mignonette proved to be Pearl Millet, a kind of grass growing ten feet high. The present season one of these itinerants is doing a thriving business by selling common Parsnip seed, which he has caused to absorb various perfumes. This, supplemented with flaming pictures of Roses of every hue, makes it an easy business for him to sell this "Rose Seed" of any perfume desired !

The following from the New York *Tribune* of February 19th, 1882, shows that occasionally these enterprising gentlemen receive their deserts :

"The case of John Harrison, the industrious seed peddler, who was locked up in Newark the other day, is

one which calls for commiseration. It was a propitious season for business in this line, for the near approach of spring had begun to warm up the desire to worry the soil and plant something, a desire that slumbers in the bosom of every man or woman who is the proprietor of a garden, a back-yard, or even of a flower pot. Our vender was therefore driving a brisk trade, when he was arrested for obtaining money under false pretenses. The pretense and falsehood charged were Mr. Harrison's statement that his seeds, when dropped into water or earth, would speedily germinate and grow into a bush, which would suddenly burst into beautiful and fragrant bloom, and then bear a rich fruitage of 'wash-rags;' a crop which at once commended itself to the cleanly and thrifty housewives of New Jersey. Now there is a well-known vine of the Cucumber family which flourishes in the West Indies, and bears a gourd-like fruit, the spongy lining of whose tough shell is used by the simple islanders to brush their huts with when they have any, and for toilet and culinary cleansing as well. Mr. Harrison's descriptions of this vegetable may have been a trifle too eloquent, but surely a merciful magistrate would consider this nothing more than justifiable professional exaggeration. Any one who has been attacked by a roving tree agent, armed with a book full of colored lithographic plates of trees clad with rainbow-hued foliage, and decorated still further with fruit of marvelous shape and bulk, will understand that Mr. Harrison is not a unique sinner, but simply a man who understands his business."

This list of humbugs on horticultural subjects might be greatly extended, but perhaps enough has been said to put the intelligent and thoughtful reader on his guard in the future.



THE FRUIT GARDEN.



CHAPTER XL.

PRUNING.

THOUGH the chapter on pruning is placed at the commencement of that division of the work which treats upon fruits, the fact must not be lost sight of that pruning is often quite as necessary upon trees and shrubs cultivated for their flowers or foliage as upon those grown for their fruit. In pruning we cut away some portion of a tree, shrub, or other plant, for the benefit of that which remains; and whether performed upon a branch six inches through, or upon a shoot so tender as to be cut by the thumb nail, the object is essentially the same. The operation, though very simple, is one which the amateur often fears to undertake; and having no confidence in his own ability, he often employs some jobbing gardener, who has no fears on this or any other gardening matter. Pruning is done for various ends, and unless one has a definite reason for doing it, he had better leave it undone. Many have an idea that pruning must, for some reason, be done every year, just as it used to be thought necessary for people to be bled every spring, whether well or ill. We prune to control the shape of a tree or shrub, and by directing the growth from one part to another, obtain a symmetrical form, especially in fruit trees, where it is desirable that the weight of fruit be equally distributed. In some trees, where the fruit is borne only on the wood of the previous season, the bearing portions are each year removed further and further from the body of the tree. In such cases a shortening of the growth each year will cause the formation of a compact head instead of the loose straggling limbs that result when this is omitted. We prune to renew the vigor of a plant. The inexperienced cannot understand how

cutting away a third, a half, or even more of a plant can improve it in vigor and fruitfulness, or abundance and size of flowers. Let us suppose that a stem which grew last year has twenty buds upon it. If this is allowed to take its own course in the spring, a few of the upper buds will push with great vigor, and form strong shoots; while those below will make gradually weaker shoots, and for probably the lower third of the stem the buds will not start at all. In fruit trees, as a rule, the most vigorous growth is at the top. The buds there were the last formed in the previous summer, are the most excitable, and the soonest to grow the next spring, and getting the start of those below them, they draw the nourishment to themselves and starve the others. If, instead of allowing this stem to grow at will in this manner, it had been, before any of the buds started, cut back so as to leave only a few of the lower ones, those having an abundance of nutriment would push forth with great vigor and be nearly equal in size, while the flowers or fruit borne upon them would be greatly superior to those upon the unpruned stem. Any one can readily be convinced of the utility of pruning by taking two rose bushes of equal size, leaving one without any pruning to take care of itself, and each spring cutting the other back severely, pruning away one-third or one-half of the wood that was formed the previous season. The result at the end of two years will be very striking.

No general rule can be given for pruning. The amateur should use his eyes, and notice the habit of growth of his trees and shrubs. He will find that many, like the Rose, produce their flowers upon the new wood of the present season, and that such plants are greatly benefited by cutting back more or less each spring. But there are other plants for which this treatment will not answer. If we examine a Horse-chestnut tree, or a Lilac bush, and many others, we shall find that the flowers

come from the large buds that were formed on the end of last season's growth, and to cut back such plants would be to remove all the flower buds. With shrubs of this kind, all that need be done is to thin out the branches where they are too crowded. These examples will warn the novice against indiscriminate pruning; and unless, as he stands before his shrub or tree, knife in hand, he knows why he is to prune and how, let him put his knife in his pocket, and give the plant the benefit of the doubt. While, under the different fruits, we can give directions for the particular pruning required by each, the proper method of treating a miscellaneous collection of ornamental shrubs and trees can only be learned by observation.

The term pruning is generally applied to the cutting away, in whole or in part, of the ripened wood; but much pruning may be done by the use of the thumb and finger. This is termed *pinching*, and is practised upon young shoots at the growing season, while they are yet soft. This most useful form of pruning allows us to control the form of a plant with the greatest ease, and is applied not only to soft-wooded plants, but to trees and shrubs, and may be so performed on these as to render nearly, if not quite, all pruning of ripened wood unnecessary. When soft-wooded plants, such as Chrysanthemums, Geraniums, or Coleus, are planted out or grown in pots, and left to themselves, most kinds will grow tall and straggling; but if judiciously "pinched back," as it is called (that is, the top of the strongest shoots pinched out), the plants can be shaped into a bushy, rounded form at will. If a vigorous shoot has its end or "growing point" pinched out it will cease to elongate, but will throw out branches below, the growth of which may be controlled in the same manner. The Blackberry illustrates the utility of this kind of pruning. The rampant growing shoot which springs up from the root will, if

left to itself, make a long cane six or eight feet high, and with a very few branches near the top. If, when this shoot has reached four, or at most five feet, its end be pinched off, it will then throw our numerous branches; and if the upper branches, when they reach the length of eighteen inches, be "stopped" (as it is called), in a similar manner, by pinching, the growth will be directed to the lower ones, and by the end of the season, instead of a long, unmanageable wand, there will be a well-branched bush, which will bear its fruit all within reach. The grower of plants in pots is usually afraid to remove even a single inch of the stem, and the result is usually a

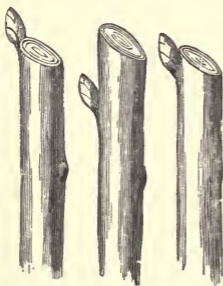


Fig. 63. Fig. 67. Fig. 68.
WHERE TO CUT IN PRUNING.

lot of "leggy" specimens not worth the care that is otherwise bestowed upon them. Plants may be prevented from ever reaching this condition, if their growth be properly controlled by pinching; but if they have once reached it, they should be cut back severely, and a compact, bushy form obtained from the new shoots which will soon start.

I may state here, however, that if it becomes necessary to cut back a plant in full leaf, care must be taken to withhold water until it again throws out shoots below, for the reason that, being robbed of the foliage and shoots that elaborated the top, an excess of moisture given to the roots, which have now no work to do, will gorge and destroy them.

The mechanical part of pruning is very simple. A sharp knife is the best implement, as it makes a clean cut without bruising the bark, and the wound quickly heals. Shears are much easier to handle, and the work

can be done so much more quickly, that they are generally preferred, and for rampant growing bushes will answer; but upon fruit trees, and choice plants generally, the knife is much better. The cut should be made just at a joint, but not so far above it as to leave a stub, as in figure 67, which will die back to the bud, there being nothing to contribute to its growth; nor should it be made so close to the bud as to endanger it, as in figure 66. The cut should start just opposite the lower part of the bud and end just above its top, as in figure 68. For the removal of branches too large to cut with the knife, as must sometimes be done on neglected trees, a saw is required. Saws are made especially for the purpose, but any narrow one with the teeth set wide will answer. The rough cut left by the saw should be pared smooth, and if an inch or more in diameter, the wound should be covered. Ordinary paint, melted grafting wax, or shellac varnish will answer to protect the bare wood from air and moisture, and prevent decay. In pruning it is well to remember that the future shape of the tree will be materially affected



Fig. 69. Fig. 70. Fig. 71.

PRUNING FOR SHAPE.

by the position upon the branch of the bud to which the cut is made. The upper bud left on the branch will continue the growth, and the new shoot will be in the direction of that bud. If a young tree is, as in figure 69, to have all its branches shortened, and each is cut to a bud, A, pointing towards the center of the tree, the tendency of the new growth will all be inward, as in figure 70; while

if all be cut to an outside bud, B, the result will be to spread the growth, as in figure 71.

As to the time of pruning, about which there has been much discussion, it may be done on small stems at any time after the fall of the leaf, before the growth starts in the spring; but for the removal of large branches, late in winter is regarded as the best time. It is a popular idea that trees should not be pruned in excessively cold weather. A very sensible belief, as affecting the comfort of the pruner; but rest assured, it in no way adds to the discomfort of the tree, either present or prospective. Pinching is, of course, done whenever it is needed during the summer months.



CHAPTER XLI.

HARDY GRAPES.

GRAPES can be grown in almost any soil, provided it is not a wet one. Although the Grape will take abundance of water when in a growing state, it must pass off quickly, or the growth will be impeded. If the ground is not naturally suitable (*i. e.*, at least a foot in depth of good soil), a border prepared in the manner recommended in the chapter on "Cold Grapery" will well repay the trouble. It is imperative that the position where the vine is planted be such as will enable it to get sunlight for the greater portion of the day. Twenty years ago I planted an arbor (with an arched top) one hundred feet long by sixteen feet wide and ten feet high, covering a walk running east and west. This gave a south and a north exposure. The crop has always been excellent and abundant (and is to-day) on the south side and top of the arbor, but on the north side (unless for the first and

second years of fruiting, when there was not sufficient foliage to impede the light) it has been nearly a failure.

There is much misconception as to what should be the age of a grape-vine when planted. Nine-tenths of our amateur customers ask for vines three or four years old. If a vine of that age could be properly lifted with every root unbroken, then there might be some advantage in its greater strength; but as vines are usually grown in the nurseries closely together, with the roots all interlaced, large plants can rarely be got with roots enough to support the vine and maintain its vigor after transplanting. As a rule, it is better to plant one or two-year-old vines, which can usually be bought at half the price of those of three or four years old, and which, in all probability, will give a crop quite as soon as the large ones, if not sooner.

The manner of planting the vine is similar to that of any other tree or shrub. The ground must be thoroughly broken up, not in a mere hole only sufficient to hold the roots, but, if a regular border has not been made, the place where each vine is to be planted should not be less than three feet in diameter (and if double that, all the better), and of a depth of not less than a foot. On receiving the vine from the nursery, it may consist of one or more shoots, but on planting it should be cut back to only two or three eyes or buds. On starting to grow, all of these buds or eyes should be rubbed off except one, selecting the strongest. Train this shoot perpendicularly to a stake the first year of its growth. The next fall, when the leaves drop, cut it back to nine or ten inches from the ground. When the vine starts the next spring, rub off all eyes or buds except two, which during the season will form two canes, as in figure 72. These, if they are canes half an inch in diameter, are in the fall to be pruned to three or four feet long, and the following spring trained horizontally, one to

the right, the other to the left. If, at the end of the second year, they are still small, it is better to delay laying down the arms until another year, and grow two upright shoots again, to get them sufficiently strong. These will form the base from which to start the upright shoots, as shown in figure 73. These upright growths will be the permanent fruiting canes, and should be from fifteen to eighteen inches apart, and pruned on what is known as the spur system, as shown by figure 74. There is nothing arbitrary as to the height of these canes. It is

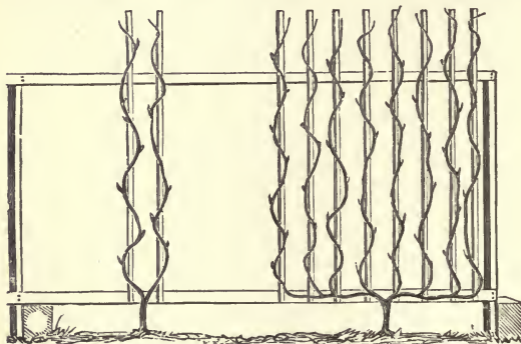


Fig. 72.—VINE WITH TWO SHOOTS.

Fig. 73.—VINE WITH ARMS.

a matter of convenience or taste whether they be trained to three feet or fifteen feet. Vines thus treated may be allowed to produce a few bunches the third year, and by the sixth year may be fruited to the height of ten or twelve feet of cane, if desired. Not more than two bunches of fruit should be allowed to each shoot. We give this manner of training as one of the simplest, although the system of training has but little to do with the crop. My own Grape arbor planted twenty years

ago, trained and pruned in this way, is still in excellent vigor, and looks as if it might remain so for twenty years longer. A top-dressing of rotted manure is placed on the border (nine feet wide on each side) every fall, and forked in in the spring. The same system of pruning and training is equally applicable to vines planted against fences or walls having an eastern or southern aspect.

The distance apart at which grape-vines may be planted, except the Delaware and a few of the weaker growing sorts, is about eight feet. The Delaware may be set one-third closer if trained in the manner described ; but

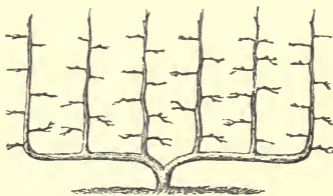


Fig. 74.—VINE SPUR-PRUNED.

if planted in the open field, and trained to stakes and wires, as shown in figure 75, they may be planted, to begin with, at least three feet in the rows and six feet between. Although grape-vines are hardy in nearly all sections, yet in any locality where the thermometer falls to zero it is beneficial to lay them down close to the ground, and cover them up with rough litter, before the approach of severe weather in winter, allowing it to remain on in spring until the buds begin to swell, when the vines are uncovered and tied up to the trellis or stake. If covered in this way they should be pruned before being laid down. Pruning may be done at any time from November to March. It is a common belief that grape-vines should be pruned only at certain seasons. The weather must not be too cold, otherwise it is sup-

posed they may be injured if then pruned. Again, they must not be pruned late in the spring, else the sap oozing from the cuts may bleed them to death. Let me say that both these notions are utter nonsense. The



Fig. 75.—VIEW OF VINEYARD.

pruning of any tree or vine in the coldest weather cannot possibly injure it, and the “bleeding” or running of the sap after any ordinary pruning can no more hurt the

vine than the blood flowing from a pin scratch would weaken a healthy man. This method of covering up the grape-vine is not commonly practised, but we are satisfied that in exposed positions it is well worth the trouble. I have practised it with vines now over twenty years old, embracing some twenty varieties. My soil is a stiff clay, very unsuitable for the Grape; yet these vines have kept clear of mildew when my neighbor's vines, a few hundred yards off, have been seriously injured by it. I have long believed that intense cold, long continued, is hurtful to even such plants as we call hardy, and the wonderful vigor of these old vines, so treated, seems a good evidence of it. The litter used in covering (which has become well-rotted by spring) is spread over the border, acting both as a summer mulch and fertilizer.

Mildew is the worst enemy to the vine. The same remedy we recommend in this book for mildew on Roses will be found equally efficacious for the Grape. On a large scale, dry sulphur is used, blown upon the vines by a bellows made for the purpose.

Propagation of the Grape is done by nurserymen in greenhouses similar to that used for propagating florists' plants; but most of the varieties can be grown with fair success by cuttings in the open air. The cuttings (made from the young, well-ripened shoots of the previous year's growth) may be made with two (figure 76) or three buds or eyes, planted in rows, say one foot apart and three inches between the cuttings, and set so that the top eye or bud only is above ground. The situation where the cuttings are placed should be well exposed to the sun, the soil rich and deep, and of sandy or light character. Care must be taken that the cutting



Fig. 76.
CUTTING.

is well firmed in the soil ; and if sawdust or some other non-conducting material is sifted over them (covering all up but the buds), success will be greater, as this will prevent the sun from baking and drying up the soil. The cuttings may be made from the prunings at any time during winter, and kept in a damp cellar or buried outside in sand until planted in the cutting-bed in the spring.

VARIETIES OF THE GRAPE.

It is the most unsatisfactory part of works on gardening to name varieties. What are cultivated as the best to-day may ten years hence be entirely discarded. Moreover, what does well in one section may be less valuable in another ; but lists must be given, and all we can do in the matter is to name such as we believe to be the best for general use at the date at which we write. The varieties are named in the order that we deem most desirable for private use.

Concord is perhaps more universally cultivated than any other. It grows most luxuriantly, bearing bunches of large size abundantly. Color black, with a rich blue bloom. The flavor is of average quality. Ripens during the month of September.

Moore's Early.—Resembles the Concord in general appearance, but ripens two or three weeks earlier. Perhaps the best early black grape for family use.

Worden.—Color black. Bunches and berries of medium size. Very early, ripening the last of August. Of excellent quality. A most desirable variety.

Delaware.—This is perhaps the richest in flavor of all hardy grapes, and quite equal to most of the foreign kinds. The bunches are small, however, though borne in great abundance, so that the *weight* of fruit on a given space is equal to most of the larger kinds. Color red. Medium early.

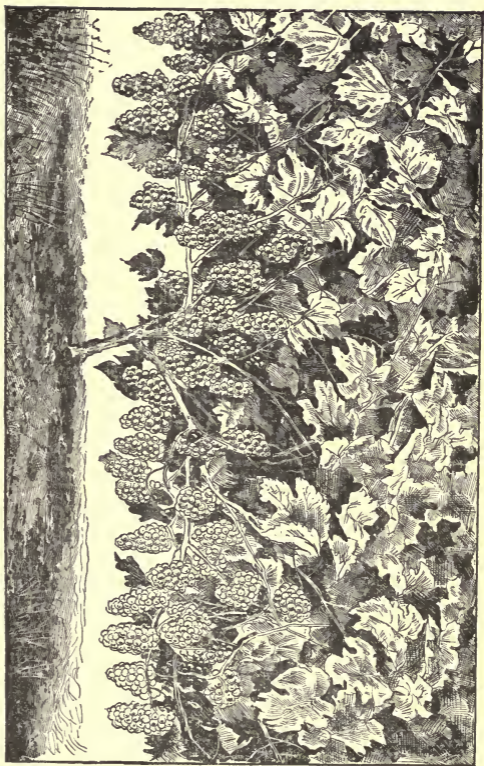


FIG. 77.—NIAGARA GRAPE.

Brighton.—Color a rich copper red. Bunches large, and of excellent flavor. Ripens in September. One of the finest of red-colored grapes yet known.

Niagara.—So far believed to be the best *white* grape for the table. It is medium early, ripening in September. In flavor it is considered equal to the best of the foreign grapes of the Chasselas class. A most abundant bearer. See engraving (figure 77), taken from a photograph two years after planting.

Pocklington.—Bunches and berries of large size. Color greenish amber, occasionally tinged with pink. It is of medium earliness, and good quality, but having a foxy odor which is objectionable to some.

Wilder.—One of the Rogers's Hybrids. Bunch medium, berries large, rich black. Flavor excellent. It ripens in September, and is unsurpassed in all good qualities.

Agawam.—Color reddish bronze. Size of bunches and berries medium. Ripens in September. This is another of the Rogers's Hybrids, having a distinct and delicious flavor, similar to some of the hothouse grapes.

Salem.—Color reddish bronze. Bunches and berries large. Ripens in September, and again, like all the Rogers's Hybrids, of excellent flavor.

Martha.—A strong-growing white grape. Bunches and berries of medium size, borne in great profusion. It is medium early and very handsome in appearance.

Merrimack.—Color deep black. Bunches and berries large. Late, ripening in October. One of the Rogers's Hybrids. Flavor excellent.

The varieties named in this list have been selected with a view to have fruit in succession from August to October, and, besides, to have a selection of such colors as will be most desirable when dished on the table, which, in the great variety of shades which we now have in this delicious fruit, makes a most beautiful ornament.

CHAPTER XLII.

THE COLD GRAPERY.

I KNOW of no addition to a country home from which such a large amount of satisfaction can be obtained at so small an outlay as from a grapery for growing the different varieties of foreign grapes. It has been proved that none of these fine varieties can be cultivated with any satisfaction in any part of the Northern or even Middle States, except under glass. In California and some other states and territories west of the Mississippi, the varieties of the European Grape have been extensively grown in the open air. There the conditions of climate are such as to make their culture a success equal to that attained any where in Europe. Besides the luxury of the Grape as a table fruit, no finer sight can be seen, and there is nothing of which an amateur gardener may be more proud than a grapery in which the vines are loaded with ripe fruit. And as this can be obtained at a trifling

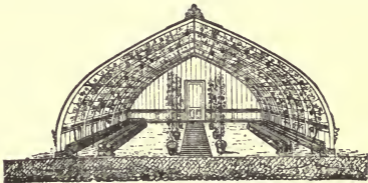


Fig. 78.—GREENHOUSE OR GRAPERY.

original outlay, and with but little attention in the cultivation afterward, I will briefly describe how to do it.

Our climate is particularly well adapted to the cultivation of vines under glass without fire heat, and the wonder is that cold graperies are not in more general use, even by people of moderate means, than they at present are. We built one for our own use on the plan shown in figure 78, which is adapted, if desired, for a greenhouse

as well as for a grapery. The dimensions are fifty feet long by twenty-five feet wide. It is finished in very good style, and cost but little more than \$1,000 without artificial heat. If heated by hot-water pipes, as shown in the interior view, it would cost about \$500 more, or \$1,500 complete. It was planted in June, and the third year from planting we cut upwards of 300 pounds of fruit from it. The next season it yielded nearly double that quantity. The building was begun by setting locust posts four feet apart. On these was framed the sill, on the front of which were placed upright sashes two and a half feet in height, and on these the gutter. From the gutter was sprung the bars, ten inches apart each way, running on the west side clear to the ridge pole; on the east framed to within two feet of it, so as to give room for lifting sashes. These were two feet wide by six feet long. To these sashes, eight in number, were attached the patent ventilating apparatus, which, by turning a crank, opens these sashes from one to twenty-four inches, as desired. The front sashes may be made so that every alternate one can open outward. With the instructions given in the chapters on Greenhouse Structures, any intelligent mechanic should be able to build from this plan, though, whenever greenhouses or graperies are to be erected on a large scale, it will always be found to be the cheapest and most satisfactory plan to have it done by a regular greenhouse architect. If there is no city or hydrant water, provision should be made by building a cistern inside the grapery, say four feet deep by eight feet in diameter, or of that capacity in an oblong shape would be better. This cistern can be supplied by water from the roof, having a waste pipe for overflow. These general directions for such a structure as is shown in the cut, figure 78, are equally applicable for almost any size or kind of grapery. Many are built in the form of a "lean to;" that is, placed against any building or fence, using such for the back wall of the

grapery. This would necessitate only the low front wall, which need not be more than one foot from the ground, if the width is but ten or twelve feet; but a path would require to be sunk inside to give room to stand upright. The sketch, figure 79, shows an outline of a "lean-to" grapery twenty feet wide, nine feet high at back, and two feet in front. Such a structure (exclusive of the "border") may be put up roughly at a cost not exceeding four dollars per running foot, without heating ap-

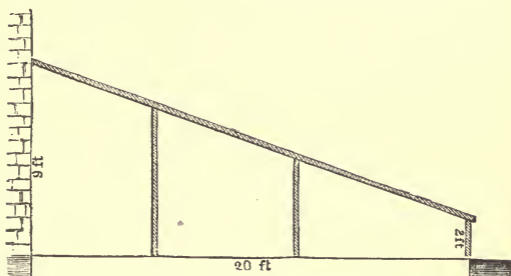


Fig. 79.—LEAN-TO GRAPERY.

paratus. Its aspect may be any point from east to southwest, though if due south all the better.

I recollect that some twenty years ago a German jeweler in Jersey City, N. J., grew a splendid crop of Black Hamburgs on vines which had been planted against the rear fence of his city lot, by placing against the fence some old sashes eight feet long. It was rather a bungling sort of an arrangement and awkward to get at, but it served the purpose of ripening the Hamburg grapes, which could not have been done without the glass.

The border of the grapery we have in use was begun by excavating the natural soil to the depth of twenty inches and fifteen feet in width, for the length of the grapery on each side. The inside was left untouched,

the borders being entirely outside. The bottom of the excavation was graded from the front of the building to the outside of the borders, with a fall of about an inch to a foot, so that thorough and rapid drainage would be sure to be attained. At the extremity of each border a drain was built to carry off the water. The whole bottom was then cemented over so as to prevent the roots from penetrating the subsoil. This pit was then filled to the depth of about two feet (four inches being allowed for settling) with a compost which was previously prepared by mixing about three parts of turf taken from the surface of a rather shaly pasture, one part of rotten stable manure, and one part of lime rubbish. In addition, about one-twentieth part of rough or broken bone was added.

It is one of the popular errors that vines for graperies should be two or three years old. The age of a vine usually has but little to do with its size, and if grapevines are properly grown the first year from cuttings, they will be quite as good for planting as if two or three years old. In fact, it is a question whether a vine grown from a cutting in March, and planted in June, is not quite as good as one a year older. Our experience has shown that there is hardly a perceptible difference in the two at the end of the season. As such vines, however, are too tender to be shipped far, we generally recommend buying one year old vines that may be planted in April, May, or June, having ripened shoots about three feet in length. These vines are all grown in pots the previous season, and when received the soil should be shaken off entirely, and the roots spread out in the border without injuring them. The root, it will be understood, is planted *outside* in the border, and the shoot taken inside, through an opening in the walls, which may be made of brick, stone, or wood, and should be left open at every three feet, the distance at which the vines should be

planted. If the wall is of wood, it can easily be cut to suit the size of the vine. The plants we used were strong one-year-old vines, and were set about June 1st. By October they had grown to over twenty feet in length. In November they were cut back to the bottom of the rafter, or about three feet from the ground, and quickly reached the top again the second year, with firm, well-ripened wood. In November following they were again pruned back to about five feet above the foot of the rafter, or eight feet from the ground. These shoots produced the 300 pounds of fruit referred to (the third year from the time of planting). The fourth year they reached the top of the rafter, when a much larger crop was taken. The varieties used were nine-tenths Black Hamburg, with a few Muscats and Frontignans, all of which have done exceedingly well, and have now been in bearing nearly twenty years. Since they have been in full bearing, which was five years from the time of planting, they have averaged, one year with another, 1250 pounds of splendid grapes, or about one pound for every square foot of base surface.

