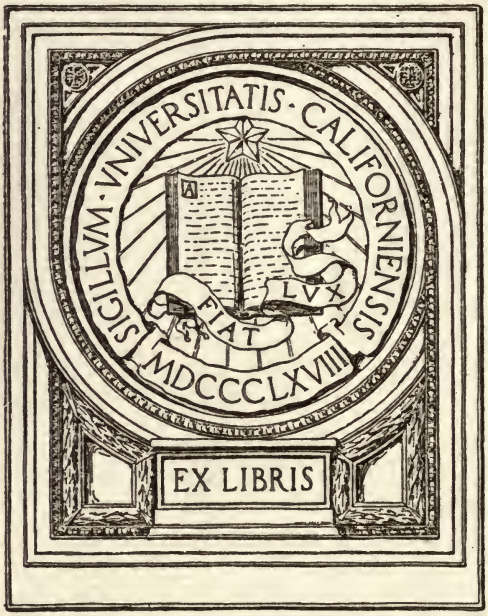

Louise Herring.

SELECT PLANTS

(EXCLUSIVE OF TIMBER TREES)

READILY ELIGIBLE FOR

VICTORIAN INDUSTRIAL CULTURE,

with indications of their native countries and some of their uses.

AN ENUMERATION OFFERED BY

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When offering an Appendix to the Acclimatisation Society's Report of last year, in the enumeration of timber trees desirable for a country of our clime, my willingness was expressed to extend the notes, then offered, also to other plants of prominent utilitarian value So considerate was the reception, which the former Appendix experienced, that I am induced already to redeem my promise of extending these data; and I do this with all the more readiness, as the rapid progress of tillage almost throughout our Colonial dominion is causing more and more a desire for the general and particular indication of such plants, which a colder clime excludes from the northern countries, where most of us spent our youth. Within the pages, allotted to this communication, the notes offered could only be indicative. Hence this list is merely intended to facilitate the choice of selection. More extensive information must be sought in special works, to which, through the English language, access is given by the literature of Britain and North America. Thus the

colonist, who wishes to pursue an altered path of husbandry, by adopting some new foreign plants for his culture, can follow up easily enough the enquiry, to which he may be led by the indications now submitted.

The writer found himself surrounded by some difficulty of drawing the line of demarcation between the plants admissible into this list and those which should be excluded, because the final importance of any particular species, for a particular want, locality or treatment, cannot be fully foretold. Moreover, the field is so ample from which our plants for novel culture may be gathered, that only the first instalment of a suggestive and abridged index could be presented on this occasion; but it may be supplemented, as well as the former notes on timber trees, should friendly consideration recognize the spirit, in which these suggestions are offered. As an instance of the difficulty to adduce what is most desirable for an enumeration, such as the present, it may be mentioned, that many species of the thousands of foreign grasses would be highly eligible here, either for naturalization or for cultural purposes. A few, however, could only be singled out for the present purpose, and this with no other view than leading the occupants of our soil onward in some new direction for their pastoral or agrarian pursuits.

The plants, which appear to be of primary importance for our rural wants, have been designated in this list with an asterisk. Of these, indeed, many are long since secured by the efforts of numerous colonists and their friends abroad, who strove to enrich our cultural resources; and in these efforts the writer, so far as his public or private means did permit, has ever endeavoured to share. But although such plants are introduced, they are not in all instances as yet widely diffused, nor in many localities tested. Also, for the sake of completeness, ordinary culture plants appear in this index, as the opportunity seemed an apt one, to offer a few passing remarks on their value. The claims of this contribution on originality must necessarily be very limited. What for ages has engaged the reflection of thousands cannot present absolutely or largely a new field of research. So

it is especially with the means and objects of ordinary culture of fields. To gather, therefore, from a widely-scattered literature that, which might be here instructive or suggestive, was mainly my task, though those gatherings may prove insignificant. Likely also such enumerations, in a very condensed form, will promote our communications for rural interchanges, both cis- and trans-equatorial, though mainly with the countries of the Northern Hemisphere, which predominantly, if not almost exclusively, provided all the vegetable substances, which enter into the main requisites of our daily life. Lists like the present may aid also in naming the plants and their products with scientific correctness in establishments of economic horticulture, or in technologic or other educational collections. In grouping, at the close of this tract, the genera of the plants enumerated, according to the products which they yield, facility is afforded for tracing out any particular series of plants, about which special economic information may be sought, or which may prominently engage at any time the attention of the cultivator, the manufacturer, or the artisan.