Every December we lay the vines down along the front wall after being pruned, covering them completely with soil until May, when they are taken up and tied to the wires, which are one-sixteenth inch galvanized iron, and run across the rafters fifteen inches apart and fifteen inches from the glass. The training followed is what is called the "spur" system, which is simply to allow one cane or shoot to each rafter (or three feet apart), and pruning the side shoots or "bearing wood" annually back to one eye, which is the same plan advised for hardy grapes. In the summer treatment of the cold grapery, the principle must never be lost sight of, that to keep the vines in perfect health, a temperature of not less than seventy degrees at night, with ten or fifteen degrees higher during the day, is always necessary. Any rapid variation

downward is certain to result in mildew. The floor of the grapery should be kept dashed with water at all times, unless in damp weather, from the time the buds start in May until the fruit begins to ripen in September, except during the period the vines are in flower, when it should be dispensed with until the fruit is set. If the weather is dry, copious watering is necessary for the border outside. The summer pruning consists simply in pinching off the laterals, or side shoots which start from where the leaf joins the stem, to one leaf. Every winter four inches of the best well-rotted stable manure is spread over the border, and over that six inches of leaves or litter. This is raked off in spring, and the manure forked in, the object being to feed the roots from the top of the border. This same treatment we give our hardy grapes with excellent results.

I am a good deal of a utilitarian, and am very apt to make even my luxuries "pay" when it is practicable to do so; and though I would hardly think of selling my grapes that have been grown for private use, yet I do not scruple to make the glass that shelters them do double duty by using it in winter to shelter our half-hardy Roses from November to May. Those that do not make rose-growing a business, as I do, can nevertheless profit by my example, and use the cold grapery for many purposes during the winter months when it is not needed for the grape-vines. Besides Roses, all plants of a half-hardy character may be kept there, such as Pomegranates, Oranges, Figs, Crape Myrtles, Pampas Grass, Tritomas, Carnations, etc., care being taken that the pots or tubs in which they are planted are plunged in leaves, tan, or some such substance, so that the roots do not freeze. The cold grapery makes an excellent poultry house in winter, only, if put to that use, care must be taken that the buried vines are secure against the scratching of the hens. In some sections grape-vines are often attacked, when thus buried,

by ground mice, which gnaw the bark, sometimes so as to completely destroy them. As a precaution, it is well to wrap the vines with hay, straw, or cotton batting, over which sprinkle a mixture of twenty parts flour to one of Paris green. This will poison the mice if they cut through the covering to get at the bark. Be careful not to use any greater proportion of Paris green than advised, as too much of it might injure the vines; or the labor of wrapping the vines may be dispensed with by poisoning the vermin in the ordinary way.

CHAPTER XLIII.

THE HOTHOUSE OR FORCING GRAPERY.

WHEN grapes are forced by artificial heat, probably the best plan is that of the "lean-to" structure shown by the illustrations, figures 80, 81, and 82. Figure 80 gives the plan, which, as in some former engravings, it is not practicable to show on the page at full length; and it is accordingly "broken," a portion, as shown by the irregular lines, being taken out of each compartment. The figures give the proper proportions. Figure 81 is a part of the front elevation, and figure 82 a section at the division between the two houses. The house is one hundred feet long by sixteen feet wide, divided into two compartments for early and late forcing, each fifty by sixteen feet, and both heated by one boiler, with valves in the furnace pit to shut off and taps to draw the water from the pipes not in use, a matter to be looked to when vineries are not in use; for if the water is not drawn out of the pipes it may freeze and break them. When grapes are to be forced, it is essential that a sufficient covering of manure or leaves be placed on the border to prevent frost from

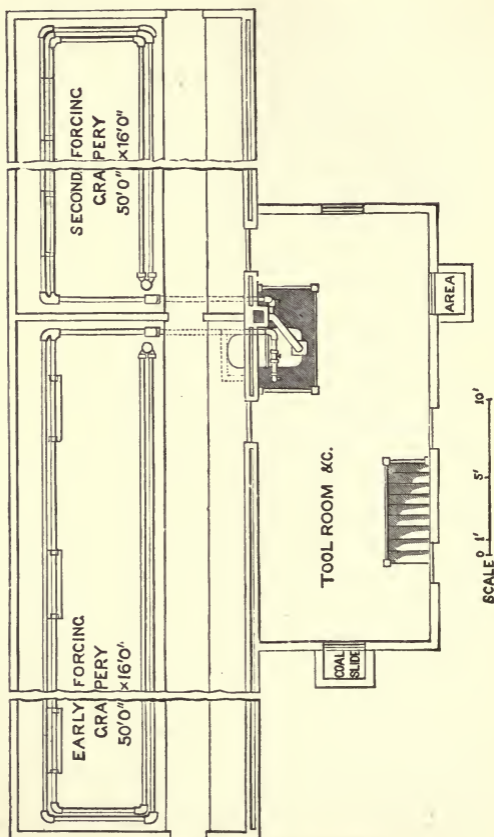


Fig. 80.—PLAN OF FORCING GRAPEVY.

reaching the roots, as to apply heat to the vines inside while the roots are frozen would seriously injure them. For very early forcing, when the vines are started as

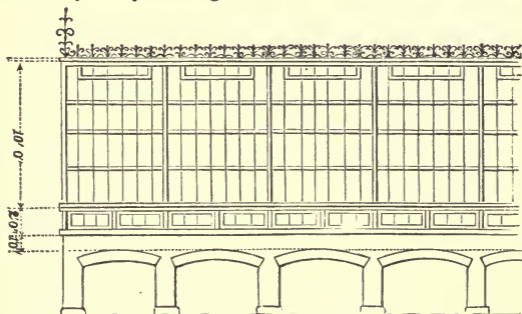


Fig. 81.—ELEVATION OF FRONT OF FORCING GRAPERY (IN PART).

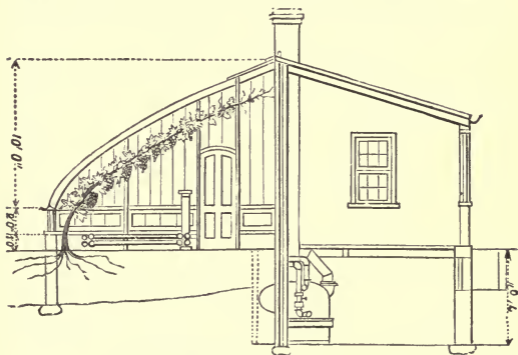


Fig. 82.—SECTION OF FORCING GRAPERY.

early as January, it is usual not only to put on covering enough to secure from frost, but also to slightly ferment, so as to throw some warmth into the border. No matter

at what season the grapery is started for forcing, the temperature should not run over fifty or fifty-five degrees at night, with a day temperature of ten or fifteen degrees higher, increasing ten degrees when the buds have opened, which will be in four or five weeks from the time of starting. In five or six weeks the fruit will be set, and the temperature is to be raised ten degrees more. In forcing, moisture is of equal importance with heat; for if this is not attended to, you may expect red spiders and thrips, and then all your labor may be in vain. To keep up this moisture, tanks are usually placed on the hot-water pipes for graperies, and these are kept filled with water, keeping up a continued evaporation, except at the time the vines are in flower. It should then be discontinued until the fruit is set. When there is no such arrangement for evaporation, dash water over the floors and use the syringe. To secure fine berries and bunches, one-half of the berries should be thinned out when of the size of peas, using scissors made for this purpose. The rules for making the border, pruning, training, and general culture are the same for the forcing grapery as for the cold grapery.



CHAPTER XLIV.

THE STRAWBERRY.

OF all small fruits, none stand so high in general favor as the Strawberry. Its culture is simple; and as it grows freely in almost any soil, adapting itself to the climate of the extreme South as well as to our most Northern States, no garden of any pretensions should be without it. If a choice of soil can be had, nothing is so suitable as a deep, rich, but rather sandy loam, though it will yield returns sufficient to warrant its cultivation on

any soil, from almost pure sand to clay, provided it is drained naturally or artificially. In all soils, deep spading or plowing is essential to the production of fine crops; and this should not be less than a foot, and if eighteen inches, all the better. A coat of thoroughly rotted stable manure, at least three inches in thickness, should be dug in and well mixed with the soil to a depth of six or nine inches. In the absence of stable manure, any of the concentrated fertilizers mentioned in Chapter VI., "How to Use Concentrated Fertilizers," used in the manner and quantities there described, will do as a substitute. Where muck from the swamps or leaf mold from the woods can be obtained, twenty bushels of either of these mixed with one bushel of ashes will make an excellent fertilizer for Strawberries, and may be spread on as thickly as stable manure, and on sandy soils is probably better.

Strawberries may be planted either in the fall or spring. If the plants are to be set in the fall, it should not be done, in this latitude, if it can be avoided, before the middle of September. This, of course, refers to the plants from runners taken up from the bed in the usual manner; and there is nothing gained in time over planting the next spring, as the plant must grow for one season before it can bear a full crop of fruit. In private gardens it is much better to have the plants layered in pots, as they may then be set at almost any time. These pots may be from two to three inches in diameter. When a lot of Strawberry plants are wanted for a new bed, all that is necessary to do is to fill these small pots with soil, and "plunge" or plant the pot just to the surface level, placing the unrooted "runner" of the Strawberry plant on the top of the soil in the flower pot, and laying a small stone or clod on it to keep it in place. This method of striking in pots is shown in figure 83. The runners so treated will form plants in two or three weeks,

and may be planted out with safety any time from August to October. If Strawberry plants, treated in this way, are planted in August, and care taken that all runners that come from them be cut off as soon as formed, so that the whole force of the root is thrown into the main crown, a full crop of berries will be gathered the season following, or in nine or ten months from the time of planting. We have practised this system of layering Strawberry plants in pots, for what we



Fig. 83.—STRIKING STRAWBERRIES IN POTS.

need for our own use, for the past twenty years, and the results have been so successful that we have many converts to the system, not only among those who grow for their own private use, but many who grow this fruit for market now use no other method. Plants grown in this manner can be obtained from the nurseries, but the necessary labor and the expense of the pots make the price five times more than that of ordinary plants rooted in the usual way and known as “ground layers.”

When Strawberry plants are set out in the fall, unless under favorable circumstances, many will fail to grow, for the reason that each young plant or runner is sustained in part by the old plant, and when detached, feels the shock more than a rooted cutting or seedling plant does, that has been growing for weeks on its own account. For that reason we have always advised all that were intending to plant fresh Strawberry beds, to prepare their plants a few weeks ahead by layering them in pots. Two to four hundred plants are all that an ordinary family will need, and two or three hours' work would be all the time required to layer the plants in the pots. One hundred plants so prepared will give more fruit the first season than a thousand planted in the usual way, and the plant forms a clump quicker, and much less time is expended in keeping them clean. The use of layered plants is recommended specially for summer and fall planting. The plants may be obtained, by this plan of layering, as early as July, and the sooner they are set out the greater will be the crop of fruit the next season, although if, for any reason, the layered plants cannot be obtained to plant before September, they will even then produce a fair crop of fruit. Our own planting is usually done by the first week in August, and we rarely obtain less than a pint from each plant.

In spring the use of potted plants would have no special advantage, as, if planted in April or May, they would have all the summer to grow, but, of course, little fruit can be expected the season of planting. For this reason, it will be seen that, to secure a crop quickly, the time to plant is in July, August, or September, and from plants that have been layered in pots. There is no arbitrary rule for the distance apart at which Strawberry plants should be set; but if the ground has been prepared as advised, the finest fruit will be had by giving them plenty of room. For our own use we usually set four hundred

plants annually in August, at two feet apart between the rows, and eighteen inches between the plants, and gather about two hundred quarts of splendid fruit. If the ground is limited they may be planted at half the above distances, particularly if set late in fall. There is no plant cultivated where the necessity for keeping the ground clean is so imperative as it is for Strawberries. It never can be made profitable under slipshod culture, for, from the nature of the plant, it cannot defend itself against weeds, and if neglected will quickly get overwhelmed and destroyed. Thousands of acres of Strawberries are planted annually, which, from the want of prompt work at the proper time, are allowed to be destroyed by weeds. At a small cost in labor, at the proper time, such crops might have paid a handsome profit.

There is one very important point in Strawberry culture that should never be neglected; and that is, that the beds be entirely covered with hay, straw, or leaves, to the depth of three or four inches. This covering should not be put on, however, before the approach of severe weather, which, in this latitude, is about the middle of December. This covering should not be taken off in spring. It is only necessary to go over the beds as soon as growth begins, and pull the covering back from the plants just sufficient to expose the crown, allowing all to remain on the bed. This covering serves several purposes. It keeps the roots warm until the plants start to grow; it keeps the fruit clean when ripe; it prevents the growth of weeds, and, finally, acts as a mulch to keep the soil from drying in hot weather.

Although Strawberry beds will remain in bearing for a number of years, the fruit is always largest and finest the first season of bearing, gradually getting smaller as the plants get older; hence it is desirable to provide for a succession, if not every year, at least every second year. For

garden culture in this, as in all other fruits, it is unwise to use any but fully tested varieties, five or six of which are sufficient. Here, again, as in almost every other fruit or flower, the advance in excellence compels us to name a different set every few years; so that, of the kinds advised in the last edition of this book written in 1875, not one can be named in 1887; and it may be that in another decade these too will have been superseded by others more desirable.

VARIETIES OF THE STRAWBERRY.

There are hardly two sections of the country, one hundred miles apart, where the same varieties of Strawberries

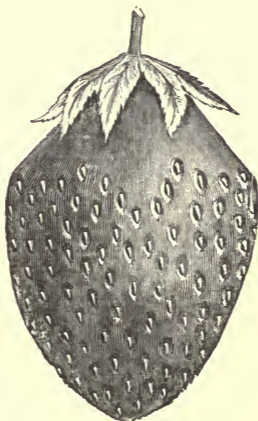


Fig. 84.—THE HENDERSON STRAWBERRY.

are grown. We can only offer those grown in the vicinity of New York as our standard.

The Henderson (figure 84). This new Strawberry originated with Mr. George Seymour, South Norwalk,

Conn., in 1883, who named it in honor of the author of this work. It is doubtful if there is another Strawberry in cultivation having such a combination of good qualities as the Henderson. The fruit is of the largest size, rich, glossy crimson in color, looking as if varnished, early, and exceedingly productive; but its excellent merit is its exquisite flavor and aroma. Whether for family or market use, the Henderson is almost certain to become a standard sort, particularly on light soils. It seems not to be so well adapted to heavy soils.

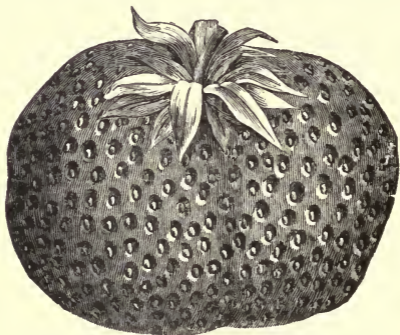


Fig. 85.—CRIMSON CLUSTER STRAWBERRY.

It is a perfect-flowered variety, and, therefore, never fails to set its fruit.

Crimson Cluster (figure 85). On the 10th of June, 1886, I examined this Strawberry on the grounds of the raiser, Mr. E. W. Durand, and found 3,000 plants that had been planted on the 15th of August, 1885, which, in less than ten months from the date of planting, were producing a crop that would average fully a quart to each plant; 3,000 quarts from the 3,000 plants, or at the rate of over 20,000 quarts per acre. The crop was so immense, and the size of the berries so large, that the

pickers, who were paid two cents per quart, averaged twenty-five quarts per hour, or five dollars per day; a fact beyond question, and which could be attested by a dozen affidavits. At the first picking, every yard of row yielded a quart of fruit. When to this extraordinary production we add the further facts, that this Strawberry is of the richest crimson color, borne in immense clusters (hence the name), and that it is one of the *earliest* as well as the *latest*—as its great vigor prolongs its season

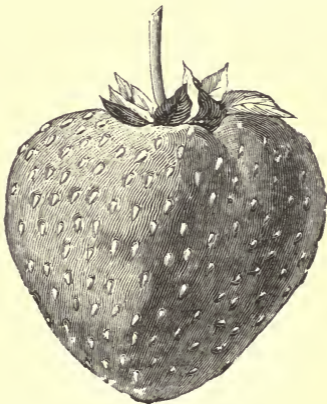


Fig. 83.—JERSEY QUEEN STRAWBERRY.

of fruiting—combined with its excellent quality, there is every reason to think that it is bound to be the most valuable Strawberry ever raised by Mr. Durand.

On the 10th of July, one month after my first examination, seventy quarts of splendid fruit were gathered from the 3,000 plants above referred to; and furthermore, to show that it still kept on fruiting, Mr. Durand sent me a large cluster of berries in all stages of development on the 30th of July; something entirely unknown in a

Strawberry that had already given an immense early crop.

Mr. Durand says that the Crimson Cluster is so completely a pistillate variety that the stamens can hardly be seen, yet, he further says, it may be planted five miles away from any other Strawberry and never fail to produce enormous crops. He adds that he has grown it in frames under glass in early spring, where it could

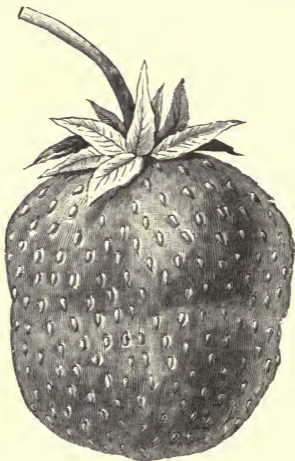


Fig. 87.—SHARPLESS STRAWBERRY.

not possibly be impregnated with any other variety, with the same results—an abundant crop.

He thinks that this fact, to a great extent, upsets the very prevalent notion that perfect stamens and pistils on the same plant are necessary to produce a crop of fruit. Without having personally given the matter much attention, I have long believed, from general observation, that there was more importance given to the necessity for

“perfect flowers,” as they are called, in Strawberries than results warranted. From its free fruiting qualities I am inclined to believe that the *Crimson Cluster* will prove to be a grand forcing Strawberry.

Jersey Queen (figure 86). This variety was sold for the first time in the fall of 1881, and is, perhaps, one of the very best *late* Strawberries thus far introduced. The size is immense, often measuring six inches in circumference. Shape, roundish conical; color, a beautiful

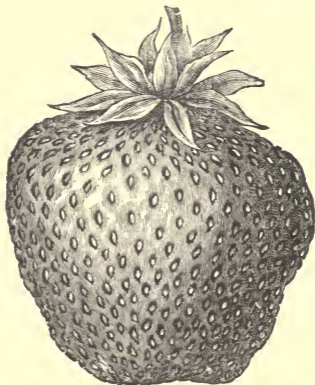


Fig. 88.—THE JEWELL STRAWBERRY.

scarlet crimson; perfectly solid, and of excellent flavor. It is an enormous bearer, many plants averaging a quart of first quality fruit. It is one of the latest Strawberries, the crop in this vicinity being in perfection about the 25th of June, while the average crop of Strawberries is at its best by the 15th of June. For this reason it is found to be one of the best kinds to grow at the summer hotels in the North.

Sharpless (figure 87). With the exception of *Jersey Queen* and *Crimson Cluster*, the largest and one of the

heaviest berries of this collection. It is of fine flavor, a good bearer, and has now become a standard sort.

Parry.—One of the earliest large berries, of great beauty, excellent quality, prolific, and one of the very hardiest and strongest growers.

Jewell (figure 88). A comparatively new variety, originated in 1880. It is of the largest size, perfect form, color bright red changing to crimson, of medium earliness; an enormous cropper, sometimes reaching four hundred bushels per acre.

The Hoffman.—This is now the most popular berry for the Southern States. It is of medium size, average flavor, but a most abundant bearer and strong grower, and, above all, has the requisite solidity or firmness essential for distant carriage.

FORCING STRAWBERRIES.

The three-quarter span greenhouses (already described and illustrated in the chapter on Greenhouse Structures), or the lean-to style, as advised for forcing graperies, are equally adapted, with slight modification, for the forcing of Strawberries. This modification is in having the benches or tables raised, so as to be as near the glass as it is practicable to have them, as shown by the sketch (figure 89) of end section annexed. The proper preparation of the plants for Strawberry forcing is indispensable to success. This is best done by layering the runners in small pots, as described under the head of "Strawberry Culture." The layers may be placed in the pots at any time from the middle of July to September 1st. When the pot is filled with roots (which will be in about two or three weeks from the time the Strawberry runner is placed in it), it is taken up and shifted into a four-inch pot in soil four-fifths turfy loam to one-fifth rotted cow dung, to which may be added a slight sprinkling of pure bone dust—say a handful to every bushel of soil.

When the Strawberry plants have been shifted from the pots in which they were layered into the four-inch size, they should be set in the open sunshine, standing the pots close together, and carefully watered as occasion requires, so as to induce the best possible growth. All runners should be carefully pinched off as they appear, so that the whole force of the roots may go to develop the main plant, or fruiting crown, as it is sometimes called. In four or five weeks the four-inch pots will be

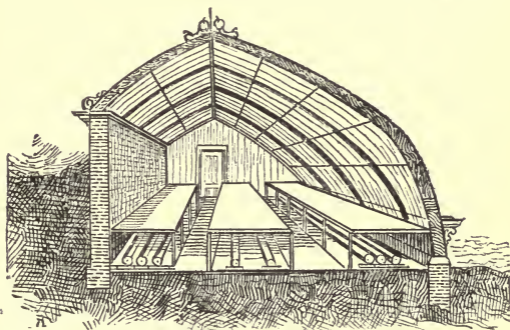


Fig. 89.—STRAWBERRY FORCING HOUSE.

filled with roots, and the plants must again be shifted into six-inch pots and treated as before, which will give, by the middle of October, the necessary strong plants for forcing. As the season of growth stops about this date, water should be withheld to some extent, so that the plants may get a season of rest.

When they are placed in the forcing-house they may either be planted out on the benches at six or eight inches apart, in soil five or six inches deep, or they may be forced in the pots, as may be desired; but, in any case, twice as many plants should be prepared as will fill the

house, for, if desired, two crops can easily be raised in succession. The first plants should be placed in the forcing-house about November 15th. These will produce ripe fruit by January or February. Plants put in in February will be ready by March or April. Of course, it will be necessary to keep the reserve plants of Strawberries in a dormant state, which is best done in cold frames or pits, or even in a light or cold cellar, the pots being plunged up to the rims in dry leaves.

The best rule to follow in forcing any plant is to keep as near as possible to its natural condition. We know that, as the Strawberry plant develops its leaves and flowers throughout May in this latitude in the open ground, the night temperature will average, perhaps, forty degrees for the first two weeks in May and fifty degrees for the last weeks, while for the first two weeks in June it will be about sixty degrees at night, and in all cases from ten to fifteen degrees higher in the day. This, then, is our rule for the forcing houses: Start slowly, increasing the temperature as the plant develops and ripens its fruit, just as Nature does in the field.

Like Cucumbers, artificial impregnation is necessary for the Strawberry in the dull winter months. This is best done by using a camel's hair pencil, twirling it from one flower to another (particularly from the perfect to the pistillate flowers, if such varieties are forced) on clear days, and allowing all possible ventilation. Sometimes hives of bees are kept in Strawberry and Cucumber forcing houses, to assist in the impregnation.

Some judgment is necessary in watering until there are indications of vigorous growth. Water at the roots sparingly; but, at the same time, do not allow the soil to get too dry, and be careful not to water the plants overhead when in bloom, as that will check the impregnation. When the fruit has "set," give water freely whenever necessary, and throughout the whole season of growth

keep the atmosphere of the house well charged with moisture, in order to keep down the Red Spider, the insect which is quickly destructive to both Strawberries and Cucumbers.

The kinds of Strawberries which seem to have been the favorites for forcing are the Champion, a rather dark crimson berry of great beauty and of the largest size, with occasional trials of Jersey Queen, on account of the great size and beauty of the fruit. But the new variety Crimson Cluster, from trials made with it, is likely to prove the most valuable variety for forcing purposes. It is of the largest size, of beautiful form; color, a rich shade of scarlet crimson, the surface looking as if varnished. These peculiarities make it specially attractive, a necessity for forced Strawberries when retailed at about fifty cents a berry; for in the winter months, it must be remembered, they sell at wholesale at six dollars per quart, and it takes only eighteen to twenty large berries to make a quart.

To our rural readers this extraordinary price paid for fruit may seem incredible; but all large cities contain people who are rich enough to afford these prices, not only for fruits, but for flowers, for it is no unusual thing for one dollar and even two dollars to be paid for single rosebuds of the rarer or finer sorts. At the same date that forced Strawberries are selling in New York at six dollars per quart, or forced Cucumbers at six dollars per dozen, both Strawberries and Cucumbers grown in the Southern States are selling at one-sixth these prices; but the quality, of course, bears no comparison with the forced commodities. Besides its value as a fruit, as a beautiful feature in the forcing house nothing exceeds the Strawberry when fully ripe. A few dozen plants will fill the house with their delightful aroma.

RASPBERRY.

To have the Raspberry in perfection, the same preparation of soil is necessary as for the Strawberry, only that, while, for the best results, the Strawberry bed must be perfectly clear of shade, the Raspberries will do very well in a little shade; that is, in such a situation as will allow them one half or so of the sunlight. The canes or shoots of the Raspberry are biennial; that is, the cane or shoot that is formed one season bears fruit the next season, and dies off after fruiting, giving place to the young cane that is to fruit the following season, and so on. The distances apart to plant the Raspberry for garden culture may be, if in rows, four feet apart, with the plants two feet apart in the row; or, if in separate stools or hills, they may be set three feet each way; or, planted at distances of four feet apart, three plants may be put in each "hill," which will sooner secure a crop. They may be set either in fall or in spring. If in the fall, a covering of four or five inches of dry leaves or litter should be spread over the roots to prevent them from getting too much frozen. Even when the plants are established and growing, it is necessary, in many cold sections, to bend down the canes and cover them with pine branches or some covering that will shield them from severe freezing. On a large scale the canes are bent down and covered with a few inches of earth, an operation that may be rapidly performed by two persons. One bends down the canes (using a pitchfork or other implement), as shown in the accompanying diagram (figure 90), while the other throws sufficient earth near the tips to hold the canes in place. After a row is thus bent over, the two go back and cover with earth more completely.