Melbourne Botanic Garden, April, 1872.

Acacia Farnesiana, Willd.

Dioscorides's small Acacia. Indigenous to South Asia; found westward as far as Japan; a native also of the warmer parts of Australia, as far south as the Darling River; found spontaneously in tropical and sub-tropical America, but apparently not in tropical Africa. Professor Fraas has recognised in this Acacia the ancient plant. The scented flowers are much sought after for perfumery. This bush may also be utilized as a hedge plant, and a kind of Gum Arabic may be obtained from it.

Achillea Millefolium, L.

Yarrow or Millfoil. Europe, Northern Asia and North America. A perennial medicinal herb of considerable astringency, pervaded with essential oil, containing also a

bitter principle (Achillein) and a peculiar acid, which takes its name from the generic appellation of the plant.

Aconitum Napellus, L.

The Monk's Hood. In the colder, especially mountainous parts of Europe and Northern Asia. A powerful medicinal plant of perennial growth, but sometimes only of biennial duration, variable in its forms. It was first introduced into Australia, together with a number of other Aconits, by the writer of this communication. All the species possess more or less modified medicinal qualities, as well in their herb as in their root; but so dangerously powerful are they, that the plants can only be administered by the exercise of legitimate medical practice. Napellus root, according to Professor Wittstein, contains three alkaloids: Aconitin, Napellin and Narcotin. The foliage contains also a highly acrid, volatile principle, perhaps chemically not unlike that of many other Ranunculaceæ. Aconitin, one of the most potent of any of the medicinal substances in existence, can likewise be obtained from the Nepalese Aconitum ferox, and probably from several other species of the genus.

Acorus Calamus, L.

The Sweet Flag. Europe, Middle and North Asia, North America. A perennial pond or lake plant. The somewhat aromatic root is used as a stomachic, and also in the preparation of confectionery, in the distillation of gin, and in the brewing of some kinds of beer. The flavor of the root depends mainly on a peculiar volatile oil.

Actæa spicata, L.

The Baneberry. On forest mountains, mainly in limestone soil of Europe, North Asia and North America. A perennial medicinal herb. Its virtue depends on peculiar acrid and bitter, as well as tonic principles. In North America, this species, and likewise A. alba, are also praised as efficacious antidotes against ophidian poisons.

Adesmia balsamica, Bertero.

The Jarilla of Chili. A small shrub, remarkable for exuding a fragrant balsam of some technic value.

Æschynomene aspera, L.

The Solah of tropical Asia. A large perennial erect or floating swamp plant, probably hardy in the warmer tracts of our Colony. Introduced from the Botanic Garden of Melbourne into the tropical parts of Australia. The pith-hats are made from the young stems of this plant. The Solah is of less importance for cultivation than for naturalisation.

Agave Americana, L.

The gigantic Aloe of Central America. It comes here into flower in about ten years. The pithy stem can be utilized for some of the purposes, for which cork is usually employed, for instance, to form the bottom of insect-cases. The honey-sucking birds and the bees are very fond of the flowers of this prodigious plant. The leaves of this and some other Agaves, such as A. Mexicana, furnish the strong Pita-fibre, which is adapted for ropes, and even for beautiful textile fabrics. The sap can be converted into alcohol. Where space and circumstances admit of it, impenetrable hedges may be raised in the course of some years from Agaves.

Agrostis alba, L.

The Fiorin or White Bent-Grass. Europe, North and Middle Asia, North Africa, North America. Perennial, showing a predilection for moisture. It is valuable as an admixture to many other grasses, as it becomes available at the season, when some of them fail. Sinclair regards it as a pasture grass inferior to Festuca pratensis and Dactylis glomerata, but superior to Alopecurus pratensis. The variety with long suckers is best adapted for sandy pastures, and helps to bind shifting sand on the sea coast, or broken soil on river banks.

Aletris farinosa, L.

The Colic root of the woodlands of North America. This pretty herb is of extreme bitterness, and can be medicinally administered as a tonic.

Alkanna tinctoria, Tausch.

On sandy places around the Mediterranean Sea. It yields the Alkanna root, used for dyeing oleaginous and other substances. It might be naturalized.