All the pruning that is necessary for the Raspberry is to thin out the shoots in each hill to four or six. This is best done in the summer after the fruit is gathered,

and at the same time the old canes that have borne the fruit should be cut out, so that the young shoots, coming forward to do duty next season, may have room to



Fig. 90.—LAYING DOWN RASPBERRY CANES.

grow freely, and develop and ripen the wood. On rich soils these shoots are very vigorous, and, if left to grow unchecked, would reach seven to eight feet in height; but it is best to pinch out the tops of the young shoots when

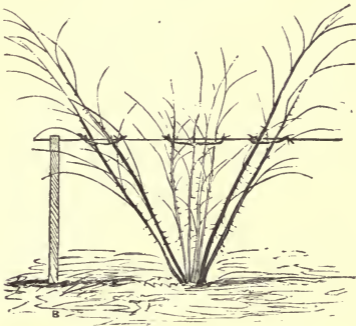


Fig. 91.—TRAINING RASPBERRIES TO A WIRE.

about six feet high. This makes the shoots stouter, besides keeping the plant at a convenient height to pick the fruit. When the leaves drop in fall, the canes may be

shortened down a foot or so, which will complete the pruning process.

To get the full benefit of all the fruit, it is very necessary to stake the Raspberry. This may be done either by



Fig. 92. — HANSELL RASPBERRY.

tying the canes of each plant separately to a stout stake, driven two feet or so into the ground, or, if grown in rows, they may be tied to wires running along the rows. The

wires should be stretched between two stout posts, one at each end of the row, and three feet, more or less, above the ground, according to variety. To prevent the wire from sagging, stakes should be driven into the ground directly under it, at intervals of six or ten feet. The wire is attached to these by means of staples placed over it and driven into the ends of the stakes. The diagram (figure 91) shows the method of training to the wire. The longer canes at the right and left are the canes which are to fruit the current year. These are tied out as there shown, while the new shoots, which are to furnish canes for the next year's fruiting, grow up in the center, and as soon as tall enough are tied to the wire. After the outer canes have fruited, they are cut away to give the others more room.

The varieties are very numerous. Those named below are such as will be most satisfactory for private use in this section of the country. From one hundred to two hundred hills or plants, of all varieties, will usually be sufficient for most families.

Hansell.—One of the earliest of all the Red Raspberries. It is of large size, beautiful in appearance, and has a rich, spicy flavor. Color a bright crimson. It is one of the hardiest varieties, and has for the past five years been considered one of the best for either family or market use. (Figure 92.)

Cuthbert.—Somewhat larger than the *Hansell*. Color dark crimson; flavor sprightly and delicious. Comes in in succession to the *Hansell*.

Golden Queen.—Found growing in a field of the *Cuthbert* Raspberry, and is, in all probability, a "sport," as it is technically called, from that variety. The berry is of the largest size. The color is a deep orange yellow, and, like all the yellow kinds, is richer in flavor than

the reds, and far surpassing them in our opinion. Besides, the rich orange yellow color makes it a beautiful



Fig. 93.—GOLDEN QUEEN RASPBERRY.

table ornament when placed alongside of the red and black varieties. (Figure 93.)

THIMBLEBERRY OR BLACK CAP RASPBERRIES

Have become very popular of late years, many persons preferring their peculiar flavor to that of the red or yellow. They belong to a distinct species of Raspberry. The plants make no suckers, but propagate themselves by taking root at the ends of the long branches, which in the fall, if allowed to grow at will, bend over and reach the earth. They throw up shoots from the base of the plant, which take the place of those which have already borne a crop. In gardens, where there is no desire to



Fig. 94.—GREGG THIMBLEBERRY.

propagate the plants, the growing shoots should be pinched off when they get three or four feet high, and any side shoots they may throw off are stopped by pinching when they are about eighteen inches long. The bearing wood is thinned out after the fruit is off. They are of the easiest culture, and even on light sandy or gravelly soils good crops can be raised. They should be planted about four feet apart each way, or five feet between

rows and two feet between the plants, for garden culture. The Black Cap is the only Raspberry suitable for drying, and for that purpose it is now largely grown.

Gregg.—This is now grown to nearly the exclusion of all other kinds of Black Caps. It is of the largest size, excellent flavor, and enormously productive. The cut (figure 94) shows a few berries of natural size.

Erhart Everbearing.—This is also an excellent variety, nearly equal to the Gregg, with the property of bearing three crops during the season, the last crop being late in the fall.

BLACKBERRY.

The cultivation of the Blackberry is nearly similar to that of the Raspberry, except that it should be planted about one-third farther apart, and being hardier, there is no need for covering it in winter in this latitude. As it has a more vigorous growth, it is sometimes set in any out-of-the-way corner, and in almost any soil; but it will amply repay generous cultivation with finer fruit. The manner of growth is the same as the Raspberry; and when the fruit is picked, the old canes are to be cut out to give the new ones a chance. The new shoots grow vigorously, and when they reach the height of five, or, at most, six feet, they should be stopped by pinching. This will cause an abundance of side shoots to start, which are to be pinched when about eighteen inches long. This treatment increases the productiveness of the plants and keeps the fruit within reach. The bushes should be kept tied to stout stakes or wires, as advised for the Raspberry.

The following are a few of the popular kinds:

Early Harvest.—This is not only a first-class Blackberry in every respect, but its great merit is earliness, coming right in to succeed the Strawberries, beginning in this section to ripen the first week in July, and per-

fecting its entire crop before other kinds have ripened. It is enormously productive, a quart of fine fruit being easily picked from a single shoot. (Figure 95.)

Fig. 95.—EARLY HARVEST BLACKBERRY.



Wilson, Jr..—This comparatively new variety combines all the good qualities of the old Wilson Blackberry, and exceeds it in being of a more vigorous and healthy growth, and, like the Early Harvest, produces immense



Fig. 96.—THE WILSON, JUNIOR, BLACKBERRY.

quantities of fruit of the finest quality. As will be seen by the illustration (figure 96), the fruit is of the largest size. Color, deep glossy black.

Wachusetts Thornless.—A strong growing variety, almost destitute of spines, which makes it, for that reason, much prized for the private garden. It is a late variety, beginning to ripen in midsummer, and continuing for a long time in bearing. Of unsurpassed flavor.

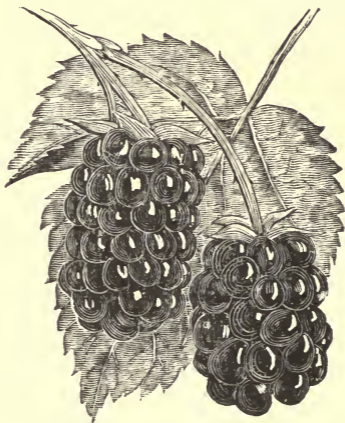


Fig. 97.—LUCRETIA DEWBERRY.

Lucretia.—This belongs to the class of Blackberries known as Dewberries. They are of trailing habit, doing nicely along the foot of old walls or waste places, creeping in the grass. Of course, if given garden culture, which might be similar to that for Strawberries, the fruit will be finer. It is an interesting variety, and well worthy of a place in every garden. (Figure 97.)

Crystal White.—This seems, as Mr. Lovett says, “a veritable albino,” a white Blackberry, a novelty as rare as a white crow or a white blackbird among birds. It is of clear, translucent white, very sweet and pleasant in flavor. Well worthy, from its novelty, of a place in the fruit garden. It is less hardy than the black kinds, requiring the same protection as raspberries (fig. 98).



Fig. 98.—CRYSTAL WHITE.

CURRENTS.

The Currant is useful both for dessert and for preserving purposes. An immense weight of fruit is obtained for the space it occupies, and the ease of its culture makes it common in every garden. The red and white varieties may be planted three or four feet apart each way, the black at four or five feet apart. Pruning is done in the fall by cutting off about a third of the young growth of the previous summer, and thinning out old shoots when the plants get too thick. All are trained in low bush form, the whites and reds usually from three to four feet high and wide, and the black four to six feet. They can also be grown trained against fences or walls like grape vines, and will, in such positions, attain eight or ten feet in height in five or six years from the time of planting, if the soil is deep and rich. Grown in this way, if care is taken in training, the fruit is larger, and when ripe, particularly if the black, white, and red varieties are placed in contrast, they form very attractive ornaments for the garden. In many places, where the area for garden operations is limited, they can easily be trained against the fences.

An insect known as the currant worm is often very de-



Fig. 99.—FAY'S PROLIFIC.

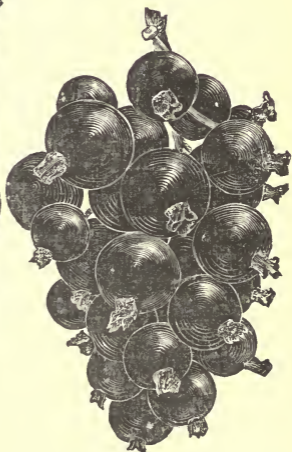


Fig. 100.—BLACK CHAMPION.

destructive. On its first appearance, if confined to a few leaves, these should be cut off, shoot and all, and destroyed. If they threaten to be troublesome, powdered White Hellebore or Persian Insect Powder, either dusted on or mixed four ounces to a pailful of water and applied with a syringe, will destroy them at once. Of course these poisonous remedies can only be used before the fruit is ripe.

Fay's Prolific.—Color reddish amber; berries and bunch large; flavor excellent. An abundant bearer, and a most beautiful and desirable fruit for dessert. (Figure 99.)

Black Naples.—This is the favorite black variety, and is used almost exclusively for jams and jellies. The black varieties are much less grown here than in Europe, but the taste for them is increasing.

Black Champion.—An improved variety of Black Currant, with dense clusters, very prolific, and decidedly superior in flavor to the preceding. The bunches, however, are hardly so large. (Figure 100.)

White Grape.—Berries large, of a yellowish-white color. The flavor of this variety is less acid than any other. Excellent for dessert.

Cherry.—Berries larger than that of any other sort, but too acid for most tastes, and only suitable for jelly.

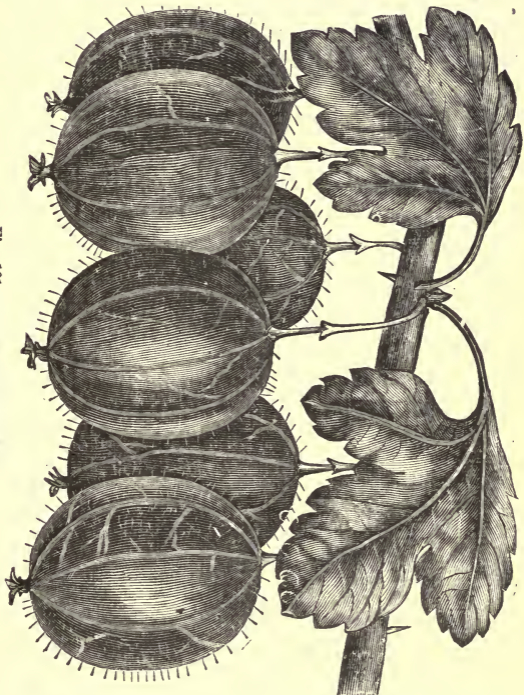
GOOSEBERRY.

The Gooseberry is a fruit better suited for the climate of Great Britain than for ours, and it is rarely seen here in the perfection it attains there. It ripens just when our hottest weather occurs, forcing it unnaturally to maturity, and hence the absence of the size and flavor it attains when ripened at a lower temperature. The native varieties, though far inferior in size and quality, are usually more free from mildew, and are therefore most desirable for cultivation here, as the fruit with us is more used in the green than in the ripe state. Goose-

berries are planted from three to four feet apart, and are treated in all other respects like Currant bushes.

Industry.—A European variety that proves admirably

Fig. 101.—INDUSTRY GOOSEBERRY.



adapted to our climate. It is comparatively new. In size and flavor it is equal to many of the finest English sorts. Color a dark red. The cut (figure 101) is an excellent representation of its average size.

Downing.—A native variety of medium size, greenish-white when ripe, and of excellent quality.

Houghton's Seedling.—Also a native variety. Size medium, color red, flavor average.

Of the foreign varieties among *Reds* may be named as leading sorts, Warrington, Champion, Waterloo; of *Greens*, Green Globe, Melville, Green Gage; of *Yellows*, Sulphur, Champagne, Golden Drop; of *Whites*, Crystal, Whitesmith, Dutch.

There are a number of English and Scotch mechanics employed at the mills in Paterson, N. J., who make a specialty of growing English Gooseberries in their cottage gardens, and hold yearly exhibitions for prizes for the best specimens. By the following method they have attained nearly as good success as is met with in England. The soil (which is naturally a good strong loam, and one foot or more in depth) is trenched to a depth of fifteen or eighteen inches, and mixed with the subsoil, which is partly sand and partly clay. Through this soil is incorporated three inches of well-rotted cow dung. The Gooseberry plants, which are all imported from England, are planted about three and a half feet each way; and as soon as the hot and dry weather begins (usually about the middle of June), a heavy mulching, three or four inches deep, of well-rotted horse or cow dung is spread over the whole surface. This keeps the roots cool and moist, the necessary conditions for the perfection of this fruit.

FIGS.

The Fig, on account of not being hardy in the Northern States, is but little cultivated, unless in tubs, which are placed in cellars or sheds to protect them during the winter months, or occasionally on the back wall of lean-to graperies; but in all parts of the country where the

thermometer does not get lower than twenty degrees above zero, they can be grown freely in the open air without protection. It is hardly ever necessary to prune the Fig, except to regulate its shape by cutting back any extra strong shoots. In sections of the country such as Maryland, West Virginia, or Delaware, where it may require slight protection when grown in the open air, it should be planted against a wall or fence, and trained against it. On the approach of cold weather it should be laid down and covered as recommended for hardy grapes. When grown in tubs to be kept in cellars, sheds, or greenhouse pits, they should be placed under cover in this latitude early in November, kept as dry as possible without shrivelling, and set out in the open air again in May. The soil and general treatment for plants grown in the open air in pots or tubs will be suitable for them. There are numerous sorts in cultivation, from which we select the following :

White Genoa.—Large, roundish, yellow skin ; flesh reddish pink, excellent flavor.

Brown Turkey.—Pear shaped, average size, brown skin ; flesh red, rich flavor.

Early Violet.—Skin brownish-red ; flesh reddish-crimson, delicious flavor ; fruit rather small. One of the hardiest.

Brown Ischia.—Size large, skin yellowish-brown ; flesh violet, sweet and luscious. Very prolific.

QUINCE.

A few Quince trees should be planted in every garden where there is any pretension to a collection of fruits. It is a tree requiring but little attention, and for that reason is often neglected, and very unsightly specimens are seen. The tree is very ornamental in flower and fruit ; and by

a little attention to pruning, a handsome head may be formed, though equally luxuriant crops are seen on trees that have been untouched for years. They may be planted eight or ten feet apart. The following varieties are in most general use.

Apple-shaped or Orange.—A large round variety, bright golden-yellow.

Pear-shaped.—Color greenish-yellow, and its shape being more pear-like, readily distinguishes it from the other and better variety.

Rea's Seedling.—This variety is the largest and finest of all.

CHERRY.

The Cherry-tree begins to bear usually in two or three years after planting trees of the size sold at the nurseries, and continues to enlarge in growth and productiveness annually, until it often attains a larger size than most of our fruit-trees. The Cherry grows freely in almost any soil that is free from moisture, preferring, however, like most other fruits, a deep loamy soil. The tree may be trained as desired, either in pyramidal form or with a round top, by pruning and directing the shoots. The distance apart may be ten or twelve feet. Varieties:

Black Tartarian.—Deep purplish-black, very large; fine solid flesh. Season last of June. This variety has been in cultivation for over fifty years, and yet stands unequalled in quality. (Figure 102.)

Rockport.—Very large, amber-yellow, dotted red; flesh firm, sweet, and excellent. Ripens in June.

Coe's Transparent.—Color pale amber-yellow, spotted with pink; flesh tender, sweet, and of fine flavor. Ripens middle of June.

May Duke.—Color dark red, size medium, quality excellent. Ripens early in June.

Morello.—A sub-acid variety of medium size, color bright red, changing to darker color when fully ripe.

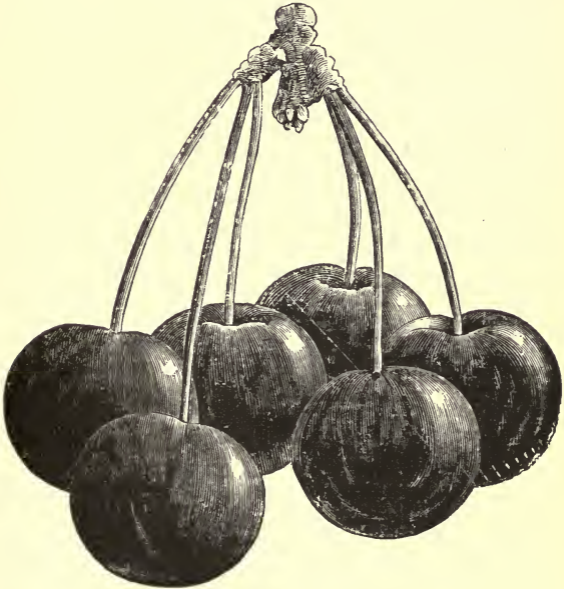


Fig. 102.—BLACK TARTARIAN CHERRY.

Hangs long on the tree, and is mainly used for pies and preserving.

PLUM.

The cultivation of the Plum is rendered nearly useless in most places by the attacks of the *Curculio*, or Plum Weevil. An almost certain remedy is to use a teaspoonful of London Purple or Paris Green to six gallons of

water, syringed on the trees every other day for fifteen days, beginning the operation as the flower begins to drop, as it is just when the fruit is forming that the insect deposits its egg. No danger need be apprehended from the small quantity of the poison used, as it will be all washed from the fruit long before it ripens. Another remedy, which will effectually save a crop in the districts infested by this insect, is to jar the tree in the morning or in cool days, first spreading sheets under the trees to catch the weevils, after which they may be burned. If this is begun as soon as the Plums are formed, and persisted in every few days until they are ripe, a large share of the crop may be saved. This may be thought to be paying rather dear for a crop of Plums, but it is really the only way it can be secured. Many years ago the crop of a Plum orchard under my charge, numbering over a hundred large trees, was saved by this process, while all other Plums in the district, where the jarring of the trees was not resorted to, were completely destroyed. This plan was recommended nearly half a century ago, and no other practicable method has been presented until the recent use of Paris Green, applied as already described. It has been recommended by some to plant the trees on the bank of a pond or running stream, and train them to overhang the water; also to pave or cement around the roots, so that the insect cannot burrow; but these plans would be often impossible, and are practically useless in general culture. Trees upon stiff, clayey soils are more exempt from the ravages of the Curculio than those upon light ones, probably for the reason that the insect in the grub or larvæ state cannot penetrate them so readily, as they must enter the ground to become perfect insects. The average distance at which the Plum may be planted is from ten to twelve feet. The following are distinct and fine sorts.

Smith's Orleans.—Color purple, with a rich blue

bloom ; size medium ; flesh deep yellow ; flavor of first quality ; clingstone. Ripens in August.

Washington.—Color yellow, marbled with red next the sun ; large size ; flesh firm, sweet, and rich ; freestone. Ripens first of September.

Green Gage.—A well-known variety, rather small in size, but of exquisite flavor. Color greenish-yellow, spotted with red on the sunny side ; freestone. Ripens early in August.

Imperial Gage.—Of large size, and similar in flavor to the Green Gage. Color yellowish-green.

Columbia.—Of the largest size ; color brownish-purple ; flesh yellow, sweet, and finely flavored ; freestone. Ripens the last of August.

Coe's Golden Drop.—A very old and well-known sort. Color golden yellow with red spots next the sun ; large, oval ; rich, sweet, yellow fleshed. Ripens the middle of September.

Magnum Bonum.—Yellowish white, egg-shaped, of large size and having a rich spicy flavor.

JAPANESE PERSIMMON.

An entirely distinct species from the American Persimmon, and is likely to become a valuable addition to fruits in the Southern States, but the Southern States only, as repeated trials have shown that it is not likely to prove hardy in any part of the country where the thermometer falls lower than fifteen degrees above zero. It has already been grown, to some extent, in Florida and California, and the fruit from Florida is now finding its way into our Northern markets, and at this time brings the very high price of twenty-five cents each, while oranges from the same section hardly bring one-sixth of that price.

The culture is very similar to that for the Orange, except that the Japan Persimmon, like its American relative, is deciduous; that is, it drops its leaves in the winter months. The fruit in taste is somewhat between a Fig and an Apricot, and when fully ripe is delicious. It has been long grown in Japan, where the varieties are quite as numerous as Plums are with us. In size and coloring some kinds resemble a red tomato,



Fig. 103.—JAPAN PERSIMMON (*From a Photograph*).

though there is a great difference in the various kinds, both in shape and color. Figure 103 shows a variety of medium size.

PEACH.

The Peach prefers the light, dry, and warm soils known as sandy loams. The tree is short-lived in most sections, and attains its best fruiting condition usually when from five to nine years old. The tree is greatly benefited by pruning. The growth of the previous sea-

son should be shortened about one-third. This, if annually followed from the time the trees are set, will give them compact heads instead of open, straggling ones, the branches of which will break down with the first full crop of fruit. In the Peach-growing districts the cultivators do not expect more than three crops in five years; and if they get two full crops in that time they are content, and amateurs should expect no more. When a crop sets at all there is usually more fruit than the tree can carry and ripen. No fruit needs severe thinning more than the Peach. In bearing seasons half or two-thirds of the Peaches which set may be removed with benefit to the rest. The fruit should be removed when about the size of hazel nuts. When a tree appears sickly with yellow foliage, dig it up at once. The distance the trees should be set apart may be from ten to twelve feet. Among the favorite varieties for garden culture may be named the following:

Hale's Early.—A very early Peach, of fair size and great beauty, but has the fault that it in some localities rots just as it begins to ripen, a difficulty probably due to overbearing rather than to locality. Freestone, excellent.

Columbia.—Large, round, color yellow and red, streaked with dark crimson; flesh yellow, rich, and juicy; flavor excellent. Freestone; ripens in September.

Crawford's Early.—Large, roundish, color yellow, tinged with red; flesh yellow, rich, and sweet. Ripens last of August; freestone.

Crawford's Late.—Similar in appearance, but ripening three weeks later.

Cooledge's Favorite.—Size medium, roundish oval, color clear white with crimson cheek; flesh rich, juicy, and of first quality. Ripens in August; freestone.

Honest John, or Early York.—Large, roundish, white

with red cheek ; flesh white, very juicy, excellent flavor. Ripens the middle of August ; freestone.

Morris White.—A well-known variety, size medium, color greenish-white, flavor average. The variety mostly used for preserving. Ripens the middle of September ; freestone.

Red Cheek Melocoton.—Fruit large, yellow, with dark red cheek ; flesh orange-yellow, flavor excellent. Ripens the middle of September ; freestone.

NECTARINES.

Nectarines are only smooth-skinned Peaches, requiring in all respects similar treatment to the Peach. They are but little grown in this country, as they are even more liable than the Plum itself to injury by the attacks of the Plum Curculio. The same treatment recommended for its destruction in Plums must be applied to the Nectarine. There is a peculiarity in the flavor of some varieties of Nectarines differing from that of any of the Peaches, and by some they are greatly preferred to any Peach in flavor. The varieties are not numerous.

Early Newington.—Large, roundish oval, greenish-yellow, mottled red ; flesh yellowish-white. Ripens in September ; cling.

Hunt's Tawny.—Large, round, amber-yellow with red cheek ; flesh orange, melting, flavor excellent. Ripens in August ; freestone.

Boston.—Large, oval, yellow, with mottled crimson cheek ; flesh yellow, quality excellent. Ripens in September ; freestone.

APRICOT.

The Apricot is closely related to the Plum, but belongs to another species. It is a delicious fruit, and in cold latitudes succeeds best grown against a fence or the side

of a house. The blighting Curculio attacks the Apricot also, and its culture can only be successful by combating the difficulties that attend that of the Plum, unless in special locations that seem few and far between. It is now grown to a large extent in California, where it is preserved by canning in immense quantities. The following are good varieties :

Moorpark.—Size large as an average Peach, yellow with red cheek ; flesh orange, sweet, and of exquisite flavor. Ripens in July.

Orange.—Pale yellow with red cheek, size medium. Ripens end of July.

Turkey.—Large, deep yellow, shaded orange ; flesh pale yellow, firm, rich, and sweet. Ripens in August.

APPLE.

The Apple can only be grown in small gardens as a dwarf, either kept in a bush form or trained as a pyramid or other shape. The dwarf trees are made so by grafting on dwarfing stocks, while the varieties are the same as those found in the large trees of the orchard. Two sorts of dwarfing stocks are used by nurserymen, the Doucin and the Paradise. Trees upon the Doucin will ultimately grow quite large ; and as the Paradise is the only stock which makes really dwarf trees, the amateur who wishes to grow dwarf apple-trees should make sure that they are worked on Paradise stocks. Of course, trees of this kind are not advised as a source of profit ; but there can scarcely be a handsomer object in the garden than a bush six feet high, and about the same through, loaded with enormous apples. Dwarf apple-trees may be planted six feet apart each way, while ordinary trees in the orchard are given fifteen to thirty feet, or even forty feet. The following sorts are recommended for garden culture.

(For descriptions, see nursery catalogues.) Baldwin, Gravenstein, Rhode Island Greening, King of Tompkins

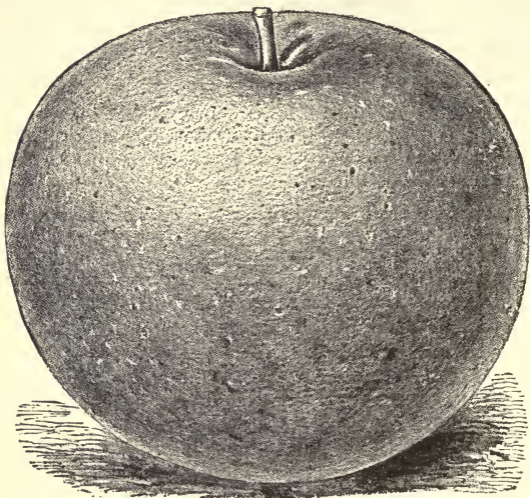


Fig. 104.—FALL PIPPIN APPLE.

County, Maiden's Blush, Esopus Spitzenberg, Early Harvest, Northern Spy, Porter, and Fall Pippin (figure 104).

PEARS.

Like Apples, Pears are grown as dwarfs and standards; the former being planted from eight to ten feet apart, the latter from ten to fifteen feet. The dwarfs, budded on the quince stock, are mostly used for garden culture, as, from their habit, they are more suitable, besides having the invaluable quality of coming quicker into bearing. Time was when the adage went, "He that plants Pears,

plants for his heirs;" but this is now no more applicable to the Pear than to the Peach; for we can have fine crops of Pears budded on the Quince in three to five years from the time of planting. The trees may be grown as pyramids (as in figure 105), or in the bush form; or, in small gardens, Pear, Peach, and other trees can be suc-

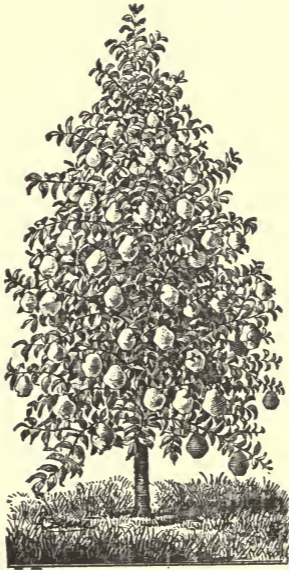


Fig. 105.—KEIFFER PEAR.

cessfully trained in what is called the oblique cordon, which allows a number of varieties to be grown in a small space. Only a general outline of the method can be given here, referring for fuller details to Barry's and

other works on fruit culture. A trellis is built about eight feet high, by nailing a strong top and bottom rail to posts, which should be about eight feet apart. Slats of inch stuff are put on between the two rails at an angle of thirty degrees. These are fastened on with screws, as, when the trees have reached the top, the slats are to be brought down to forty-five degrees; and they should be long enough to allow for doing this. Young trees are set in an inclined position in a line with these slats, which are three feet apart. Each tree is cut back to a few buds, and one shoot allowed to grow from the

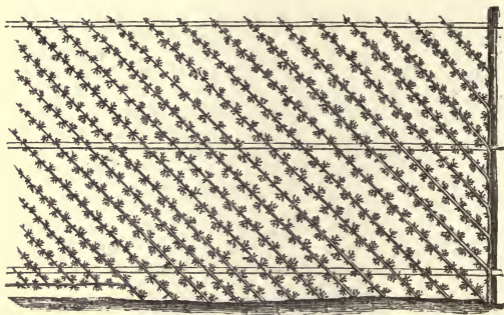


Fig. 106.—CORDON-TRAINING OF PEAR TREES.

strongest bud, all the others being removed. This shoot, as it grows, is kept tied to the slat, and when it throws out side shoots, as it soon will, they are pinched back to three or four leaves, whenever the shoot is sufficiently developed to allow the number of the leaves to be seen. By growing in this inclined position, and by pinching every shoot back to three or four leaves, the tree is dwarfed and made to bear early, and, when properly managed, forms a perfect cordon or garland, with fruit

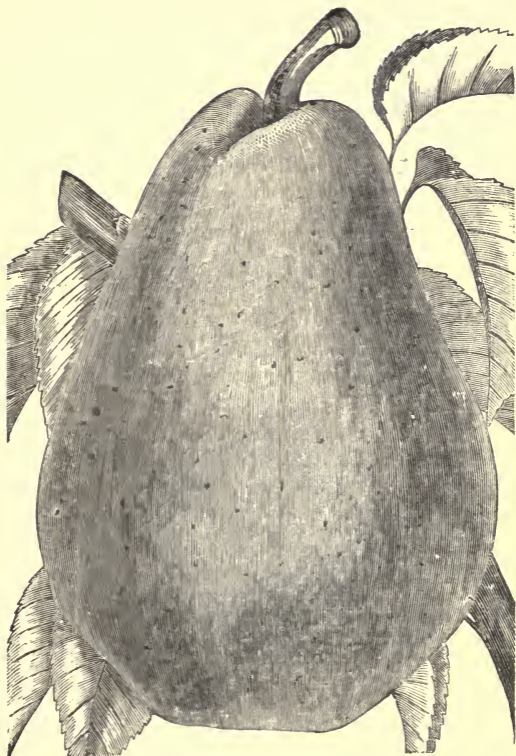


Fig. 107.—BARTLETT PEAR.

along its whole length. Figure 106 shows a portion of a trellis of this kind.

The following varieties are recommended for either kind of training. (For descriptions, see nursery catalogues.) Beurré d'Anjou, Seckel, Beurré Bosc, Sheldon, Summer Doyenné, Winter Nelis, Duchesse d'Angoulême, Doyenné Boussock, Lawrence, Howell, Belle Lucrative, Louise Bonne de Jersey, and Bartlett (figure 107). Beurré Bosc, Sheldon, and Winter Nelis on Quince stock should be double worked.



VEGETABLE GARDEN.



CHAPTER XLV.

COTTAGE GARDENING—A DIGRESSION.

BEFORE taking up the subject of vegetable culture, I will relate an incident connected with cottage gardening that may interest, if it does not benefit, some of those into whose hands this book may fall. About twenty years ago I had the pleasure of making the acquaintance of a gentleman whose duties compelled him to be at his desk in a close office in the city of New York, from nine o'clock A.M. to four P.M. Being naturally of a weak constitution, his sedentary life soon made him the victim of dyspepsy to such a degree that he felt that he must soon resign his situation. He was then a man of forty, entirely ignorant of anything pertaining to country life, and it was with great misgivings and reluctance that, by the advice of his physician, he changed his home from a closely built part of New York to a cottage in the then country-like suburb of Jersey City Heights, N. J. His means enabled him to purchase a modest cottage built on a lot fifty by one hundred and fifty feet. He did not want the land, he said, but the cottage was such as he fancied, and the ground had to go with it. It was about this time that I formed his acquaintance, through some business transaction, and he asked my professional advice as to what he could do with his land, which he had already begun to consider somewhat of an encumbrance. I replied to him that, if I was not greatly mistaken, in his little plot of ground lay a cure for all his bodily ills, and that, besides, it could add to the comforts if not the luxuries of his table if he would only work it. "I work it!" he exclaimed. "You don't suppose that these hands could dig or delve," holding up his thin and bloodless fingers; "and if they could, I know nothing about gardening."

I told him I thought neither objection insurmountable, if he once began.

The result of our conversation was, that he resolved to try, and try he did to a purpose. Our interview was in March, and before the end of April he had his lot all nicely dug over, the labor being done by his own hands during an hour and a half each morning. His custom was to get up at six o'clock, and work at his garden until half past seven. This gave him ample time to dress, get breakfast, and be at his desk in the city by nine. The labor of merely digging was (to him) heavy and rather monotonous; but he stuck to it bravely, and when he again presented himself before me for plants and seeds, and information as to what to do with them, it was with some pride that I saw my prescription had worked so well, for my friend then looked more like a farmer than a pallid clerk. The regulating of his little garden was a simple matter, and was done according to the following diagram :

Cauliflower, Cabbage, and Lettuce.	Strawberries.
Cucumbers, Onions, and Parsley.	Raspherries.
Beets, Carrots, and Parsnips.	Tomatoes.
Peas and Bush Beans.	Asparagus and Rhubarb.

During his first season, of course, he made some blunders and some failures, but his interest in the work increased year by year. His family was supplied with an abundance of all the fresh vegetables and fruits his limited space could admit of being grown; a supply that it would have taken at least one hundred and fifty dollars to purchase at retail, and stale at that. But the benefit derived from the cultivation of this cottage garden was

health—strong, rugged health—that, for the six years he was my neighbor, never once failed him.

I know this case is an extremely exceptional one, for I never knew another man who so resolutely worked himself into health. There are hundreds of business men, book-keepers, salesmen, clerks, and the like, who live in the suburbs of all great cities, many of whom can ill afford to pay for the keeping of the plots surrounding their cottages, but who think they can far less afford to do the work themselves. As a consequence, in nine cases out of ten, the rear, at least, of their suburban plots is a wilderness of weeds. But this is not the least of the evils. The owner has a certain amount of muscular force, and this, be it more or less, being unused, its possessor pays the penalty of his laziness in dyspepsy and a host of other ills. The proofs are apparent everywhere that garden operations are conducive to health and longevity. The work is not unduly laborious, and when fairly entered into has a never-failing interest. The growing and the watching of the great variety of plants give a healthy tone to the mind, while the physical labor demanded by cultivation takes care of the body.



CHAPTER XLVI.

THE VEGETABLE GARDEN.

It is perhaps best that the space allotted to vegetables should be at one side of the garden, and that for fruits at the other, at least in the beginning, though a rotation of crops or change of position may be advantageous in course of time. Figure 108 gives a convenient plan for the Fruit and Vegetable Garden. I will give in brief the

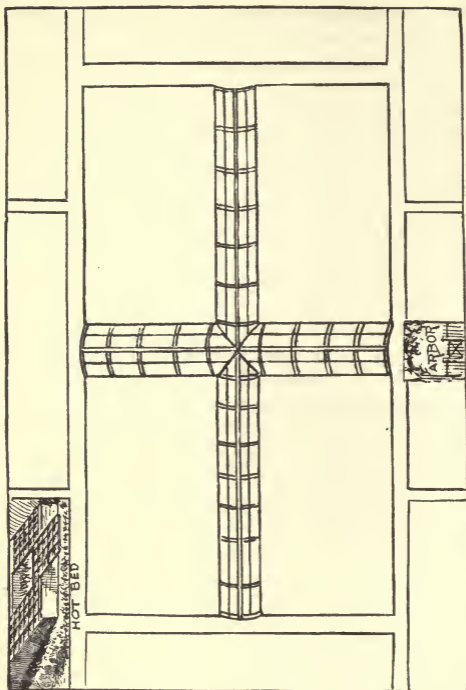


Fig. 108.—PLAN FOR FRUIT AND VEGETABLE GARDEN.

culture of each vegetable in general use, placing them alphabetically for easy reference, and enumerate the leading varieties.

ASPARAGUS (*Asparagus officinalis*).

Asparagus should be planted the first spring that the owner comes into possession of the land. In the latitude of New York any time from April 1st to May

15th ; and if the house is yet to be built, let the *Asparagus* bed be planted at once, as it takes the roots two or three years to acquire sufficient strength to give a crop. For an ordinary family a bed of six rows of fifty or sixty feet in length, and three feet apart, will be sufficient, the plants in the rows being set nine inches apart. In planting it is customary to use two-year-old plants ; but it often happens that as large a plant is raised from seed in good soil in one year as in a

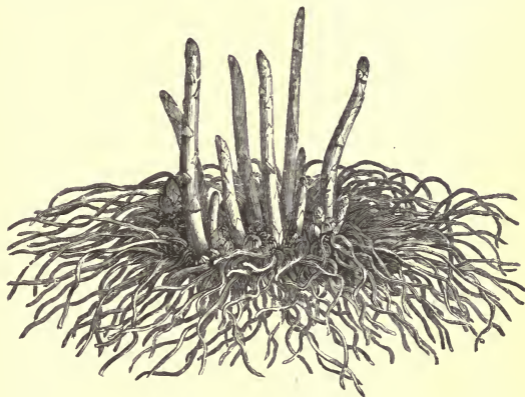


Fig. 109.—*ASPARAGUS*.

poorer soil in two years. In such cases the one-year-old plant is preferable.

The preparation of the *Asparagus* bed should be made with more care than for most vegetables, from the fact that it is a permanent crop, which ought to yield as well at the end of twenty-five as of five years, if the soil has been well prepared. The *Asparagus* bed, to start with, should be on ground thoroughly drained, either naturally or artificially, and if choice can be had, on a rather light,

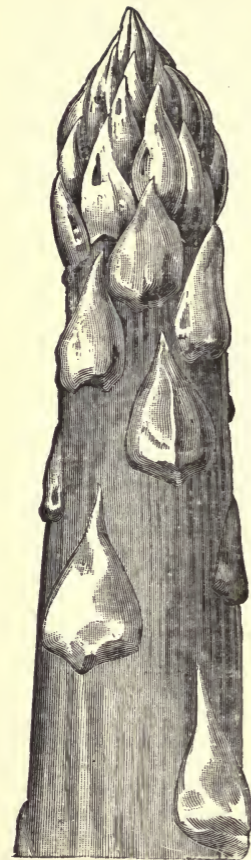


Fig. 110.—PALMETTO ASPARAGUS.

sandy loam. This should be trenched and mixed with sufficient manure to form a coating at least six inches thick over the bed. This manure should be worked into the soil by trenching to the depth of two feet, as the roots of the plant will reach quite that depth in a few years. In setting, the crowns of the plants should be placed at least three inches below the surface. Asparagus may be planted either in the spring or the fall. If in the spring, it should be done as early as the ground is dry enough to work; and if in the fall, just as soon as the plants can be had, which is usually in the early part of October. We prefer fall planting on light, well-drained soils, for the reason that, if it is done then, young roots are formed which are ready to grow on the approach of spring; but if the planting is done in March, April, or May, this formation of new roots has to take place then and causes a corresponding delay in growth. Plants are sold by market gardeners and seedsmen; and as it will save a year or two to pur-

chase them, it is not worth while to raise them from seed in a private garden.

The edible portion is the undeveloped stems, which, if cut away as soon as they appear, are followed by others, which start from the crown of the plant. The cutting, if continued too long, would finally exhaust the root; hence it is customary to stop cutting as soon as early peas become plenty, and allow the remaining shoots to grow during the rest of the season, and thus accumulate sufficient strength in the plant to allow it to produce another crop of shoots the next season. The engraving (figure 109) represents a strong plant with the earth removed from the roots. The shoots are shown in different stages of development, and it will be seen how readily careless cutting may injure the buds which are ready to produce a succession of shoots.

The surface of the *Asparagus* bed should have a top-dressing of three or four inches of rough stable manure every fall (November), which should be lightly forked into the bed in the spring. The variety mostly grown is the Colossal, although the new French variety, known as the Palmetto (figure 110), is likely to supersede it, its merit being that the shoots grow more uniformly large than the Colossal.

In some localities *Asparagus* is attacked by an insect called the *Asparagus Beetle*. The best method of getting rid of this pest, that we have found, is to coop up a hen, and let the chickens eat the insects and their eggs.

ARTICHOKE, GLOBE (*Cynara Scolymus*).

The portion used of this plant is the undeveloped flower cluster, or the portion which is known as the scales of the involucre. They are boiled and served with drawn butter; but outside of France they do not seem to be very generally appreciated. The plants are propagated

first by seeds, sown in a hot-bed in March, and planted out at distances of from two to three feet. It is not always hardy enough for our winters in the Northern States, though it proves so in all latitudes south of Washington. Here it is necessary, on the approach of winter, to draw the leaves together and earth up around them, and later to cover the tops with litter.



Fig. 111.—GLOBE ARTICHOKE.

ARTICHOKE, JERUSALEM
(*Helianthus tuberosus*).

This is an entirely different plant from the preceding; but as the two are sometimes confounded, we give engravings of both. The edible portion of this is the tuber,

while that of the *Globe* Artichoke is the scales surrounding the flowers. The tubers of the Jerusalem Artichoke somewhat resemble the Potato in appearance, and the



Fig. 112.—JERUSALEM ARTICHOKE.

plant produces immense crops. But few persons in this country like the flavor, and it is rarely grown unless for stock or as a curiosity. Its culture is similar to the

Potato. It has stems, leaves, and flowers much like the common annual Sunflower, to which family it belongs.

BEAN (*Phaseolus vulgaris* var. *nanus*), BUSH, SNAP, OR KIDNEY.

An indispensable vegetable, of easy cultivation, growing freely in almost any soil, though in well-enriched land it will be more prolific in quantity and more tender in quality. It is a plant of tropical origin, and, like all such, should not be sown until the weather is settled and warm, and all danger from frost is past. In this latitude, the time of sowing should not be sooner than the fifth of May. Sow at intervals of two or three weeks all through the season, if wanted for use. Seed may be sown in drills eighteen to twenty-four inches apart, and three inches deep, dropping the seeds at distances of two or three inches in the drills, and covering to the general level. For such as use them all through the season, three or four quarts would be required, although a quart at one sowing would give an ample quantity for any average family. The varieties most in use at present are Red Valentine, Early Mohawk, Yellow Six Weeks, Refugee, White Marrowfat, Black Wax, and Golden Wax.

BEAN, POLE OR RUNNING, AND LIMA (*Phaseolus lunatus*).

Pole Beans are usually cultivated in hills three or four feet apart. The poles (which are best made of young cedar trees) should be nine or ten feet high, and firmly fixed at least eighteen inches deep in the ground, and the hills formed around them by digging up the soil and mixing it with a shovelful of well-rotted manure, or an ounce or so of guano or bone-dust, if the stable manure is not attainable; but in either case let the mixing be thorough. The hills should be but two or three inches above the general level, and at least eighteen inches in

diameter. The term "hill" is an unfortunate one, as it often leads inexperienced persons to suppose that a tall heap must be made, and it is a common mistake to form miniature hills often a foot or more in height, upon which to sow seeds or set plants. The effect of this is to confine the roots to this small, high, and dry space. When the word "hill" is used in this work, it is to indicate the place plants are to occupy, and unless some height is mentioned, it is not above the general level. After the hill has been properly formed around the pole, from five to six beans should be planted around it at a depth of two inches; but the planting should never be done in this latitude before the 20th of May. In all our experience as seedsmen, we know of no seed that is so universally replanted as Lima Beans. I think it safe to say, that at least half of all the people who buy, plant before the ground is dry and warm, and then tell us that the seed must have been bad, because it rotted in the ground. In the hurry of business we have not always time to explain why they rotted, and would here state, for the sake of ourselves and cotemporaries, that the reason why the Limas fail to grow in ninety-nine cases out of a hundred is, that they are planted too early, and that it is no fault of the seed, which is rarely imperfect. The proper method of planting Lima Beans is to push each one singly into the soil, from one to two inches deep, with the eye downward. The embryo is so very broad and flat that it is difficult for it to turn itself as smaller seeds do when placed in a wrong position. From one to two quarts are used for an ordinary family.

The *Large White Lima* is the variety that is most prized.

The *Jersey Extra Early Lima* is a new and excellent variety, nearly a week earlier than the Large Lima, though not quite so large.

The *Scarlet Runner* is a highly ornamental variety,

producing dazzling scarlet flowers during the whole summer. It is used mainly as a snap bean. Lima Beans are usually planted only once in this latitude, as they take nearly the whole season to mature.

All kinds of running or pole beans have been usually grown on poles eight or ten feet long ; but the new pea vine trellis (see " Implements"), introduced in 1887, is infinitely better and far more convenient.

BEET (*Beta vulgaris*).

Sow in shallow drills twelve to eighteen inches apart in April or May, dropping the seeds so that they will fall an inch or so apart. When the plants have grown to the height of about two inches, thin out, so that they will stand four inches apart. When the roots are three inches in diameter they are fit for use. Of course they are used when much larger, but the younger they are, the more delicate and tender. Four ounces of each kind will be sufficient for ordinary family use, unless successional crops are wanted, when double the quantity may be used. The kinds most used are Egyptian Turnip, Eclipse, and Long Smooth Blood.

BORECOLE OR KALE (*Brassica oleracea* var.).

The rather indefinite name of "sprouts" is given to this vegetable about New York. It is sown here in September, in rows one foot apart, treated in every way as Spinach, and is ready for use in early spring. Four ounces of seed are sufficient to sow three hundred feet of row. Two varieties of this, but little grown here, are the Scotch Kale, or Curled Greens, and the Dwarf German Greens. The former is of a deep green color, the latter bluish purple. Both varieties are much curled, almost like Parsley. The seeds of these are sown in May, and transplanted in July, just as we do late Cab-

bage, at distances of two feet apart each way. These "Greens," of either variety, when touched by frost, are the most tender and delicate of all the cabbage tribe, and it has always been a matter of wonder to me why their cultivation has not been more general in this country. In Britain they are used very extensively as a winter vegetable. The most popular German variety is Purple Borecole. The most popular English variety is Cottager's Kale, very hardy and profitable, more weight of it being grown in the same space than of any other variety. An ounce of each kind is about the average quantity used.

BROCCOLI (*Brassica oleracea* var.).

We persist in growing under the two distinct names of Broccoli and Cauliflower, plants which at best are nothing more than very nearly related varieties. The main difference between them is, that what we call Broccoli is planted for fall use, while that which we call Cauliflower is planted for spring or summer use; though in this respect they are frequently reversed without seeming to mind it. For fall use a packet of seed should be sown in the early part of May, which will give plants large enough to be set out in July. Further south the sowing of the seed should be delayed from four to six weeks later, and the plants be set out correspondingly later. Here we put them out in July, though further south it may be delayed to August or September. In the mild autumn weather of those latitudes this vegetable may be had in perfection from November to March, while with us, if planted out in July it matures during October and November. The plants are set at two and a half to three feet apart, and as a hundred plants are all that most families would use, it is usually cheaper to buy them, if in a section where they are sold, than to raise the plants from seed. Broccoli requires an abundance of manure. The varieties are—

White and Purple Cape.—There is no difference in flavor, though the white is the most pleasant looking vegetable when cooked.

BRUSSELS SPROUTS (*Brassica oleracea* var.).

This vegetable, as the engraving shows, is a variety of the Cabbage which forms scarcely any terminal bud or head; but the buds along the stem, which in the ordi-

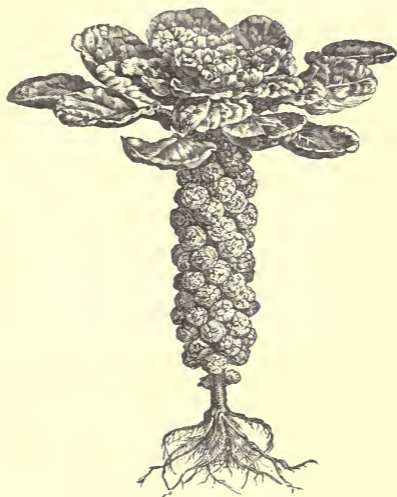


Fig. 113.—BRUSSELS SPROUTS.

nary Cabbage remain small, are in this developed into small heads, which are the edible portion. Brussels Sprouts are much more used in Europe than with us. Though the plant is not sufficiently hardy to endure our northern winters, it will stand in this latitude until

Christmas. Its cultivation is exactly similar in all respects to that of Broccoli, except that it may be planted closer, say from one and a half to two feet apart.

CAULIFLOWER (*Brassica oleracea* var.).

There is quite an ambition among amateur gardeners to raise early Cauliflower; but as the conditions necessary to success with this are not quite so easy to command as with most other vegetables, probably not one in three who try it succeed. In England, and most places on the Continent of Europe, it is the most valued of all vegetables, and is grown there nearly as easily as early Cabbages. But it must be remembered that the temperature there is on the average ten degrees lower at the time it matures (June) than with us; besides, their atmosphere is much more humid, two conditions essential to its best development. I will briefly state how early Cauliflowers can be most successfully grown here. First, the soil must be well broken and pulverized by spading or plowing to at least a foot in depth, mixing through it a layer of three or four inches of strong, well-rotted stable manure. The plants may be either those from seed sown last fall and wintered over in cold frames, or else started from seeds sown in January or February, in a hot-bed or greenhouse, and planted in small pots or boxes, so as to make plants strong enough to be set out as soon as the soil is fit to work, which in this latitude is usually the first week in April. We are often applied to for Cauliflower plants as late as the end of May, but the chances of their forming heads when planted late in May are slim indeed.

The surest way to secure the heading of Cauliflowers is to use what are called hand-glasses, some of which are described in the chapter on "Implements." These are usually made about two feet square, which gives room

enough for three or four plants of Cauliflower, until they are so far forwarded that the glass can be taken off. When the hand-glass is used, the Cauliflowers may be planted out in any warm border early in March and covered by them. This covering protects them from frosts at night, and gives the necessary increase of temperature for growth during the cold weeks of March and April; so that by the first week in May, if the Cauliflower has been properly hardened off by ventilating (by tilting up the hand-glasses on one side), they may be

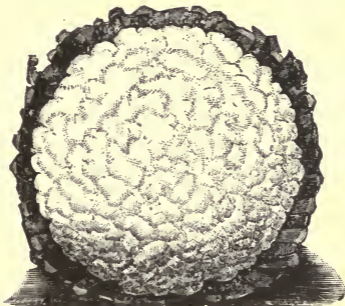


Fig. 114.—HENDERSON'S EARLY SNOWBALL CAULIFLOWER.

taken off altogether, and then used to forward Tomatoes, Melons, or Cucumbers, at which date these may be started, if under the protection of hand-glasses. If the weather is dry, the Cauliflowers will be much benefited by being thoroughly soaked with water twice or thrice a week; not a mere sprinkling, which is of no use, but a complete drenching, so that the water will reach to the lowest roots. If the ground is slightly sprinkled around the roots with guano before watering, all the better. The best varieties of Cauliflower we have found as yet are the Early Snowball (figure 114), introduced by me in

1880, and, for succession, Early Paris or Algiers. These instructions refer to the early crop of Cauliflower. For late or fall crop sow the seeds in May, and plant out as for Cabbage in June or July. In our climate there is usually more success with late than early Cauliflower.

CABBAGE (*Brassica oleracea* var.).

The Cabbage is so easily raised that but little space need be devoted to it here. Like all of its tribe, it requires an abundance of manure for its full development.



Fig. 115.—CABBAGE, SAVOY.

The early varieties should be either raised in cold frames or in hot-beds, as stated for Cauliflower, and planted out at distances of from twenty to thirty inches apart each way, as early as the ground is fit to work in April. The best early varieties are the Early Wakefield and Early

Summer. As a successional variety the Winningstadt is very popular. It has a sharply conical head, and sometimes grows quite large.

For late varieties, the seed should be sown in May, and the plants set out in June or July at two to three feet apart. For winter use the Flat Dutch or Drumhead is usually grown, to the exclusion of all others; and while the Curled Savoy is vastly better flavored, not one Savoy is planted for every thousand Drumhead. The flavor of

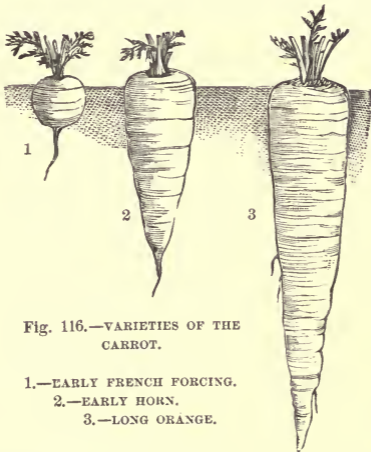


Fig. 116.—VARIETIES OF THE CARROT.

- 1.—EARLY FRENCH FORCING.
- 2.—EARLY HORN.
- 3.—LONG ORANGE.

the Savoy is as superior to that of the Drumhead, as that of a Bartlett is to that of a choke pear, and it is altogether the best late Cabbage for family use, and the wonder is how long it has taken for it to be appreciated here, though we find its culture is increasing rapidly.

CARROT (*Daucus Carota*).

Carrots are sown any time from April to June, in rows one foot apart, covering the seed two inches deep. If

the soil is light, they will be better flavored. When the plants are an inch or so high, thin out to three or four inches apart. The varieties most in use are Early French Forcing, Early Horn, and Long Orange. Eight ounces of seed will sow three hundred feet of row, which, for most families, would be an abundance, both for summer and winter use. Carrots are much prized as food for horses and cows, and if wanted for this purpose in quantity, they should be sown with a seed-drill, in rows one and a half to two feet apart. About four pounds of seed per acre are required.

CELERY (*Aplum graveolens*).

If I am fitted to instruct on the cultivation of any vegetable, it is this, as for many years I have cultivated nearly half a million roots annually, and this experience has resulted in greatly simplifying the operation. The seeds are sown on a well-pulverized, rich border, in the open ground, as early in the season as the ground can be worked. The bed is kept clear of weeds until July, when the plants are set out for the crop. But as the seedling plants are rather troublesome to raise, the small number wanted for private use can usually be purchased cheaper than they can be raised on a small scale (they cost from fifty cents to a dollar per hundred); and if they can be procured fresh from the seedsmen, market gardeners, or florists in the neighborhood, it is never worth while to sow the seed, as from three hundred to five hundred plants are ample for ordinary sized families. The European plan is to make a trench six or eight inches deep in which to plant Celery; but our violent rain storms in summer soon showed us that this plan was not a good one here, so we set about planting on the level surface of the ground, just as we do with all vegetables.

Celery is a "gross feeder," and requires two or three

inches thick of well-rotted manure, which, as usual, must be well mixed and incorporated with the soil before the Celery is set out. If stable manure is not convenient, bone dust, guano, or other concentrated fertilizer may be sown on the rows about as thick as sand or sawdust is strewn on a floor, and well chopped in and mixed with the soil. Whether stable manure or a concentrated fertilizer be used, it should be spread over and mixed to at least twelve inches in width and six inches in depth. When the ground is thus prepared, we stretch a line to the distance required, and beat it slightly with a spade, so that it leaves a mark to show where to place the plants. These are set out at distances of six inches between the plants, and usually four feet between the rows. Great care must be taken in putting out the Celery, to see that the plant is set just to the depth of the roots. If much deeper, the "heart" might be too much covered up, which would impede the growth. It is also important that the soil be well packed to the root in planting; and if the operation can be done in the evening, and the plants copiously watered, no farther watering will usually be required.

If planted in July, nothing is to be done but keep the crop clear of weeds until September. By that time the handling process is to be begun, which consists in drawing the earth to each side of the Celery, and pressing it tightly to it, so as to give the leaves an upward growth preparatory to blanching for use. Supposing this handling process is done by the middle of September, by the first week in October it is ready for "banking up," which is done by digging the soil from between the rows and laying or banking it up on each side of the row of Celery. After being so banked up in October, it will be ready for use in three or four weeks, if wanted at that time. But if, as is usually the case, it is needed for winter use only, and is to be put away in trenches or in the cellar, as

will be hereafter described, all that it requires is the operation of "handling," to straighten it up. If the Celery is to be left in the open ground where it was grown (as it can be in any section of the country where the thermometer does not fall more than fifteen degrees below the freezing point), then a heavy bank must be made on each side of the rows, and as cold weather approaches—say by the middle of November—an additional covering of at least a foot of leaves or litter must be closely packed against the bank, to protect it from frost.

Perhaps the best way to keep Celery for family use is in a cellar. This can be done by storing it in narrow



Fig. 117.—"HANDLING" CELERY.

boxes of a depth a little less than the height of the Celery. A few inches of sand or soil are placed in the bottom of the box, and the Celery is packed upright, the roots being placed on damp sand or earth at the bottom, *but none is to be put between the heads*; and be careful not to water the Celery, as, if packed moderately tight, the air will be excluded, so that it will not wilt; and the roots being on the damp sand or soil at the bottom of the box, the moisture there will sustain them. Boxes thus packed and placed in a cool cellar in November, will be blanched fit for use during January, February, and March, though, for succession, it will be better to put it in the boxes

from the open ground at three different times, say October 25th, November 10th, and November 20th. Or, if boxes are not at hand, the Celery may be put away on the floor of the cellar in strips nine or ten inches wide, separated by spaces of the same width, and divided by boards of a height equal to the height of the Celery. The reason for dividing the Celery in these narrow strips by boards is to prevent "heating," which would take place if the plants were packed together in too thick masses. The dates above given apply, of course, to the latitude of New York. If farther south, do the work later; if farther north, earlier. If one has no suitable cellar, the



Fig. 118—SHOWS CELERY BANKED UP.

Celery can be very readily preserved in the manner followed by market gardeners, thus :

After it has been "handled" or straightened up, as before described, what is intended for use by Christmas should be dug up by about October 25th; that to be used in January and February, by November 10th; and that for March use, by November 20th, which latter date is as late as it can be risked here. Although it will stand quite a sharp frost, the weather by the end of November is often severe enough to kill it, or so freeze it in the ground that it cannot be dug up. The ground in which it is to be preserved for winter use must be as

dry as possible, and so arranged that no water can remain in the trench. Dig a trench as narrow as possible (it should not be wider than ten inches), and of a depth equal to the height of the Celery; that is, if the plant of Celery be eighteen inches high, the trench should be dug eighteen inches deep. The Celery is then packed exactly in the manner described for storing in boxes to be placed in the cellar; that is, stand it as nearly upright as possible, and pack as closely together as can be done without bruising it. As the weather becomes cold, the trenches should be gradually covered with leaves or litter to the thickness of six or eight inches, which will be enough to

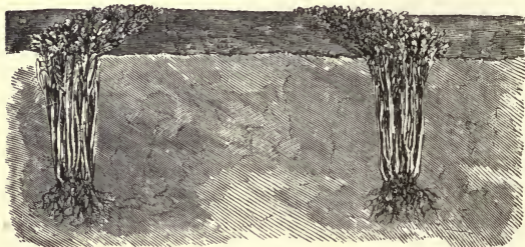


Fig. 119.—STORING CELERY IN TRENCHES FOR WINTER.

prevent severe freezing, and enable the roots to be taken out easily when wanted. Figure 119 represents this method of storing Celery in trenches for winter use.

The best varieties of Celery for family use I believe to be the four described below :

White Plume, introduced by me in 1884, is now perhaps more largely grown than any other Celery, and possesses all the best qualities of the best of the old kinds. It has the great merit of being nearly self-blanching, as in its natural growth, without being earthed up, the inner stems and leaves are white, and nearly fit for use without being blanched artificially.

The flavor, however, is much improved by blanching, so that it is necessary to at least handle and earth up this variety to half its height to get the best results. Another



Fig. 120.—HENDERSON'S WHITE PLUME CELERY.

great merit of the White Plume Celery is that, while being unsurpassed in flavor, it excels all other vegetables

as an ornament for the dinner table, its graceful white leaves resembling somewhat an ostrich feather. We sent samples of it to all the leading hotels in New York the present season, from all of which we had the most flattering testimonials of its excellence.

Sandringham.—This is a dwarf, full-hearted kind, and, when it does well, is one of the very best, equaled by none in fact; but it has a great tendency to rust or burn, which impairs its value. A new sport from this, known as the *Golden Self-Blanching*, is somewhat of an improvement on the *Sandringham*.

For general use the *Golden Dwarf* comes next in merit to the White Plume. It is a short-growing or half-dwarf sort, with yellowish heart, solid and crisp.

A variety introduced by us in 1886, called the *Rose*, is the best of all the Red or Pink Celeries. The red kinds are used nearly exclusively in the London markets, as they are certainly more crisp and better flavored than any of the white kinds, besides being hardier and less liable to rot in winter; but, so far, they are comparatively little used in this country. While we sell nearly a thousand pounds of seed each of such kinds as White Plume and Golden Dwarf annually, we do not, as yet, sell one-tenth of that quantity of the Red.

CELERIAC, OR TURNIP-ROOTED CELERY (*Apium graveolens* var.).

This is grown almost the same as the common Celery; and as it requires but little earthing-up, the rows may be nearer together. Its turnip-like root is used as a salad, mostly by the French and Germans. It is sometimes stewed, but usually simply boiled, sliced, and dressed as a salad for the table.

CORN-SALAD OR FETTICUS (*Valerianella olitoria*).

This is sold to a considerable extent in spring in the city markets for use as an early salad. For mode of cul-

tivation, etc., see Spinach, as it is grown in exactly the same manner.

CHIVES (*Allium Schenoprasum*).

An entirely hardy, onion-like plant, of easy culture. It will grow on almost any soil for years without being transplanted. The leaves are the part used, and may be shorn off every two weeks during summer. It is propagated by tearing apart the old clumps and setting the divisions in rows a foot apart.

CRESS OR PEPPER GRASS (*Lepidium sativum*).

A spring and summer salad plant. Sow in early spring, and in succession every week or so if desired, in rows one foot apart. The curled variety is the best, as it can be used for garnishing as well as for salad.

CRESS, WATER (*Nasturtium officinale*).

A hardy aquatic plant, which can only be properly cultivated where there are running streams. If there is a brook on the place, all that would be wanted for private use may be had by setting a few plants or sowing seeds in spring on the margin of the water. There is a variety recently introduced known as "Upland Cress," that can be grown in an ordinary garden. It is almost identical in flavor with the Water Cress.

CORN (*Zea Mays*).

The varieties known as "Sweet" are the kinds cultivated to be used in the green state. Corn may either be planted in "hills" (dropping three or four seeds in a hill) four feet apart each way, or in rows five feet apart, dropping the seeds at distances of eight or ten inches in the rows. In this latitude it is useless to plant Corn before the middle of May. For successional crops it should be

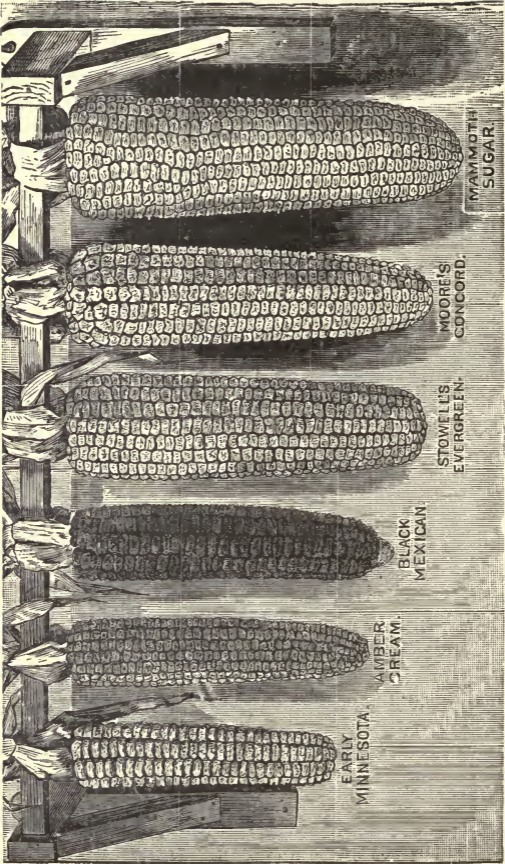


Fig. 121.—VARIETIES OF SWEET CORN.

planted every two or three weeks until July first. After that date it will not mature here. Corn requires a rich, light soil to be early. The leading varieties are shown in figure 121. Three or four quarts are required, if successional crops are sown. If only one crop, two or three pints will be sufficient for an ordinary family.

CUCUMBER (*Cucumis sativus*).

In most places where the Cucumber is grown outdoors, it is more or less troubled with the "Striped Bug;" but if only a few dozen hills are cultivated, it is not a very troublesome matter to pick them off, which is about the only sure way to get rid of them. The safest method of raising Cucumbers, however, is to cover the seeds, when first sown, with the hand-glass described in the chapter on "Implements," which, by the time they are wanted for Cucumbers, are no longer needed over Cauliflowers. If such hand-glasses are not obtainable, a simple method is to use a light box ten or twelve inches square, and place it over the seeds after sowing, covering it with a pane of glass. This will not only forward the germination of the seeds, but will protect the plants against the bugs until they are strong enough not to be injured by them. Bryant's Plant Protector, a simple article, made of light strips of wood covered with mosquito netting, may be used instead of a hand-glass. This will be found equally valuable for protecting all plants liable to the attacks of flying insects, and against the light frosts so often injurious to tender plants. Light, sandy soil is rather best for Cucumbers. The "hills" should

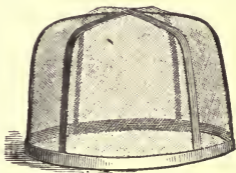


Fig. 122.

BRYANT'S PLANT PROTECTOR.

be prepared in the same manner as for Lima Beans, but set three feet apart, dropping five or six seeds in each hill. Cucumbers may be sown about the middle of May, and in succession, every three or four weeks, until July. The White Spine and Long Green Prickly are favorite varieties. The Gherkin or Burr is by some used for pickling.

FORCING CUCUMBERS.—The forcing house shown at page 267 as suitable for Strawberry forcing, can be made equally available for forcing Cucumbers, either during the entire winter or spring season, or to succeed the early forced crops of vegetables or fruits in spring.

If wanted for forcing Cucumbers during the fall or winter, the seed should be sown in the greenhouse in October or November, in small pots, three or four seeds in each, and thinning out to one strong plant. These, if grown in a temperature averaging seventy-five degrees, will in thirty days have become sufficiently strong to plant out at twenty-four inches apart on the south side of the bench, one row only. A trellis of galvanized iron wire is made with about a nine-inch mesh, diamond shaped. This, on the middle bench, should be kept two feet from the glass, but on the front bench it can only be kept one foot, owing to its nearness to the glass. The depth of soil should be, if on raised wooden benches, about five or six inches; if on the solid center bed, ten to fifteen inches. The soil should be a sandy loam, with one-fifth well-rotted cow manure. The night temperature in the forcing-house for the fall, winter, and spring months for Cucumbers, should range as near as possible from sixty to sixty-five degrees, with a temperature on bright days of from ten to fifteen degrees higher, giving ventilation at all reasonable times. Cucumbers delight in a moist atmosphere, and whenever the weather is bright and clear, water should be sprinkled on the pipes, walks, and under the benches. A dry atmosphere

is certain to develop the Red Spider, which is fatal to success. It may also be here stated, if Cucumbers are to be forced during the winter months, that, to keep up the necessary high temperature, eight runs of four-inch pipes will be required in a greenhouse twenty feet wide.

Although there is no necessity for artificial impregnation of the Cucumber flowers when grown in the open air, where the insects and winds do the work, yet, when grown in the forcing house, it is absolutely necessary, particularly in midwinter. This is best done with a camel's hair pencil, by detaching the pollen, or fertilizing dust, from the stamens and applying it to the stigma. It will also facilitate impregnation on bright days to slightly jar the wire trellis, so as to let the pollen loose, which, in floating through the air, fastens on the stigma. The Cucumber and all plants of that class have the male and female flowers separate on the same plant. Cucumbers from seed sown in October will give a continuous crop until June—of course, if well handled. When wanted only to succeed crops of forced Lettuce, Radishes, or Strawberries in spring, the seed should not be sown until February or March. The variety for forcing which seems to be most favorably received in our markets is Selected Early White Spine, though, of late years, the beautiful long kinds, such as Telegraph and Rambler, which are almost exclusively used in Europe for forcing, are beginning to be favorably received.

Although Cucumbers are now to be found in our markets at nearly all seasons of the year, grown at the south, yet they never have the fine appearance nor the delicate flavor of those grown by being forced under glass; so that large areas of forcing houses for this and other vegetable and fruit crops are now profitably used in all our large cities, though coming in direct competition with Southern products.

EGG PLANT (*Solanum Melongena*).

This is always an interesting vegetable to cultivate, being worthy of a place as an ornamental plant, as well as being much prized for culinary use. It is a native of the tropics, and peculiarly tender. We find the seeds will not germinate freely below a temperature of seventy degrees; and even then often tardily, unless the conditions are just right. Nothing suits them so well as a warm hot-bed; and to get plants of the proper size to be set in the open ground by the end of May, the seeds should be sown early in March, and the plants potted into small pots when an inch or so in height. But as only a dozen or two plants are needed for a family, whenever the plants can be purchased conveniently, it is never worth the trouble to attempt the raising of them from seeds, unless, indeed, there is room in a hot-bed, or a hot-house used for other purposes. Do not plant out sooner, in this latitude, than the 25th of May, unless they can be protected by hand-glasses. Set at distances of four feet apart, preparing the hills as described for Lima Beans. Each plant should average a dozen fruits, which will weigh from ten to forty ounces each. The best flavored variety, in our opinion, is the Black Pekin, but the most prolific is the New York Market. A pure pearly white variety is highly ornamental, and also of excellent flavor. There is also a beautiful scarlet variety, sometimes grown as a greenhouse ornament. The Egg Plant is usually fried in slices; but there are other methods to be found in the proper authorities on such matters.

ENDIVE (*Cichorium Endivia*).

A plant related to the Lettuce. If sown in early spring, either in a hot-bed or in the open ground in April, it will be ready in May. Set out at distances of fifteen

inches apart. It is mostly used towards fall, however, and when wanted at that time, should be sown in June or July, and set out in August or September. Nothing further is done after planting but hoeing to keep down the weeds, until it attains its full growth, which is from twelve to eighteen inches in diameter. It is then "blanched," either by gathering up the leaves and tying them by their tops in a conical form, or by placing a slate or flat stone on the plant to exclude the light and effect the blanching. It is used as a salad. The varieties are the Moss Curled and Plain-leaved Batavian.

HERBS, SWEET.

Thyme, Sage, Basil, Sweet Marjoram, and Summer Savory are those in general use. The seeds of all should be sown in shallow drills, one foot apart, in May, and the plants will be fit for use in September and October.

GARLIC (*Allium sativum*).

This is used mostly by Europeans. It grows freely on any soil. The sets, obtained by breaking up the old bulbs, are planted in early spring in rows one foot apart, and five or six inches between the plants. When the leaves wither, the bulbs are taken up and hung in a dry, cool place.

HORSERADISH (*Cochlearia Armoracea*).

For family use a few roots of this should be planted in some out-of-the-way corner of the vegetable garden. A dozen roots, once planted, will usually give enough for a lifetime, as it increases and spreads so that there is never any danger of being without it. The trouble is, if it is once admitted into the garden, it is difficult to be got rid of, if so desired.

KOHLRABI, OR TURNIP-ROOTED CABBAGE (*Brassica oleracea* var.).

This vegetable resembles a Turnip, but is regarded as a variety of the Cabbage, with a fleshy, edible stem. Seeds should be sown in rows fifteen or eighteen inches apart, in May or June, and when an inch high, thinned out to nine or ten inches. It is a favorite vegetable with the Germans, and immense quantities are sold in the markets of New York. There are two varieties, White and Purple.

LEEK (*Allium Porrum*).

Sow in April, and plant out in June or July, in rows one foot apart and six inches between the plants. It is used mainly during the winter months. It is an entirely hardy plant; yet, in order that it may be handy to get at in winter, it is better to put it in trenches or boxes, as advised for preserving Celery.

LETTUCE (*Lactuca sativa*).

Lettuce should be sown in a hot-bed or greenhouse, if wanted early. Seeds sown there in February will give



Fig. 123.—BLACK-SEEDED SIMPSON LETTUCE.

nice plants to set out in April, to mature in May; or, if it is sown in the open ground in April and planted out in

May, it will mature in June, and so on through the summer season if successional crops are desired, as it only takes from five to six weeks to mature. The great excellence of Lettuce consists in its freshness, and it can rarely be purchased in perfect condition; hence, those who would enjoy it in its best state should raise it themselves. For early use, to be ready in May, the Curled Silesia and Boston Market are the best; while for summer use the Salamander, New York, and Black-seeded Simpson (figure 123) should be sown, as they do not readily run to seed. The Cos varieties are mainly used in Europe, and are by far the best flavored; but, from their tendency to run to seed in our warmer climate, are but little cultivated, though they might be safely grown in the cool weather, in spring or in fall. Although usually transplanted, the seed is also sown in rows, and the plants thinned out to twelve inches apart. An ounce of seed of each variety will be ample.



Fig. 124.

PARIS WHITE COS LETTUCE.

MARTYNIA (*Martynia proboscidea*).

The unripe pods, when perfectly tender, are used for pickling. They must be gathered every day or two, or some will become hard and useless. Sow in open ground in May, in drills two feet apart, and thin out to one foot.

MELON, MUSK (*Cucumis Melo*).

The cultivation of the Melon is almost identical with that of the Cucumber, to which reference may be made.

The varieties are numerous, those named below being the most popular at the date I write. Early Hackensack,



Fig. 125.—BALTIMORE MUSK MELON.

Baltimore (figure 125), and Montreal Market (figure 126).
(For illustrations and descriptions see seed lists.)



Fig. 126.—MONTREAL MARKET MUSK MELON.

MELON, WATER (*Citrullus vulgaris*).

The cultivation of the Water Melon is in all respects similar to that of the Musk Melon, except that, being a

larger and stronger growing plant, it requires to be planted at greater distances. The hills should not be less than eight feet apart each way. It delights in a light, sandy soil, and will not grow satisfactorily on heavy, clayey soils. The leading sorts are named, as usual, in

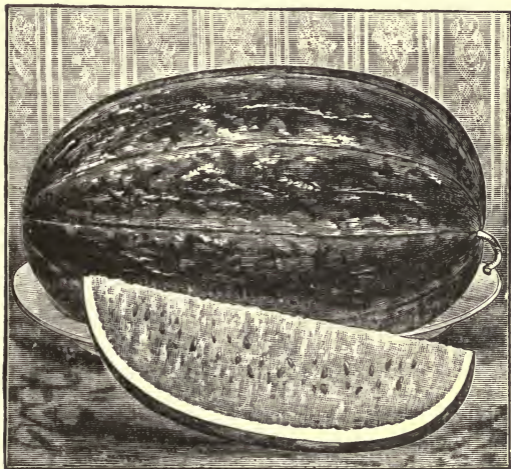


Fig. 127.—SCALY BARK WATER MELON.

the order of what I consider to be their excellence, and are of the kinds most approved at the date of writing. Phinney's Early, Rattlesnake or Gypsy, Ironclad Mammoth, and Scaly Bark. "Green and Gold," an entirely new and excellent variety, with golden yellow flesh, will be sent out by us the present season (1888). (For illustrations and descriptions, see seed catalogues.)

MUSTARD (*Sinapis alba*).

For use and cultivation see Cress.

MUSHROOM (*Agaricus campestris*).

Many who have a taste for horticultural pursuits grow Mushrooms as much for the novelty of the thing as for use; for it is certainly very gratifying for an amateur to find that he has succeeded with a crop of this curious vegetable in mid-winter, when everything outside is frost-locked and snow-bound. I have said that the novelty is attractive; for in growing all other plants the cultivator sees something tangible to start with, either seeds, plants, or roots, but with the Mushroom it may be said he sees none of these; for no seeds can be discovered either with the naked eye or with a magnifier, and it requires some faith to believe the minute, thread-like substance we call "spawn" to be either plants or roots.

Mushrooms are always raised in the dark, and any cellar, stable, or an out-house of any sort, wherein a temperature of forty-five to sixty-five degrees can be commanded, will grow them. There are various methods followed by Mushroom growers, but I will only give two, premising that, if the directions given are strictly followed, success is just as certain as in growing a crop of Peas or Potatoes. Let horse droppings be procured from the stables each day, in quantities not less than a barrow load. To every barrow load of droppings add one-fourth the quantity of fresh loam from a pasture or sod land, or soil of any kind that has not been manured (the objection to old manured soil being that it may contain the spores of spurious fungi). Let the droppings and soil be mixed together day by day, as the manure can be procured; or, if they can be had all at once in sufficient quantity, so much the better. Let the heap (which should be under cover, so as not to get wet) be turned every day, so that it is not allowed to heat violently until you have got together a sufficient quantity to form a bed of the desired size.

From the prepared droppings and soil, begin to form

the bed. A convenient width is four feet, and the length may be as great as desired. First spread a thin layer of the compost, pounding it down firmly with a brick or mallet, layer after layer, until it reaches a depth of eight inches. Be careful that the thickness is just about eight inches, as, if more, it would heat too violently, and if less, it would not heat enough. Into this bed plunge a thermometer. In two or three days the bed will heat, so that the thermometer will rise to one hundred degrees or over. As soon as the temperature declines to ninety degrees, take a sharp stick and make



Fig. 128.—MUSHROOMS.

holes an inch or so in diameter all over the bed, at about a foot apart and six inches deep. Into these holes drop two or three pieces of "spawn," and cover up the holes again with the compost of which the bed is made, and beat it slightly again, so that the bed will present the same level surface as before the spawn was put in. Let the bed remain in this condition for ten or twelve days, by which time the spawn will have run all through it. Now spread evenly over the surface of the bed about two inches of fresh loam, press it down moderately with the

back of a spade, and cover up the bed with hay or straw to the thickness of three or four inches.

If this operation is finished in November or December, and the place has an average temperature of fifty-five degrees, you may look for a crop in January or February. The bed will continue bearing about three or four weeks, and the crop is usually enormous, often producing a bushel on two square yards of space. After the first crop is gathered, a second, and even a third, can be taken, if desired, from the same bed without further trouble than to spread a little fresh soil on the surface, giving it a gentle watering, and covering up with hay as before. Great care must be taken that, after placing the spawn in the newly-made bed, the earth covering is not put on sooner than ten or twelve days. In my first attempt at Mushroom growing I failed two years in succession, because I put on the soil when the spawn was first put into the bed. By so doing, the steam arising from the manure was prevented from passing off, and the result was, that the spawn rotted. I believe this very common error is the cause of most of the failures in raising Mushrooms.

Another method of raising Mushrooms in winter in cold cellars, or other places where there is no artificial heat, is as follows, given by John Cullen, of Bethlehem, Penn., whose success in Mushroom growing has been unailing.

“My Mushroom cellar is a structure fifteen feet long and twelve feet wide. Formerly it was a water cistern, but with a little alteration was easily converted into a Mushroom cellar. My plan of culture is as follows: In September manure from horse stables is collected in a heap, and to that is added one-fifth of soil. To prevent overheating it is turned over three times a week for a month. By that time the violent heat is subdued.

“*Making the Beds.*—Having obtained a sufficiency of horse droppings for a bed, in the right condition, that is,

rather dry, and turned so as to expel the violent heat, a layer four inches thick is placed on the floor of the cellar and beaten down firmly. Another layer of the same thickness is added, and the same beating process carried out, and so on till the bed is made of sufficient thickness. I make my beds fifteen inches in depth when artificial heat can be obtained of fifty degrees, but in cold cellars the bed should be at least eighteen inches.

“Spawning the Bed.”—I spawn my beds when the temperature declines to eighty-five degrees at about three inches under the surface, though the heat in the centre of the bed may be one hundred degrees. The spawn is broken in pieces of about one and a half to two inches, and I insert them about seven inches apart each way, and so deep as to admit of being covered about an inch with the same material as the bed is composed of, firming it well about and over the spawn.

“Soiling the Bed.”—This is done in eight days from the time of spawning. I put two inches of fine loam all over the bed, making it firm by beating it well with the back of the spade, damping the surface, and passing the back of the spade over it at the last to give a smooth finish to it. As soon as the soil is placed on the bed a covering of hay is placed over it rather thinly, doubling it as the heat declines.

“Gathering the Crop.”—In six weeks from the time of soiling I usually gather my first crop of Mushrooms, and cut from ten to twelve pounds weekly from a space of two hundred square feet, or, for the whole crop, an average of about one pound per square foot, some of them measuring five inches in diameter. In gathering I draw the Mushrooms out of the bed with a twist, so as not to disturb the roots remaining, afterward filling the holes with some fresh loam. Water about ten degrees warmer than the cellar is applied when the surface of the bed becomes dry.”

NASTURTIUM, INDIAN CRESS (*Tropæolum majus*).

A highly ornamental plant, cultivated in flower gardens as well as in the kitchen garden. The shoots and flowers are sometimes used in salads, but it is mainly grown for its fruit or seed pods, which are pickled in vinegar and used as a substitute for capers. The plant is of the easiest culture. Sow in shallow drills in May. The *tall* variety will reach a height of ten or fifteen feet if furnished with strings or wires, and makes an excellent screen for shade, or for quickly covering up and concealing any unsightly place. The *dwarf* variety is grown like Peas, and staked with brush, or grown on the garden trellis.

OKRA OR GUMBO (*Abelmoschus esculentus*).

A vegetable of the easiest culture. Sow in drills in May, three feet apart for dwarf and four feet for tall sorts, in drills two or three inches deep. The long pods, when very young and tender, are used in soups, stews, etc., and are very nutritious.

ONION (*Allium cepa*).

Onions are raised either from "sets," which are small dry Onions grown the previous year, or from seeds. When grown from the sets, they should be planted out as early in spring as the ground is dry enough to work. Plant them in rows one foot apart, with the sets three or four inches apart. When raised from sets, the Onions can be used in the green state in June, or they will be ripened off by July. When raised from seeds, these are sown at about the same distance between the rows, and when the young plants are an inch or so high, they are thinned out to two or three inches apart. It is important that Onion seed be sown very early. In this latitude it should be sown not later than the middle of

April; for, if delayed until May, warm weather sets in and delays, or rather prolongs the growth until fall, and often the bulbs will not ripen. We find that, unless the Onion tops dry off and the bulbs ripen by August, they will hardly do so later. The best known sorts are Early Flat Red, Yellow Globe Danvers, and Southport White Globe. The Italian kinds best suited for the Southern States are White Queen and Red Giant Rocca.

Two kinds are grown exclusively from bulbs. One of

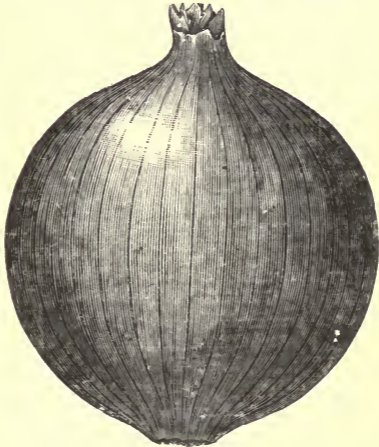


Fig. 129.—SOUTHPORT WHITE GLOBE ONION.

these is the Potato Onion, or “Multiplier,” which increases by the bulb splitting up and dividing itself into six or eight smaller bulbs, which in turn form the sets to plant for the next crop. The other variety is what is called the Top Onion, which forms little bulbs on the stem in the place of flowers. These bulbs are in clusters, and about the size of hazel nuts. The bulbs are broken

apart, and planted in spring at the same distances as the "sets" referred to on page 340. All mature in August.

PARSLEY (*Apium Petroselinum*).

But a very small quantity of this is usually wanted in the family garden. Sow in shallow drills in April or May. A good plan is to sow in shallow boxes as much as may be needed. They can be placed wherever there is moderate light and no frost, in the kitchen window or similar place. By this means a fresh supply may be kept on hand in hard winter weather, when it is most desirable to have it, either for garnishing dishes or for other uses. The best variety to grow is the Moss or Double Curled.

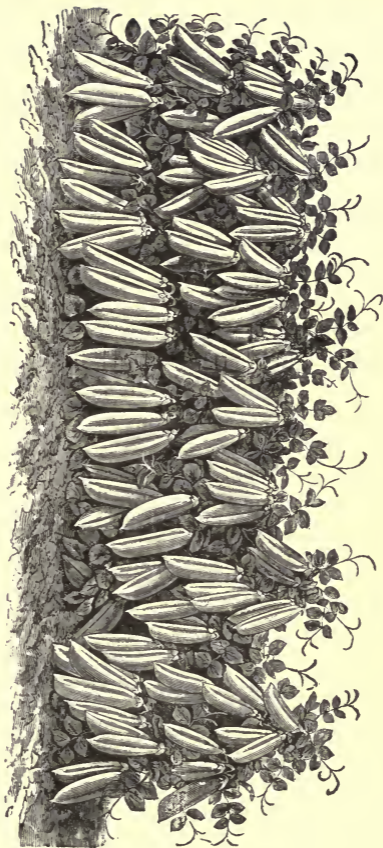
PARSNIP (*Pastinaca sativa*).

For the mode of cultivation of Parsnips, see Carrot, as their culture is identical, except that this, being hardy, can be left out in winter, while in this latitude Carrots cannot. A portion of the crop may be dug and stored in the cellar or in trenches, and the remainder may be left until spring. The Hollow Crowned is best for general use.

PEA (*Pisum sativum*).

The Pea is indispensable in the garden, and there is more satisfaction in growing it on one's own ground than there is in raising any other vegetable. If too old when picked, or stale, which is too often the case when purchased from the dealers, Peas have but little resemblance to those taken directly from the vines. For an early crop Peas should be one of the first things sown in the spring. We prefer to sow in double rows, which saves half the labor in staking or bushing up, and gives nearly the same crop to the row as if sown in single rows.

FIG. 130.—AMERICAN WONDER PEA. DWARF, REQUIRING NO SUPPORT.



Double rows are made at eight or nine inches apart, and four feet from other rows. Set a line, and draw the drills three or four inches deep with a hoe. The seed should be sown, as nearly as possible, an inch or so apart. In order to have a succession of crops of Peas, they should be sown every two or three weeks until July. If successional crops are grown, an average quantity for a family would be twelve quarts; if only first crops of early and late, from four to six quarts will be sufficient.

The new Pea Vine Trellis, described in the chapter on "Implements," is the most valuable acquisition to Pea growing ever introduced. We used it the past season on over two thousand feet of row in our trial ground with the most gratifying results, finding it not only much better for the purpose than the ordinary "pea stakes" cut from the woods, but far more sightly; and taking into consideration that the pea vine trellis may be used for a dozen years, it is actually cheaper.

The varieties of Peas are almost innumerable, and new sorts—or at least sorts with new names—are sent out every year. They may be classed in two groups, the round and the wrinkled Peas. The round varieties are the earliest, but they are as much inferior to the wrinkled or marrow kinds as field is to sweet corn. These two groups are subdivided according to height. The earliest round Pea we have found to be a selection made by us, and sent out in 1882 under the name of First of All. The earliest wrinkled variety is the American Wonder (figure 130).

These two are really all that are needed for private use for early, while for *successional* or *late* kinds, Champion of England (figure 131) and Telephone seem yet the best. But all seed catalogues now give very full illustrations and descriptions of new kinds, which are being yearly introduced, and to which my readers are referred.

FIG. 131.—CHAMPION OF ENGLAND, AS GROWN ON PEA TRELLIS.



PEPPER OR CAPSICUM (*Capsicum annuum*).

The Pepper is sown and cultivated in all respects the same as the Egg Plant, which may be referred to. The leading varieties are the Bull Nose or Bell (scarlet), the Golden Dawn (yellow), and the Long Red Cayenne.

POTATO (*Solanum tuberosum*).

Potatoes are grown by planting the tubers, either cut or whole, it makes but little difference which. If large, cut them; if small, leave them uncut. They are usually planted in drills three feet apart, and four or five inches deep. The ground should be prepared by first spreading in the drills a good coat of stable manure, say two inches deep, upon which are planted the tubers or sets, at distances of eight or ten inches apart. In a warm exposure planting may be begun early in April, and the crop will be fit for use in June. Some of the small-leaved varieties, such as the Ash-leaved Kidney, were formerly grown under hand glasses, or in frames, to forward them; but now this is hardly worth the trouble, as our supplies from southern latitudes are so early that it is no longer desirable to force the crop. The generally favorite variety for early crops is still the Early Rose. Among other greatly improved sorts for the general crop are Early Puritan, Vanguard, and Beauty of Hebron; but there are scores of other varieties which have a special or local reputation.

PUMPKIN (*Cucurbita Pepo*).

Pumpkins are still grown in many gardens with a tenacity that is astonishing, when it should long ago have been known that they have no business there, as their first cousins, the Squashes, are eminently superior for every culinary purpose whatever. The Pumpkin is a valuable product for the farm, as a food for cattle, but

for nothing else. If people will waste valuable land in raising Pumpkins, they may plant them the same as directed for Squashes.

RADISH (*Raphanus sativus*).

One of the first vegetables that we crave in spring is the Radish, and it is so easy of culture that every family can have it fresh, crisp, and in abundance. A garden patch of a few feet square will give enough for an ordinary family. It is sown either in drills or broadcast, care being taken that the seed is not put in too thickly; from one to two inches apart, either in drill or broadcast, being the proper distance, as usually every seed germinates. The best varieties are the Red and French Turnip, and the Short Top Long, Red or White. Some beautiful fancy kinds have been recently introduced, equally as crisp and well flavored as the older sorts, and which are very ornamental for the table besides. The most marked are the Round White-tipped Turnip Radish and the Long Chartier, white tipped. If wanted specially early, the above sorts are best for hot-bed forcing; for summer and winter use the yellow and gray varieties are preferred.

RHUBARB OR PIE-PLANT (*Rheum Rhaponticum*).

Rhubarb may be planted in either fall or spring, using either plants raised from the seed, or sets obtained by division of the old roots, taking care to have a bud to each. Set at distances of three or four feet apart each way. The place where each plant is to be set should be dug eighteen inches deep and the same in width, and the soil mixed with two or three shovelfuls of well-rotted stable manure. Two dozen strong plants will be enough for the wants of an average family. If desired in winter or early spring, a few roots can be taken up and placed

in a warm cellar or any such dark and warm place. The roots, if the cellar is dark, may be put in a box with earth around them, or, if in a light cellar, they may be put in the bottom of a barrel with earth, and the top covered. The only care needed is to see that the roots do not get too dry, though water is rarely necessary when the plants are placed in a dark cellar. The useful portions are the long and thick leaf-stalks, and these, when



Fig. 132.—ST. MARTIN'S RHUBARB.

forced, are much finer in flavor than when grown exposed to air and light in the open garden. The plants in the open ground should have the flower stalks cut away as they appear. In gathering do not cut the leaf stalks, as they will readily come away by a sidewise pull, and leave no remnant to decay. The varieties are Myatt's, Linnæus, Victoria, and the new variety known as St. Martin's (figure 132), which has a distinct gooseberry flavor.

SALSIFY OR OYSTER PLANT (*Tragopogon porrifolius*).

The culture of this vegetable is the same in all respects as for Carrots, which see. Like the Parsnip, it is hardy, and can be left out during winter in any district without injury from frost. It is rapidly becoming more popular. It is stewed like Parsnips or Carrots, is used to make soup, which has a decided flavor of the oyster, or is first parboiled and then fried. There is but one kind.

SCORZONERA OR BLACK SALSIFY (*Scorzonera Hispanica*).

This is somewhat different in flavor from Salsify, and is preferred to it by many. It has much broader leaves, but is cultivated and used in the same manner.

SEA KALE (*Crambe maritima*).

Sea Kale is a favorite vegetable in European gardens, but here, as yet, almost unknown. Anticipating that at no distant day it may be as generally cultivated as it deserves to be, I briefly describe the mode of culture. The seeds of Sea Kale should be sown in the greenhouse, or in a slight hot-bed in February or March, and when the plants are an inch or two in height, they should be potted in two or three-inch pots, and placed in a cold frame to harden, until sufficiently strong to be planted in the open ground. They should then be set out in rows three feet apart, with two feet between the plants, on land enriched as for any ordinary cabbage crop. If the plants and the soil in which they have been planted are both good, and cultivation has been properly attended to, by keeping the plants well hoed during the summer, they will have "crowns" strong enough to give a crop the next season. In the northern states it will be necessary to cover the rows with three or four inches of leaves, to protect the plants from frost. Sea Kale is only fit for use

when "blanched;" and to effect this, on the approach of spring the "crowns" should be covered with some light material, such as sand or leaf mold, to the depth of twelve or fifteen inches, so that the young shoots, being thus excluded from the light, will become blanched in growing through this covering.



Fig. 133.—SEA KALE.

Sometimes cans made for the purpose, or large flower pots, or even wooden boxes, are inverted over the plants, the object in each case being to exclude the light. If it is desired to force Sea Kale, or forward it earlier, the materials used to make hot-beds, leaves or stable manure, are heaped over the pots or cans in a sufficient quantity to generate the proper heat to forward or force on the growth of the

plants. The young shoots are cut from the plant before the leaves are developed, and when cooked, have a flavor something between Asparagus and Cauliflower, but by most persons much preferred to either. The engraving (figure 133) shows young shoots when ready for the table.

SHALLOTS (*Allium Ascalonicum*).

A plant of the Onion genus, which is cultivated by setting out the divided bulbs in September in rows a foot apart, allowing six inches between them. It is entirely hardy, and fit for use in early spring.

SPINACH (*Spinacia oleracea*).

Spinach is a vegetable of easy culture. The seed may be sown either in spring or fall. If in the fall, the proper time is from the 10th to the 25th of September, in rows one foot

apart. Sow rather thickly. Cover the plants with two or three inches of hay or leaves on the approach of severe frost in December. When sown in the fall, the crop, of course, is ready for use much earlier than when sown in the spring, as half the growth is made in the fall months. By the time the seed can be sown in the spring, the crop that has been wintered over will be coming into use. To follow the crop thus wintered, seeds should be sown in the same manner in the spring, as early as the soil can be worked, and another sowing may be made two weeks later. The variety known as Savoy-leaved is best for winter, and Thick-leaved for spring. About four ounces are enough for ordinary wants for either season's sowing.

SPINACH, SUBSTITUTES FOR.

In the southern states, or even in our northern summers, Spinach runs rapidly to seed if sown in hot weather, and several plants may be used as substitutes. Among these are Swiss Chard, a species of Beet, sometimes called Spinach Beet, or Perpetual Spinach. Young plants of the ordinary Beet are by some preferred to Spinach. Ordinarily Beets need thinning, and the seed is sometimes sown very thickly, in order that there may be an abundance of thinnings to use as Spinach, or Beet greens. They are used with the young Beet attached, which should not be thicker than an ordinary lead pencil. If larger, the leaves will be too strong. Another substitute is

NEW ZEALAND SPINACH (*Tetragonia expansa*).

This is a remarkable plant, of low, branching habit, and grows with surprising luxuriance during hot weather. Single plants often spread from five to eight feet in diameter. The leaves are used exactly as ordinary Spinach. The seed should not be sown before warm weather

sets in in May, and the plants should be set out in hills three or four feet apart each way.

SQUASH (*Cucurbita Pepo* and *C. maxima*).

The summer varieties are, among others, the White and Yellow Bush and Summer Crookneck. As with all plants of this class, it is useless to sow the seeds before warm weather in May, and the directions given for Cucumbers and Melons are alike applicable to the Squash, except the distances apart of the hills, which should be from three to four feet for the bush sorts, and from six to eight for the other varieties, which "run" or make a long vine. The fall or winter Squashes are planted at the same time, but are allowed to mature or ripen, while



Fig. 134.—ESSEX HYBRID SQUASH.

the summer varieties are used green. They are usually planted eight or nine feet apart, in hills prepared in the usual way. These Squashes are great feeders, and for the best results the soil should be well enriched, besides the special manuring in the hills, as the vines throw out roots at every joint to assist in feeding and maturing the heavy crop they usually bear. The popular varieties are the Essex Hybrid (figure 134), Hubbard (figure 135), Marblehead, and Mammoth Chili. (For descriptions and

illustrations, see seed catalogues.) Most of the winter varieties, if kept in a dry atmosphere at a temperature from forty to fifty degrees, will keep until May. A garret

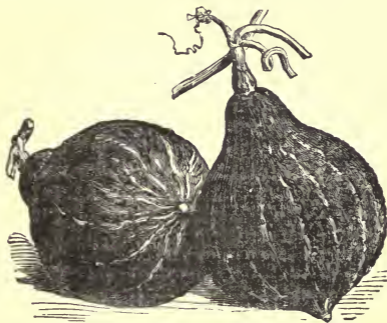


Fig. 135.—HUBBARD SQUASH.

room in a moderately well-heated dwelling house will often be a very suitable place for storing them.

SWEET POTATO (*Ipomœa Batatas*).

It is useless to attempt to grow the Sweet Potato on anything but a light and dry soil. On clayey soils the plant not only grows poorly, but the potatoes raised upon such soil are watery and poorly flavored. The plants are raised by laying the roots on their sides on a hot-bed or the bench of a greenhouse, and covering them over with sand, about the first week in May. By keeping up an average temperature of seventy-five or eighty degrees, fine plants will be produced by June 1st, at which time they should be planted in this vicinity. The plants are set in hills three feet apart each way, or on ridges four feet apart, and twelve or fifteen inches between the plants, drawing the earth up to them as they grow, until

the top of the ridge or hill is four or six inches above the level. The soil under the ridges should be highly manured, and as the vines grow they should be kept clear

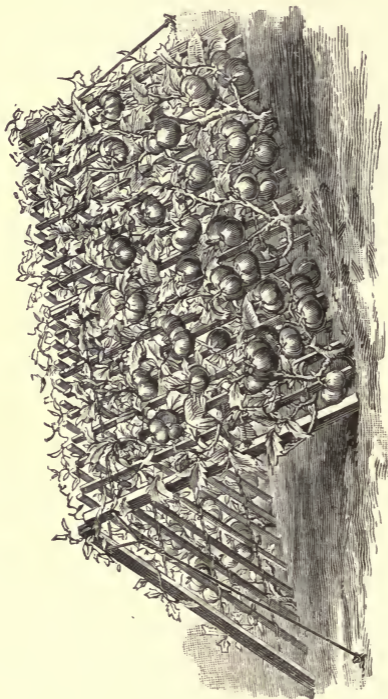


Fig. 136.—TOMATO PERFECTION, AS GROWN ON TRELLIS.

of weeds. When, late in the season, they show a disposition to root at the joints, they must be moved every week or so. This is easily done by running a rake handle or

other stick under the vines, and lifting them sufficiently to draw out the small roots upon the stem. As is the case with many other vegetables of which the plants or sets are raised in large quantities for sale, it is better and cheaper, when Sweet Potato plants are procurable, to purchase them, than to attempt to raise the small number required in a private garden. A hundred plants, not costing more than a dollar, are all that most families would require. The Nansemond is the favorite variety.

TOMATO (*Lycopersicum esculentum*).

If any vegetable is grown in a family garden, it is almost certain to be the Tomato. Hundreds of people who have only a few feet of ground at their disposal, manage to cultivate a dozen or two of Tomato plants,



Fig. 137.—PERFECTION TOMATO.

though they may have nothing else. So well is it known, that I think few of my readers will require to be told much about its culture. The Tomato will grow anywhere, and under almost any circumstances, provided

always that it has the necessary high temperature. It is essentially a plant of the tropics, and need never be sown in a hot-bed here before March, or planted in the open ground before the middle of May. When grown in private gardens, the Tomato should always be provided with some sort of trellis (see description of Pea Vine Trellis in chapter on "Implements," and also figure 136), or be tacked up against a fence or wall. By this treatment, not only will a heavier crop be obtained, but the flavor will be better. When the fruit rests on the ground it

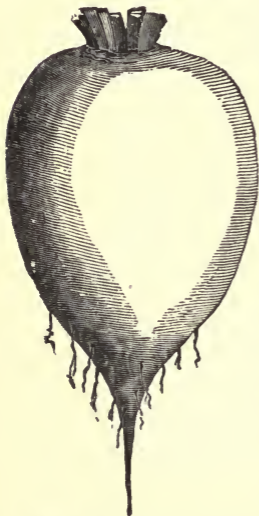


Fig. 138.—WHITE EGG TURNIP.

has often an inferior flavor, particularly when eaten raw, and is also more apt to decay. A few dozen plants usually suffice for an ordinary family; and if there are no hot-beds or other glass arrangements on hand, the plants had better be purchased, as they are sold cheaply everywhere. The favorite varieties are the new Mikado, Acme, Perfection (figure 137), Paragon, Trophy (all scarlet or crimson), and the Yellow Trophy, besides the Red and Yellow Plum Tomatoes, used for pickling and preserves.

TURNIP (*Brassica campestris*).

The Turnip, if wanted for an early crop, is sown in early spring, as directed for Beets. The best sorts are the varieties known as White and Purple-top Strap-leaved, White Egg (figure 138), and Early Milan (figure 139). If for winter or fall

use, sowing should be deferred until July or August. The Ruta Baga or Swedes are sown in July, and the



Fig. 139.—EXTRA EARLY MILAN TURNIP.

earlier winter sorts, such as Yellow Globe or Flat Dutch, in August.

SUCCESSIONAL CROPS OF VEGETABLES.

To get the full benefit of fresh vegetables during the entire season, it is necessary to sow or plant successional crops every two or three weeks, particularly with such crops as Bush Beans, Cabbage, Cauliflower, Sweet Corn, Cress, Cucumber, Lettuce, Peas, Radish, Spinach, and Turnip. Even small areas of ground, if well manured, may double or treble the crop if judiciously sown or planted. For example, the ground first sown in Radishes, Spinach, Turnip, or Lettuce, in April, will have ripened these crops so that the ground can be cleared, dug up, and manured, and again used by the first of June, when such crops as Sweet Corn, Cucumbers, Peas, or Tomatoes can be planted, and so on all through the list, and thus from May to October the table can be daily supplied with fresh vegetables for a moderate sized family, even from a quarter of an acre of ground, if labor is given sufficient to sow one crop after another has been exhausted.

GENERAL INSTRUCTIONS

In concluding the section of this book devoted to vegetable growing, we will add a few general instructions that may have been omitted in the details already given. In sowing all kinds of seeds, more particularly those of small size, be careful, if the soil is dry, to "firm" or press down the surface of the bed or row, after sowing, with the feet, or a light roller, or the back of a spade, more especially if the weather is beginning to get warm. Crops are often lost through the failure of the seeds to germinate, for the simple reason that the soil is left loose about the tiny seeds, and the dry atmosphere penetrates to them, shriveling them up until all vitality is destroyed.

We sow nearly all vegetable crops in rows, and in every case, as soon as the seed is sown, it is pressed down in the drill with the foot, then covered up level by the back of a rake drawn lengthways with the drills, and again firmed by the roller or back of a spade. For want of this simple precaution, perhaps one-fourth of all seeds sown fail to germinate, and the seedsman is blamed, while the fault is owing entirely to the ignorance or carelessness of the planter. Again, for the same reason, when setting out plants of any kind, be certain that the soil is pressed close to the root. In our large plantings in market gardening, particularly in summer, we make it a rule in dry weather to turn back on the row after planting it with the dibber or trowel, and press the earth firmly to each plant with the foot. We have seen whole acres of Celery, Cabbage, and Strawberry plants lost solely through neglect of this precaution.

Never work the soil while it is so wet as to clog. Better wait a week for it to dry than to stir it if wet.

In no work in which men are engaged is the adage, "A stitch in time saves nine," more applicable than to the work of the farm or garden. The instant that weeds

appear, attack them with the hoe or rake. Do not wait for them to get a foot high, or a twelfth part of it, but break every inch of the surface crust of the ground just so soon as a germ of weed growth shows itself. And it will be better to do it even before any weeds *show*; for by using a small, sharp steel rake, two or three days after your crop is planted or sown, you will kill the weeds just as they are germinating. The newly developed germ of the strongest weed is at that time very tender. In my market garden operations I had one man whose almost exclusive duty it was to work in summer with the steel rake; and in a few days after a crop was planted the surface was raked over, destroying the thousands of weeds just ready to appear. Had we waited for the weeds to be seen, so that they were too large to be destroyed by the raking, four men could not have done with the hoe the work accomplished by this man with the rake.



CHAPTER XLVII.

GARDEN IMPLEMENTS.

THE tool shed is an important and necessary appendage to a well-kept garden. The following list includes such implements as are generally needed in private gardens:

THE WHEELBARROW (figure 140).—The wheelbarrow

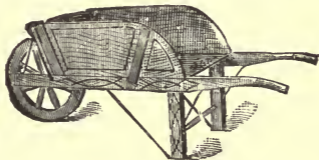


Fig. 140.

is an important vehicle in the garden, for the moving of soils, carrying manures, and for conveying the products

of the vegetable garden to the house or place of storage, and numerous other purposes. It may be purchased of different sizes and styles, or can be "home-made" by those possessing a little mechanical skill. Iron barrows are becoming popular where known. They cost only about one-third more than wooden ones, and they are practically indestructible, quite light, and hang well.

THE SPADE (figure 141).—The uses of the spade in a garden are too obvious and general to need description.



Fig. 141.



Fig. 142.



Fig. 143.



Fig. 144.

The best in use are the patent smooth back cast-steel, which are light, strong, and durable, and work clean and bright.

THE SHOVEL (figure 142).—The shovel is used for loading, and for mixing and spreading composts and

short manures. They are made with long or short handles and round or square points. Those with solid backs and straps on the handle, all in one piece, are the best and strongest, and are much superior to those with riveted backs.

THE DIGGING FORK (figure 143), or Forked Spade, is used instead of a spade to dig in manures, to loosen the earth about the roots of trees, or for taking up root crops, being less liable to cut or injure them than the spade. It is much easier to handle than the spade, and by its aid the soil can be more readily broken and pulverized. These spades are made with four and five tines, the former being the one generally used. An improved pattern has the tines pointed, so that it can be inserted in hard or clayey ground with more ease.

THE MANURE FORK (figure 144).—This is used for mixing, loading, and spreading manure, work which could not be efficiently done without it. They are made with either four or five tines, oval or diamond shaped. The oval tined fork is the lightest, and a careful man can handle it with more speed; but it is more easily broken than the diamond tined. The latter should be given to careless hands or used for heavy work.

RUBBER HOSE (figure 145).—The usual garden size is three-quarter inch (inside diameter of bore), though one inch hose is sometimes used where a large quantity of water is wanted with little force. A great deal of roguery is practised by hose manufacturers, who put in composition material which easily rots, causing the hose to soon

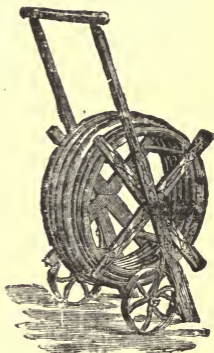


Fig. 145.

leak in places, though the hose, when new, can hardly be detected from pure *rubber*, unless examined by an expert. It is therefore advisable to buy only from those that you can depend upon to give you pure, or nearly pure, rubber hose. Although it costs a little more to begin with, it will outlast the other four times over. A recent introduction, known as "Armored Hose," we have used for over a year. It has wire twisted around the hose, thus saving it from friction in dragging. It looks as if it would be six times more durable than common hose.

THE HOSE REEL (figure 145) will be found useful for transporting the hose to various parts of the garden or lawn. It also drains the hose in winding it up, making it last longer.

HAND CULTIVATORS (figure 146).—With these implements a great variety of garden work can be done, such as hoeing, cultivating, weeding, making drills, earthing



Hoeing Between Rows.



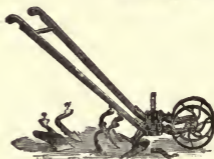
Earthing Up.



Cultivating Two Rows.



Hoeing Both Sides.



The "Planet Jr." Double Wheel Hoe, Cultivator, and Plow.

Fig. 146.

up, etc., and with greater speed and more ease than with an ordinary hand hoe.

THE COMMON OR DRAW HOE (figure 147).—There are several patterns of draw hoes, but the one in general use

is the common square hoe, as represented in the figure. Its uses in the garden are manifold, and it has frequently to do duty for several other implements. Its principal

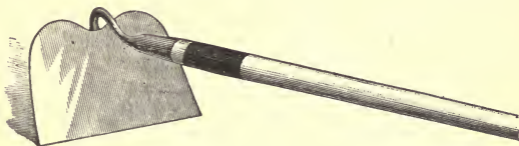


Fig. 147.

uses are to clean the surface of the grounds from weeds, to open drills for seeds, and to cover them.

THE PRONG HOE (figure 148).—This is one of the most useful of all garden tools, and is far superior to the blade hoe for stirring and pulverizing the soil. It cannot, it is true, be used where weeds have been allowed to grow to any considerable height; but then we claim that

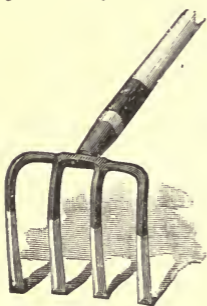


Fig. 148.

in all well-regulated gardens weeds should never be allowed to grow so large that they cannot be destroyed by the prong hoe.

THE DUTCH OR PUSH HOE (figure 149) is sometimes preferred to the preceding for cutting the weeds between the rows of vegetables, a work which can be done very quickly by its aid. It is not so



Fig. 149.

generally useful as the draw hoe, but is better for the special purposes of destroying weeds.

THE WARREN HOE (figure 150) is a new pattern of real merit. The blade is heart-shaped, and slightly

curved, similar to the mold-board of a plow. It consequently always scours bright, and works nearly one-half

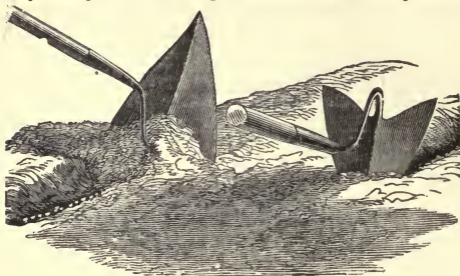


Fig. 150.

easier than the common draw hoe. For making drills and covering seeds it cannot be equaled.

THE LAWN SPRINKLER (figure 151) is attached to



Fig. 151.



Fig. 152.

three-quarter inch hose, and sprinkles the lawn a distance of from twenty to forty feet in diameter, according to the kind of sprinkler or the force of the

water. It is very valuable in dry weather, as it can be allowed to sprinkle for an hour or more in one place, and then be removed to another portion of the lawn. It is also a pretty ornament as a fountain. The illustration shows a small revolving sprinkler called the "Perfection," which is simply stuck in the ground. There are larger and more elaborate affairs with arms and ball and basket attachments, which keep a silvered ball continually dancing in the air.

THE REEL AND LINE (figure 152) are necessary in every well-regulated garden, enabling us to plant in straight and accurate rows. The best lines are those of *braided* linen, which will not stretch nor kink. Wind upon the reel when not in use.

PRUNING AND BUDDING KNIVES (figure 153) are necessary to every gardener. They are of different sizes

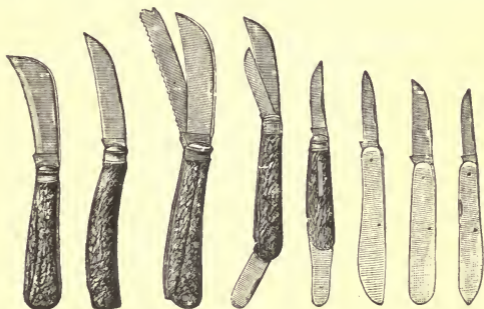


Fig. 153.

and shapes, for the various purposes of grafting, budding, etc., and are made of the best steel.

GRAPE SCISSORS (figure 154).—These are slender-pointed scissors, used for thinning out the berries of foreign grapes when they are about a quarter grown, so

that those that are left may have room to develop. This operation should never be neglected if large berries and well-shaped bunches are desired.

FLOWER GATHERERS (figure 155).—A very useful article. The scissors cut off, and at the same time hold fast the flower or fruit after it is cut, thus enabling one



Fig. 154.



Fig. 155.

to reach much farther to cut flowers or fruits than if both hands had to be used. It is particularly useful in gathering rose-buds, as the stem can be cut off with but little danger from the thorns.

THE GARDEN TROWEL (figure 156) is used for setting the smaller kinds of plants when transferred from pots



Fig. 156.

to the open ground, for transplanting annuals, and for many other uses. It is a very necessary little implement.

LAWN SCYTHE (figure 157).—The lawn scythe is now but little used, the lawn mower taking its place, unless



Fig. 157.

on hill-sides or among trees or shrubs, where the lawn mower cannot be worked.

LAWN MOWERS (figure 158).—The great improvements in Lawn Mowers during the past few years, and the low price at which they may now be obtained, have

made their use common in every garden. They are of many sizes, from the small machine that can be easily worked by a boy, and admirably adapted for city garden plots, to the large horse mowers, that may be daily seen in use in our larger parks. In buying a lawn mower, always be sure that it is light running; that it will cut high grass; that all wear can be taken up, and that it is simple. "Side-wheel mowers" are always to be pre-



Fig. 158.

ferred on ordinary lawns, as they run much easier than a "roller mower." The latter has one advantage only, and that is in cutting on a narrow border where a side-wheel mower would run off on the side. But the benefit derived by a lawn from the rolling received by a "roller mower" is in theory only, as the roller is not heavy enough to be of any actual benefit, while it is heavy enough to make the machine run hard. If you wish to roll your lawn, get a roller that will weigh not less than three hun-

dred pounds. *Grass Boxes* can now be furnished on the new Henderson Lawn Mowers for collecting the cut grass. This is very desirable in some cases, particularly in tennis courts, croquet grounds, etc.; but I do not advise this in other cases, especially if the lawn is fully exposed to the hot sun. The cut grass in this case acts as a mulch, and prevents the sun from drying the roots out.

THE GARDEN ROLLER (figure 159).—The benefit derived from using a roller on the lawn, especially in the spring, is not fully understood. The action of freezing

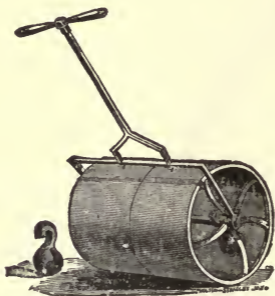


Fig. 159.

and thawing causes the ground to heave, and if it is not firmly pressed back with a roller before hot weather the grass is apt to be killed or injured, leaving the lawn full of bare spots. For use on the lawn always take a "*two or three section*," as they can be turned without injuring the grass. "*One section*" will be preferable for walks, as they leave no mark. Rollers having weights attached to the central shaft, that can be unhooked and removed when lighter weight is desirable, are the best. These weights always keep the handle up from the ground, and out of the way.

THE LAWN RAKE is used for raking off lawns previous to and after using the scythe or lawn mower, and for removing dead leaves and other rubbish. An improvement over the old 22-teeth wooden rake is

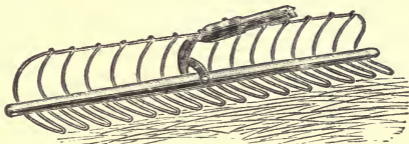


Fig. 160.

the *Steel Wire Rake* (figure 160). The teeth are so made that they will not catch in the roots. It rides over the grass in place of having to be held up, making the work easier.

THE GARDEN RAKE (figure 161) is used to level the surface of the ground after it has been spaded or hoed, and to prepare it for the reception of seeds or plants. Rakes are made of different sizes, for convenience in using between rows of plants, with from six to sixteen teeth. When a crop like cabbages is newly planted, we



Fig. 161.

use the rake in preference to anything else, as raking over the surface before the weeds start to grow, destroys the germ of the weed, never allowing it to appear at all. One of the best garden rakes made is the "bow rake" (figure 162), which will not break, like an ordinary garden rake, where the handle is fastened in the center of the head.

THE GRASS EDGING KNIFE (figure 163) is used for cutting the grass edgings of flower beds, its rounded



Fig. 162.



Fig. 163.

edge fitting into curved lines, for which the spade would be unsuitable.

THE GRASS HOOK (figure 164).—This is a most useful implement for switching around and trimming off grass under hedges, bushes, fences, etc.



Fig. 164.

GRASS EDGING OR BORDER SHEARS (figure 165).—No lawn looks finished unless the overhanging grass around the edges of the borders has been trimmed. The shears here shown are the best for the purpose that we know of. They can be procured with a wheel at the heel of the blade, so that the



Fig. 165.

shears can be rolled along on the ground; but old gardeners generally prefer them without.

HEDGE SHEARS (figure 166) are better fitted for clipping hedges than the Bill Hook sometimes used for the purpose, particularly in inexperienced hands. A line

should be set at the height to which the hedge is to be cut, as a guide to work by. The notch near the heel of the blade of all improved shears is to catch strong branches, which would otherwise slide out when an effort was made to cut them.

HAND-PRUNING SHEARS (figures 167 and 168).—These are very efficient and useful, and will cut off a small branch as clean as a knife. They are indispensable in pruning small trees and vines, and for use in grapery and garden.

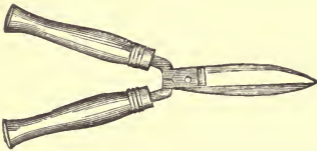


Fig. 166.



Fig. 167.



Fig. 168.

LOPPING OR BRANCH PRUNING SHEARS (figure 169).—These are powerful shears for cutting large branches. They have wooden handles from two to three feet long, which enable the operator to reach up a considerable

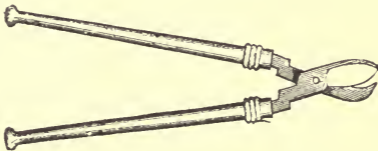


Fig. 169.

distance. For thinning out and trimming up old shrubs, such as Lilac bushes, they cannot be equaled. Figure 170 shows another style, called the *Slide Cut Lopping Shears*. These are so made that the cutting blade is drawn through the branch like a knife, which prevents bruising and crushing.

POLE TREE PRUNER (figures 171 and 172).—With this implement branches of three-quarters of an inch and less in diameter can be trimmed from almost any

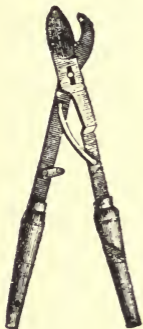


Fig. 170.



Fig. 171.



Fig. 172.

part of a tree without the trouble and risk of climbing or standing on a ladder. The newer patterns can be attached to poles of any length, and operated by a rope. A spring throws the knife back after the branch has been cut.

THISTLE AND WEED CUTTER (figure 173).—With this tool all sorts of weeds can be cut out of the lawn without breaking the surface of the sod. The projection on the side is to press the foot on for large roots, and places where the scythe or lawn mower cannot be used, or where the place to be cut is small.



Fig. 173.

MOLE TRAPS (figure 174).—Where moles are prevalent in lawns, flower beds, and bulb beds, they can be effectually

ally got rid of by using a first-class trap. The one we here illustrate is, we believe, the best we have ever used. It is called "Hale's Perfect Mole Trap." To be successful, however, a person should know *where* to set a trap, as any "run" will not always do. Moles go through some "runs" regularly, and through others only once. To find a "regular run," press the ridge down with your foot in various portions of the grounds. An examination next morning will show some depressions that have been raised, and will show where the regular runs are.

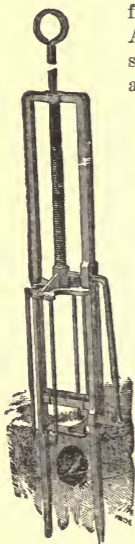


Fig. 174.



Fig. 175.



THE PRUNING SAW (figure 175) is used for cutting off branches that are too large for the knife, for removing dead ones, etc. It can be had of various sizes, from sixteen to twenty inches in length, and can be attached to a pole, so that the higher limbs can be reached.

GARDEN SYRINGE (figures 176 and 177).—The syringe is indispensable, and is in daily use in the greenhouse, conservatory, and garden. Syringing is necessary to keep

Length of Barrel, 19 in., diameter, $1\frac{1}{4}$.



Fig. 176.

the plants in a flourishing and healthy condition, and prevent the attacks of red spider, and with it fluid insecticides can be applied. They are made of several sizes and

Length of Barrel, 18 in.; diameter, $1\frac{1}{2}$.



Fig. 177.

patterns, and fitted with roses for dispersing water with varying force and fine or coarse sprays.

THE WATER BARREL AND TRUCK (figure 178).—A very useful combination for carrying water and other fluids. The barrel can be instantly detached, so that the truck can be used for conveying other barrels for various purposes. The barrel is exactly balanced over the axle,



Fig. 178.

and therefore no lifting or down pressure on the handles is needed in transportation. It is sometimes rigged up with a sprinkling attachment for sprinkling lawns, and a portable hand pump can be attached to throw water and insecticides over shrubs, plants, etc. The tires are

two and a half inches broad, to prevent cutting into soft ground. A box can also be attached after the barrel has been removed, making a very convenient hand-cart.

THE GARDEN ENGINE (figure 179) is an important adjunct to the garden. It is especially valuable for preventing the ravages of insects on trees where they can not be reached with an implement less powerful. The rapid increase of insects, worms, etc., in some portions of the country, whereby fruit is destroyed and trees injured, renders it necessary to wage continual war

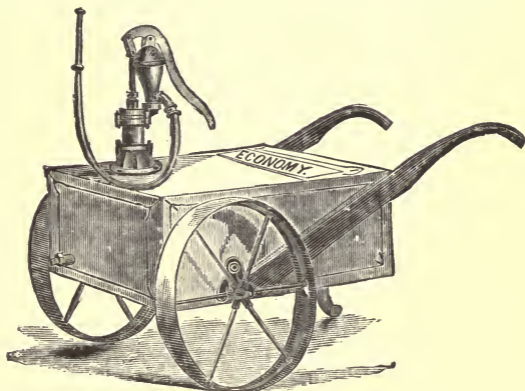


Fig. 179.

against them, and it can be successfully done by spraying with solutions of Paris green, London purple, kerosene, and other mixtures, without injury to the fruit. The Garden Engine holds forty gallons of water, and will throw a stream sixty feet high or a spray forty feet high. It can be procured with a suction attachment, whereby it can fill its own box from a pond or cistern.

WATERING-POTS.—A watering-pot is indispensable in the greenhouse or conservatory, where it is daily needed. It is made of various sizes, from one to five gallons (the two-gallon size is convenient), with a rose for sprinkling, which may be detached at will. The new French pattern (figure 180) is much superior to the old style for ease of handling, especially for greenhouse work, as its flat shape allows it to be carried readily between the benches; but its great merit is the handle, whereby it can be held in any position without straining the wrist.

THE PORTABLE HAND FORCE PUMP (figure 181) is a very compact and useful implement for greenhouse and



Fig. 180.



Fig. 181.

garden work. It is easily operated, and throws a continuous stream forty or fifty feet. It is very effective for watering shrubbery, gardens, or lawns, and especially valuable for applying fluid insecticides, such as Paris green water, to trees and bushes that are being ravaged by insects.

POWDER BELLOWS (figure 182).—For applying insect

powders, such as hellebore, Persian insect powder, tobacco dust, etc., to bushes and plants infested with insects, or sulphur to rose bushes and grape vines to



Fig. 182.

prevent and cure mildew. The powders can be better applied with this than by any other method, as the force given it causes it to reach all crevices where insects hide.

A FLUID BELLOWS OR VAPORIZER (figure 183) is sim-



Fig. 183.



Fig. 184.

ilar in construction to the above, the receptacle holding fluids in place of powder, which is distributed in a fine mist over a large surface. It is valuable for applying

such solutions as kerosene, fir tree oil, etc., to plants, etc., rendering their use perfectly safe. We also find it useful for spraying the foliage of plants before we dust powders on them.

PLANT SPRINKLER (figure 184).—This is a very useful rubber ball, holding from half a pint to a pint of water, according to the size. By pressing the ball with the hand a very fine spray is forced out, suitable for watering cut flowers, bouquets, seedlings, etc.

FUMIGATORS.—Figure 185 shows one of the most complete implements that I know of for smoking green-houses, conservatories, etc., without danger of fire, and without leaving a lot of litter behind, as is the case in the old way. This fumigator is arranged so that a handful of shavings or paper can be put on the grate, and on these the dampened tobacco stems. A



Fig. 185.

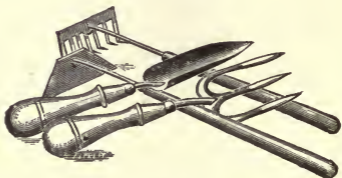


Fig. 186.

sliding door in front regulates the draught, and a pan underneath catches the ashes and dirt. They come in various sizes.

LADIES' AND CHILDREN'S GARDEN TOOLS (figure 186) —In all flower gardens there is a great deal of hand-work to be done. This lot of small implements, consisting of a trowel, fork, rake, and hoe, will be found very useful in working on small flower borders. There are various sizes of these tools. Those with handles about three to four feet long are really very practical.

HAND WEEDERS.—Indispensable little tools for garden work, such as weeding, loosening the soil around plants, etc. They save the fingers and work with great rapidity. There are now several styles, all of which are good. We give illustrations of the best. Figure 187, Hazeltine's;

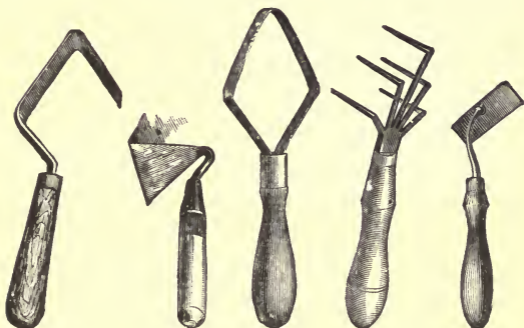


Fig. 187.

Fig. 188.

Fig. 189.

Fig. 190.

Fig. 191.

figure 188, Onion; figure 189, Noyes's; figure 190, Excelsior; figure 191, Allan's.

HAND GLASSES (figure 192).—These have been mentioned under Cauliflower, Cucumber, etc. They are invaluable for starting and forcing young plants, protecting them from insects and frosts, and save much annoyance and care. Home-made hand glasses, being simply a small frame covered with a pane of glass, are very useful; but as they exclude some light they are not equal to that shown in the illustration, which is a simple galvanized iron frame hinged at the top, so that it can be folded together, and a number packed away safely and in a small compass. The ends are of cloth, which admits sufficient air to keep the plants healthy and prevent burning. The glass is slipped in from

the top, so that if one is broken it can be quickly and cheaply repaired.

TRELLISES, or supports for plants, are needed in the flower and vegetable garden not only for climbers, but for keeping plants which have weak stems within proper

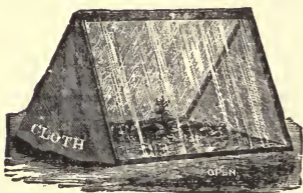


Fig. 192.

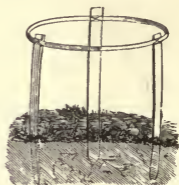


Fig. 193.

bounds. Trellises for pots may be purchased ready made, as may those for climbing Roses and such plants. They are usually made of rattan upon a frame of light wooden stakes, and some are made entirely of wire. A person of a mechanical turn can readily make all that will be

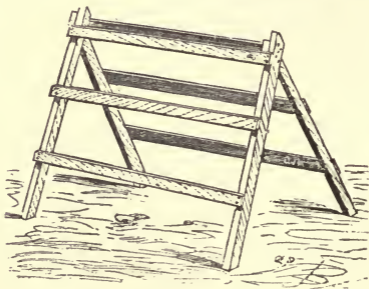


Fig. 194.

needed. A few engravings are given here as suggestions. Figure 193 shows a useful support made with a barrel hoop and staves. The same plan may be carried out with

two or more hoops, and laths, if staves are too heavy. This will answer for Tomatoes, Raspberries, and various other plants. A more permanent tomato trellis is shown in figure 194, in which slats are supported by Δ shaped uprights. If put together with screws, such a trellis may be carefully put away in the fall and made to last several years. A rustic trellis, like that in figure 195, is often useful in the flower garden, or it may serve, when covered with climbers, to divide the flower from the vegetable garden. It is made of sticks of cedar or other durable wood, set as shown in the engraving, and

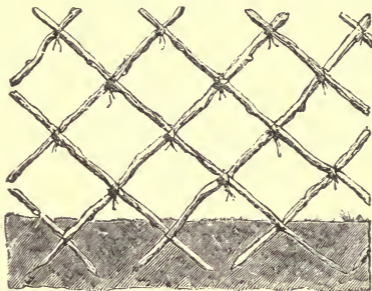


Fig. 195.

tied, where the bars across one another, with strong tarred twine. With these examples as suggestions, one will find no difficulty in making more elaborate supports and with other materials.

THE WHITE'S TRELLIS (figure 196), before referred to in other parts of this work, I consider to be one of the most valuable of garden requisites. It is of simple construction, so that it can be sold very cheaply, the price being from six to fifteen cents per running foot, according to size. Its original design was, that it should be used as a substitute for the ordinary pea brush or pea stakes; and

though for such purposes it will be mainly employed, yet it should be used for all plants requiring support, such as Lima Beans, Tomatoes, etc., and when space is limited, Cucumbers and Melons could be trained to fruit on it with little trouble; besides, there are scores of climbing flowering plants, both perennial and annual, which can be trained with the best results on the Pea vine trellis. We used this new trellis extensively in our trial grounds last season, and found it an admirable substitute for brush or strings in staking Peas, Tomatoes, etc. Its construction is such that the cultivator is enabled to pass freely between the rows,

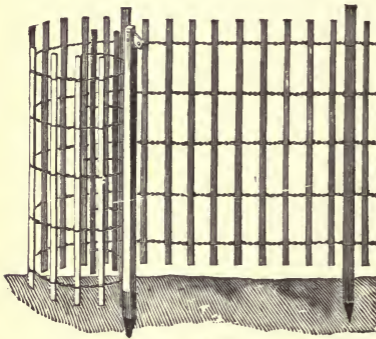


Fig. 196.

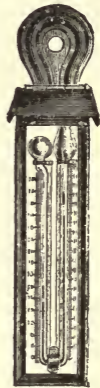


Fig. 197.

thus simplifying the work of cleaning and picking; and, besides, it is at all times a neat and ornamental feature in the garden. These trellises are strongly made of galvanized wire, with staunch wooden uprights, neatly painted, and, with care, will last for a dozen years. They are so made that, after they are through with in the garden, they can be rolled up into a small compass and put away.

THERMOMETERS (figure 197).—There are many kinds of these that are useful, but none that can equal the one illustrated, which is known under the peculiar name of “sixes,” or, properly, “self-registering.” It will register both heat and cold, and is set by using a magnet to draw the steel needles down to the mercury. With this thermometer one can tell the coldest and hottest degree reached in the greenhouse during the night.

STEP LADDERS (figure 198).—The step ladder is always useful in a garden and orchard, especially during

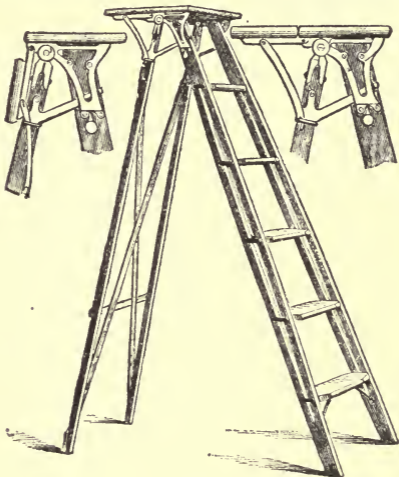


Fig. 198.

the fruiting season. It is made in different sizes, varying from four to twelve feet high. The illustration shows an improved pattern with extension top for holding a basket for fruit.

TREE SCRAPERS (figure 199).—A handy little tool for scraping rough or diseased bark from trees, thereby preventing insects from hiding and breeding, and making



Fig. 199.



Fig. 200.

applications of whale oil soap or other solutions very effective.

BILL HOOK (figure 200), useful for trimming hedges, cutting brush, etc.

APHIS BRUSH (figure 201).—A splendid little brush for cleaning the leaves of plants infested with green fly and other insects.

GARDENER'S GLOVES (figure 202) of heavy tanned goat

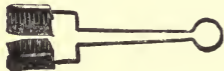


Fig. 201.

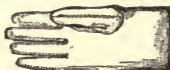


Fig. 202.

or sheep skin. They enable one to work among thorny bushes without danger of having the hands scratched.

ASPARAGUS KNIFE (figure 203).—For cutting Asparagus below the surface of the soil. The saw-tooth edge



Fig. 203.

is to use where there is danger of injuring the knife edge by cutting against stones.

MONTHLY CALENDAR OF OPERATIONS.

ALTHOUGH I have endeavored throughout the foregoing pages to be particular in stating the season or date at which each gardening operation should be done, still it may save time to the novice, and be otherwise of advantage, to briefly suggest what work should be done each month.

JANUARY.

GREENHOUSE AND FLOWER GARDEN.—But little need now be done in either. In the greenhouse care must be exercised with the fires to protect against frost, as this is usually the coldest month of the year; it is also that in which there is the least sunshine. But little ventilating need be done; but when it does become necessary to do it, caution must be used. Be careful to raise the ventilating sash only so high that the heated air from the greenhouse will be able to drive back the outer air to such an extent as not to chill the plants. For example, occasionally, after a very cold night, where severe firing has been necessary to keep up the required temperature, say to sixty degrees, it happens that the sun comes out bright during the following day, so that by noon, or before, the temperature may be at a hundred degrees inside the greenhouse, though outside it may be nearly at zero. In such case the raising of the sashes an inch or two will rapidly lower the temperature of the greenhouse, so that an hour or so of such ventilating would be all that is required. If the greenhouse is heated by flue, or even by hot water or steam, examine nightly, that no combustible material is laid on the flue or thrown against the chimney of the boiler. As little fresh air can be given, insects are to be watched this month closely. By the use of fire heat a dry atmosphere will be created, in which the *red spider* luxuriates. Nothing answers so well for its destruction as copiously syringing the plants at night, and splashing the paths with water, as it cannot exist to an injurious extent in a moist atmosphere. The Aphis, or “green fly,” must also be destroyed, or it will soon cause great injury to the plants. Tobacco in almost any form is death to it, and may be either used by burning the

stems or dusted on as snuff, or syringed on in liquid form. For full directions see body of the work.

Hyacinths and other bulbs that have been kept in the cellar or other dark, cool place, may now be brought into the light of the greenhouse, provided they have filled the pots with roots. If not well rooted, let them remain until they are so, or select such of them as are best, and leave the others until ready. In the outside flower garden little can be done, except that shrubs may be pruned, or new work pushed on, such as making walks or grading, if weather permits.

FRUIT GARDEN.—Pruning, staking up, or mulching can be done if the weather is such that the workman can stand out. No plant is injured by being pruned in cold weather, though the pruner may be.

VEGETABLE GARDEN.—Nothing can be done this month in the northern states except to prepare manure, and get sashes, tools, etc., in working order; but in sections of the country where there is but little or no frost, the hardier kinds of seeds and plants may be sown and planted, such as Asparagus, Cabbage, Cauliflower, Carrot, Leek, Lettuce, Onion, Parsnip, Peas, Spinach, Turnip, etc. In any section where these seeds can be sown in the open ground, it is an indication that hot-beds may be begun for the sowing of such tender vegetables as Tomatoes, Egg and Pepper Plants, etc., though, unless in the extreme southern states, hot-beds had better not be started before the first of February.

FEBRUARY.

GREENHOUSE AND FLOWER GARDEN.—The directions for January will in the main apply to this month, except that now some of the hardier annuals may be sown, and also the propagation of plants by cuttings may be done rather better now than in January. For instructions in such matters, see chapter on "Propagation."

FRUIT GARDEN.—But little can be done in most of the northern states as yet, and in sections where there is no frost in the ground, it is likely to be too wet to work; but in many southern states this will be the best month for planting fruit trees and plants of all kinds, particularly Strawberries, Raspberries, Blackberries, Pear, and Apple, while Grape-vines will do quite a month later. One of the greatest wants, in many parts of the

south, is reliable nurseries, where such things can be procured ; and as all such plants are at this season frozen solid in nurseries at the north, orders for such things cannot usually be shipped before April. Still, though something may be lost by this circumstance, if proper attention is given to planting, watering, and shading (when practicable), good results may be obtained by planting trees from the north, as it is always better to take plants of any kind from a cold climate to a hot one, than from a hot to a cold.

VEGETABLE GARDEN.—Horse manure, leaves from the woods, or refuse hops from the breweries, when they can be obtained, may be got together towards the latter part of the month, and mixed and turned to get “sweetened” preparatory to forming not-beds. For detailed instructions see article on “Hot-beds.” Manure that is to be used for the crops should be turned and broken up as fine as possible ; for it should be known that the more completely manure of any kind can be mixed with the soil, the better will be the crop, and, of course, if it is dug or plowed in in large, unbroken lumps, it cannot be properly commingled. Cauliflower, Cabbage, and Lettuce seeds for early crops should be sown in hot-bed or greenhouse this month.

MARCH.

GREENHOUSE AND FLOWER GARDEN.—Brighter sunshine and longer days will now begin to show their effects by a rapid growth of plants in the greenhouse, and also in those of the parlor or window garden. Examine all plants that are growing vigorously and are healthy, and if the roots have struck to the sides of the pot and matted the “ball” of earth, then they must be shifted into larger sized pots. If this is long neglected the plants are certain to suffer in consequence. For details of operations see chapter on “Potting.” The plants propagated last month may now need shifting also, and propagation should continue of all plants that are likely to be wanted. If propagation is put off much later, most plants would not be large enough if needed for bedding purposes in the flower garden in summer. The hardier kinds of annuals may now be sown. It is best done in boxes, as recommended in chapter on “Propagation by Seeds.” Lawns may now be raked off and top-dressed (if it was not done in the fall) with short manure or rich garden

earth mixed with one-tenth part of bone dust or similar fertilizer, where manure is not obtainable, and on light soils flower beds may be dug up so as to forward the work preparatory to the coming of the busy season.

FRUIT GARDEN.—In light, dry soils planting may be safely done in many sections, but we again caution the inexperienced not to get impatient and begin to plant before the ground is dry. It is bad to do so even in light, sandy soils, but in stiff and clayey ones it will be utter destruction. Again at this season, although a tree or plant will receive no injury *when its roots are in the soil*, should a frost come after planting, yet the same amount of freezing would greatly injure the plant if the roots were uncovered and exposed. Thousands of trees and plants fail every year from this cause. They are exposed for sale in our markets with no protection to the roots, and even the experienced purchaser rarely has sufficient knowledge to be certain whether the roots of a tree have been injured by being frozen or dried up by the cold winds of March. It is always best, when it can be done, to purchase direct from the nearest reliable nurserymen. They well know the importance of having the roots properly protected, while in two cases out of three the market huckster neither knows nor cares.

VEGETABLE GARDEN.—This is a busy month. Hot-beds must now be all started, and all the seeds of the hardier vegetables may be sown in the open ground in locations where the frost is out and the ground dry. The list given for the southern states in January may now be used at the north, while for most of the southern states the tender kinds of vegetables may now be sown and planted, such as Egg-Plant, Okra, Melon, Sweet Potatoes, Squash, Tomatoes, Potatoes, etc. For early crops north, all these tender vegetables should now be sown in the hot-bed or the greenhouse.

APRIL.

GREENHOUSE AND FLOWER GARDEN.—Plants, whether grown in the greenhouse or in windows, will require increased ventilation and water this month; and as they will now be growing rapidly, due attention must be paid to shifting into larger pots when necessary, and also increase the space, if possible, by putting the hardier sorts out in frames. If plants are crowded at this season in the greenhouse, they will grow spindling and

weak. It is better to throw away the common or coarser plants if there is not room for the finer sorts to develop properly. Towards the end of the month it may be necessary to partly shade the glass of the greenhouse. This may be done either by sheeting hung on rollers from the top, or, more simply and cheaply, by making a very thin whitewash of lime. This may be spattered over the glass very lightly at first, just to mark the glass with white spots as thick as if a slight shower should leave the marks of its drops. The wash is to be spattered on thicker every week or two, as the season advances. The planting of all kinds of hardy herbaceous plants and shrubs may now be done in the flower garden. Bulbs and all tender plants that have been covered for protection in winter may now be stripped, and the beds slightly forked and raked. Sow tender annual flower seeds in boxes in the greenhouse, hot-bed, or sitting-room, and the hardier kinds in the open border.

FRUIT GARDEN.—Strawberries that have been covered up by straw or leaves, should now be relieved around the plant, only leaving the covering between the plants. See chapter on "Strawberries." Raspberries, Grape-vines, etc., that have been laid down may now be uncovered and tied up to stakes or trellises, and all new plantations of these and other fruits should now be made.

VEGETABLE GARDEN:—The covering of Asparagus, Rhubarb, Spinach, etc., should now be removed, and the beds hoed or dug lightly. The hardier sorts of vegetable seeds and plants, such as Beets, Cabbage, Cauliflower, Celery, Lettuce, Onions, Parsley, Parsnip, Peas, Potatoes, Radishes, Spinach, Turnip, etc., should all be sown or planted by the middle of the month, if the soil is dry and warm, and in all cases where practicable before the end of the month; for if these varieties of vegetables are delayed until the hot weather in May, they will not be so early, and in most cases will not produce so fine a crop. It is quite a common practice with many amateurs to delay garden operations of all kinds until May, but all the hardier sorts of vegetables are likely to be later and inferior in consequence. Any one expecting to get fine *early* Cabbage, Cauliflower, Lettuce, or Radishes, if planting or sowing is delayed until the time of planting Tomato and Egg-Plants in May, is certain to be disappointed.

MAY.

GREENHOUSE AND FLOWER GARDEN.—The majority of plants in the greenhouse or window garden should now be in their finest bloom. Firing may now be entirely dispensed with in the greenhouse, though care must yet be exercised in ventilating in the first part of the month, as we still have cold winds in this section. By the end of the month all of the plants that are wanted for the summer decoration of the flower borders may be planted out. In doing so, when the ball of earth has been completely matted with roots, it will be better to bruise it slightly between the hands, so that, after being planted, the water will pass freely through the "ball," as it often happens that it is so hard and dry as to prevent the water from penetrating it, and the growth is impeded in consequence. Water once copiously after planting if the weather is dry. When the greenhouse is not to be used during the summer months, Camellias, Azaleas, and plants of that character should be set out-doors under some shade; but most of the other plants usually kept in the greenhouse or window garden in winter, may be set in the open border, where the pots should be plunged to the rim in ashes or sand, keeping them slightly apart from each other, to prevent crowding. Where there are indications that the pot has become filled with roots, the plant should be shifted into a size larger, just as it is done inside the greenhouse. As the plants make growth, they, with few exceptions, should be pinched back to cause a stout and branching form. Lawns should now be mown and edgings trimmed nicely, and all flower beds hoed and raked; for if weeds are not kept down as they first appear, treble the labor will be required to eradicate them next month. Annuals that have been sown in the greenhouse or hot-bed may now be planted out, and seeds of such sorts as Mignonette, Sweet Alyssum, Phlox Drummondii, Portulaca, etc., may be sown in the borders. Cuttings or young plants of Chrysanthemums, if started now, will give fine plants for fall flowering.

FRUIT GARDEN.—Where it has not been convenient before, most of the smaller fruits may yet be planted the first part of the month. Ply the hoe or cultivator vigorously to keep down weeds. If any of the numerous varieties of caterpillars, slugs, or worms make their appearance on the young shoots of vines or trees, a free application of tobacco dust mixed with Pyrethrum

or Persian insect powder will dislodge most of them. It is best to use it as a preventive; for if they once get a foothold, the crop may be ruined.

VEGETABLE GARDEN.—Thin out all crops sown last month, that are now large enough, and hoe deeply all planted crops, such as Cabbage, Cauliflower, Lettuce, etc. Plant out all tender vegetables, viz. : Tomatoes, Egg and Pepper Plants, Sweet Potatoes, etc. Plant seeds of Lima Beans, Corn, Melons, Okra, Cucumbers, etc., and successional crops of Peas, Spinach, Lettuce, Beans, etc.

JUNE.

GREENHOUSE AND FLOWER GARDEN.—The greenhouse may now be used for hot-house or tropical plants, if such are desired during the summer months. It should be well shaded, and fine specimens of fancy Caladiums, Dracænas, Palms, Ferns, and such plants as are grown for the beauty of their foliage, will make it very attractive. Hyacinths, Tulips, and other spring bulbs may now be dug up, dried, and placed away for next fall's planting, and their places filled with such plants as Geraniums, Coleus, Achyranthes, and the various "white-leaved plants" that are suited for late bedding. Lawns will now require to be mowed weekly in all well-kept places. It is as much an indication of slovenliness to see a door-yard that has any pretensions to be called a lawn with the grass uncut, as it would be to see a dust-begrimed carpet in the parlor.

FRUIT GARDEN.—If Strawberries have not been mulched with hay or straw in winter, the cut grass from the lawn is a convenient thing to place between the rows to keep the fruit from getting sanded by dashing rains. Nearly all the small fruits, such as Gooseberries, Raspberries, etc., are much improved by having a mulching of some sort placed around the roots, which should be done this month. For such fruits as require to be thinned, see instructions for next month.

VEGETABLE GARDEN.—This is usually the busiest month in the garden. Crops mature and have to be gathered, and while doing so weeds are apt to steal a march on you, and may destroy entirely some of your hard work of former months, unless you attack them in their embryo stage, that is, just when breaking through the soil. A man will hoe and rake over six times the surface of soil when the weeds are in this stage that

he would if the weeds were six inches high, and in this matter, more than anything else I know of in gardening, does a "stitch in time save nine." Beans, Peas, Beets, Corn, Cucumbers, Lettuce, etc., may still be sown for successional crops, and late plantings of Irish Potatoes and Sweet Potatoes will yet do well in suitable soils. Tomatoes should be tied up to trellises or stakes, if fine-flavored and handsome fruit is desired.

JULY.

GREENHOUSE AND FLOWER GARDEN.—But little need be said of the greenhouse this month. Watering, ventilating, and fumigating (or the use of tobacco in other forms for destruction of Aphis), must be attended to. Keep the atmosphere of the greenhouse moist. The plants from the greenhouse that may have been plunged out-doors, must be watched when they require repotting; and where the roots have run through the pots, they should also be occasionally turned round, to break them off; for if this is not done now, it would seriously injure the plant in the fall when the roots have run through the pot and deep into the soil, as they often do. Plants such as Dahlias, Roses, Gladioluses, as well as many herbaceous perennial and annual plants, will now require staking. Be careful to proportion the size of the stake to that of the plant, and do not tie it too tightly. Stakes painted green look best, and the square are nearly as good as the round ones, and much cheaper. Carnations and other plants that are throwing up flower stems, if wanted to flower in winter, should be cut back. Top Chrysanthemums to make them bushy.

FRUIT GARDEN.—If there are any signs of mildew on the grape-vine leaves, dust them over with dry sulphur, choosing a still, warm day. The fruit will now be gathered from the Strawberries; and if new beds are to be formed, the system recommended of layering the plants in small pots is the best. See "Strawberries." Where Apples, Pears, Peaches, etc., have set fruit thickly, thin out one-half or two-thirds of the young fruit, as by doing so you will get at least an equal weight and much finer fruit. The same is true of grape-vines and all other fruits that have set thickly. Where thinning out is practicable, it will always be beneficial to practise it.

VEGETABLE GARDEN.—Plants of Cabbages, Cauliflowers, Cel-

ery, and all similar varieties of vegetables wanted for fall or winter use, are best planted this month, though in some sections they will do if left until next. See directions given under these separate heads. Sweet Corn, Beans, Cucumbers, and Lettuce may yet be sown for late crops, and in some sections Ruta-baga Turnips for the main winter crop. Tomatoes should be kept tied up to stakes or trellises, and Sweet Potatoes must be hoed or moved to prevent the vines from rooting at the joints.

AUGUST.

GREENHOUSE AND FLOWER GARDEN.—The instructions for July apply with but little variation in these departments this month.

FRUIT GARDEN.—Strawberries that were planted in spring, and also those that have fruited, will now be making "runners" or young plants freely. All runners should be kept cut off close to the old plant, so that the full force of the roots is expended in maturing the "crowns" or fruit buds for the next season's crop. New plantations of Strawberry plants should now be made from pot layers, though they will do as late as the end of September; but the sooner they are planted after they are rooted in the pots, the heavier will be the crop. If plants are wanted for fresh plantations, about the required number can be allowed to run, but should be layered in pots, as recommended under "Strawberries." Cut away the old stems of Raspberries and Blackberries that have borne their fruit, and thin out the young shoots to three or four canes to each hill or plant. If tied to stakes and topped when four or five feet high, they will make stronger canes for fruiting next year.

VEGETABLE GARDEN.—Planted crops, such as Cabbage, Cauliflower, and Celery, should be hoed deeply. We do not recommend the earthing up of Celery this month. Onions will in many sections now be ready for harvesting. This condition will be known by the tops becoming yellow and falling down. They are best dried by placing them in some dry shed in thin layers. For Sweet Potatoes, see directions of last month. Spinach may be sown for early fall use, but it is yet too early to sow for the winter crop. Red-top, White Globe, and Yellow Aberdeen Turnips should now be sown. Ruta-baga Turnips sown last month will need thinning.

SEPTEMBER.

GREENHOUSE AND FLOWER GARDEN.—Towards the end of the month, in many sections, the more tender plants will require to be put in the greenhouse, or housed in some way; but be careful to keep them as cool as possible during the day. They would be better outside yet if it were safe to risk them. Cuttings of all bedding plants may now be made freely, if wanted for next season, as the young cuttings rooted in fall make better plants for next spring's use than the old plants. This is true of what is known as bedding plants, such as Geraniums, Fuchsias, Verbenas, Heliotropes, etc.; but with Roses and other plants of a woody nature, larger plants are usually the best. Holland bulbs, such as Hyacinths, Tulips, etc., and most of the varieties of Lilies may be planted this month. See detailed instructions under "Holland Bulbs." Violets that are wanted for winter will now be growing freely, and the runners should be trimmed off as recommended for Strawberries last month. Seeds of Pansies, Daisies, Mignonette, Sweet Alyssum, Candytuft, etc., should now be sown in the early part of the month. The early part of this month is as late as Chrysanthemums should be pinched back.

FRUIT GARDEN.—New plantations of Strawberry plants may still be made from the runners that have been layered in pots. The sooner in the month they are planted, the stronger they will be for next season. These plants will soon make runners, which must be trimmed off to throw the strength into the crowns for next season's fruiting. Attend to Raspberries and Blackberries as advised last month, if not then done.

VEGETABLE GARDEN.—Seeds of Cabbage, Cauliflower, and Lettuce, to raise plants to be placed in cold frames, should be sown in this latitude from the tenth to the twentieth of this month. The main crop of Spinach or Sprouts that is wanted for winter or spring use, should be sown about the same dates. Celery may now have the earth drawn to it with the hoe preparatory to earthing up by the spade. Onions that were not dried and harvested last month must be done this, or it will be too late. The early or flat sorts of Turnips may yet be sown the first week of this month.

OCTOBER.

GREENHOUSE AND FLOWER GARDEN.—In almost all northern localities, tender plants yet outside should be got under cover

the early part of this month. Avoid the use of fire heat as long as possible. Unless the nights become cold enough to chill the plants inside of the house, they are better without fire heat, though the greenhouse at this season should never be allowed to fall below fifty degrees at night. When there is indication that the night is likely to be cold, let down the sashes that have been raised for ventilation, early in the afternoon, and thus shut up the heated air until next day. If there is a cold frame or pit at hand, the hardier sorts of plants, such as Roses, Carnations, Camellias, Azaleas, etc., will do better if placed there until the middle of November, than in the ordinary greenhouse. Treated in this manner they make strong, healthy roots, that enable them to withstand the forcing process better when placed in the greenhouse. Look out for and destroy insects. See methods already given in chapter on "Insects." The planting of fall bulbs of all kinds, such as Hyacinths, Tulips, etc., may continue during this month. Dahlias, Tuberoses, Gladiolus, Cannas, Caladiums, Tigridias, and all tender bulbs or tubers that are planted in spring, should be taken up before the end of the month, dried, and stowed away in some dry place free from frost during winter.

FRUIT GARDEN.—Strawberries that have been layered in pots may yet be planted early this month. Great care should be taken to trim off runners from early plantings. All kinds of fruit-trees and shrubs may be set out. If planting is deferred to the last of the month, the ground around the roots should be mulched to the thickness of three or four inches with leaves, straw, or rough manure, as a protection to the roots against frost.

VEGETABLE GARDEN.—This is one of the busiest fall months in the kitchen garden. Celery will now be in full growth, and will require close attention to earthing-up, and during the last part of the month the first lot may be stored away in trenches for winter. See Celery. Beets, Carrots, Parsnips, Squash, Sweet Potatoes, and all other roots not designed to be left in the ground during winter, should be dug by the end of the month. The Cabbage, Cauliflower, and Lettuce plants from the seed sown about the middle of last month, should now be pricked out in cold frames. If Lettuce is wanted for winter use, it may be now planted in the greenhouse or cold frames, and will be ready for use by Christmas. Rhubarb and Asparagus, if wanted for use in winter, should be taken up in large clumps and

stowed away in pit, frame, shed, or cellar for a month or two, when it may be taken into the greenhouse and packed closely together under the stage, and will be fit for use from January to March, according to the temperature of the house.

NOVEMBER.

GREENHOUSE AND FLOWER GARDEN.—All plants should now be in-doors. A sharp lookout must be kept for cold snaps. These often come very unexpectedly in November, and as many plants are injured by frost in this as there are in the colder months, when the enemy is more closely watched for. When fire heat is freely used, be careful to keep up the proper supply of moisture by syringing, sprinkling the paths, etc. In the flower garden nothing is now to be done except to clean off dead stalks and straw up tender Roses, vines, etc., and wherever there is time, to dig up and rake the borders, as it will greatly facilitate spring work. All beds where Hyacinths or other fall bulbs have been planted, had better be covered with rough litter or leaves to the depth of two or three inches. If short, thoroughly decayed manure can be spared, a good sprinkling spread over the lawn will help it to a finer growth in spring.

FRUIT GARDEN.—In cold sections the hay or straw mulching recommended in the chapter on the "Strawberry" may be put on during the last of this month. Grape-vines and fruit-trees generally should be pruned; and if wood of the vine is wanted for cuttings, or cions of fruit trees for grafts, they should be tied in small neat bunches, and buried in the ground until spring.

VEGETABLE GARDEN.—All Celery that is to be stored for winter use should be put away before the end of the month in all places north of Richmond, Va. South of that it may be left, in most places, in the rows where grown, if covered up. Directions for storing Celery for winter are given under "Celery." The stalks of Asparagus beds should be cut off; and as Asparagus sometimes becomes a weed by the seeds dropping, it is better to burn the stems if there are berries on them. Spread a heavy dressing of rough manure three or four inches thick on the beds. All roots that are yet in the ground, and not designed to be left there all winter, must be dug up in this latitude before the middle of the month, or they may be frozen in until spring. Onions, Spinach, Sprouts, Cabbage, or Lettuce

plants that are outside should be covered with two or three inches of leaves, salt hay, or straw, to protect them during winter. Cabbages that have headed may be usually preserved against injury by frost until the middle of next month, by simply pulling them up, and packing them close together in a dry spot in the open field with the *heads down* and roots up. On the approach of cold weather in December they should be covered up with leaves as high as the tops of the roots; or, if the soil is light, it may be thrown over them if leaves are not convenient. Cabbages so packed will keep until March, if the covering has not been put on too early. Where small lots only are grown, these and Cauliflower may be hung up in a cool cellar, and will keep for months. Whenever it is practicable, all empty ground should be dug or plowed this month, trenching or subsoiling, whenever time will permit. All such operations, when performed in the fall, not only benefit the soil, but greatly facilitate work at the hurried season in the spring. The cold frames where Cabbage, Lettuce, or Cauliflower plants have been planted will now require regular ventilation by lifting up the sashes in warm days, and on the approach of very cold weather, straw mats or shutters would be a great protection to the plants. For the Cauliflower this protection is absolutely necessary here.

DECEMBER.

GREENHOUSE AND FLOWER GARDEN.—We are now fairly into winter, and close attention must be given to protecting all tender plants. It is one of the commonest complaints, especially from ladies, that their plants “looked so nice until one cold night in December” defeated the whole care of the year by killing or wounding hundreds of the cherished favorites of the greenhouse or window garden. There is no rule but vigilance; and as extra strong fires will be kept up, look out again nightly for all combustible matter near the flue or chimney. If, by sundown, you find the thermometer in the greenhouse or parlor where your plants are kept, falling down to thirty-four or thirty-five degrees, the chances are that there will be frost in the house before morning unless the fires are kept up. If there are not sufficient heating arrangements, the best protection, in such cases, is either to set the plants under the benches or on the walk if in the greenhouse, or move them from

the cold point if in the parlor. If the plants are low and uniform in height, covering them with paper or sheeting will usually save them from injury, even if the thermometer falls to twenty-six or twenty-eight degrees. Another plan, where the heating apparatus is not sufficient, is to dash water on the pipes or flue in the greenhouse on cold nights, when the steam, rising to the glass, freezes there, and stops up all crevices. All mulching, strawing up, or other modes of protecting against frost in use in the flower garden, must be finished this month.

FRUIT GARDEN.—Grape-vines, Raspberries, etc., in sections where protection from severe frost is of advantage, should be attended to this month, by laying them down as near the ground as possible, and covering them with rough litter or leaves, or with a few inches of soil, and Strawberries mulched.

VEGETABLE GARDEN.—The final covering of Celery in trenches or roots in pits; the Spinach crop in the ground, or any other plant in need of protection, must have it done before the end of this month. Manure and compost heaps should now be forwarded as rapidly as possible, and turned and mixed so as to be in proper condition for spring. Snow that accumulates on cold frames or other glass structures should be removed, particularly if the soil that the glass covers was not frozen before the snow fell. If frozen, it may remain on the sashes longer; for the plants if frozen are, of course, dormant, and would not be injured by being deprived of light for eight or ten days.

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