Allium Schœnoprasum, L.

The Chives. Europe, Northern Asia and North America. Available for salads and condiments. This species of Allium seems not yet so generally adopted in our culinary cultivation as Allium Ascalonicum (the Shallot), A. Cepa (the ordinary Onion), A. fistulosum (the Welsh Onion), A. Porrum (the Leek), or A. sativum (the Garlick). A. Scorodoprasum, or the Sand Leek of Europe and North Africa, resembles both Garlick and Shallot.

Aloe ferox, Mill.

South Africa. This species yields the best Cape Aloe, as observed by Dr. Pappe. The simply inspissated juice of the leaves of the various species of this genus constitutes the Aloe drug. It is best obtained by using neither heat nor pressure for extracting the sap. By re-dissolving the aqueous part in cold water, and reducing the liquid through boiling to dryness, the Extract of Aloes is prepared. All species are highly valuable in our Colony, where they are hardy, and can be used, irrespective of their medicinal importance, to beautify any rocky or otherwise arid spot.

Aloe linguiformis, Miller.

South Africa. According to Thunberg, from this species the purest gum-resin is obtained.

Aloe plicatilis, Mill.

South Africa. The drug of this species acts milder than that of A. ferox.

Aloe purpurascens, Haworth.

South Africa. Again one of the plants, which furnishes the Cape Aloe of commerce.

Aloe socotrina, L,.

Hills of the Island of Socotra. Also cultivated in Barbadoes and elsewhere, thus yielding the Socotrin Aloe.

Aloe spicata, Thunberg.

South Africa. This aloe provides Cape Aloe. It is an exceedingly handsome plant.

Aloe vulgaris, Lamarck.

The Yellow-flowered Aloe. Countries around the Mediterranean Sea, also Canary Islands, on the sandy or rocky sea coast. Such places could also here readily be utilized for this and allied plants. Dr. Sibthorp identified this species with the Ἀλόη of Dioscorides; hence it is not probable, that A. vulgaris is simultaneously also of American origin, although it is cultivated in the Antilles, and furnishes from thence the main supply of the Barbadoes Aloe. In East India this species is also seemingly only existing in a cultivated state. Haworth found the leaves of this and of A. striata softer and more succulent than those of any other aloe. It is said to be the only species with yellow flowers among those early known. It is also this species only, which Professor Willkomm and Professor Parlatore record as truly wild in Spain and Italy.

Aloe Zeyheri, Harvey.

South Africa. A magnificent, very tall species, doubtless valuable like the rest.

Alopecurus pratensis, L.

Meadow Foxtail Grass. Europe, North Africa, North and Middle Asia. One of the best of perennial pasture grasses. Though so extensively cultivated for years in our Colony, it is mentioned, for completeness' sake, in this list. It attains to its full perfection only after a few years of growth, as noticed by Sinclair. For this reason, it is not equal to Dactylis glomerata for the purpose of changing crops. Otherwise it is more nutritious than the latter, although the annual return in Britain proved less. Sheep thrive well on it. Sinclair and others found that this grass, when exclusively combined with white clover, will support from the second season five ewes and five lambs on an acre of sandy loam. But this grass, to thrive well, needs land not altogether dry. In all permanent artificial pastures, this

Alopecurus should form one of the principal ingredients, because it is so lasting and nutritive. In our Alpine regions it would also prove prolific, and might convert many places there gradually into summer-runs. It is early flowering, and likes the presence of lime in the soil.

Alstonia constricta, F. v. M.

Warmer parts of East Australia, particularly in the dry inland districts. The bark of this small tree is aromatic-bitter, and regarded as valuable in ague, also as a general tonic.

Alstrœmeria pallida, Graham.

Chili. Palatable starch can be obtained from the root of this plant, which, for its loveliness alone, deserves a place in any garden. The tubers of others of the numerous Alstrœmerias can doubtless be utilized in a similar technic manner.

Althæa officinalis, L.

The Real Marsh-Mallow. Europe, North Africa, North and Middle Asia. A tall perennial herb, with handsome flowers. The mucilaginous root and also the foliage are used for medicinal purposes. The plant succeeds best on damp, somewhat saline soil.

Amelanchier Botryapium, Candolle.

The Grape-Pear of North America. This fruit tree attains a height of 30 feet. The purplish fruits are small, but of pleasant taste, and ripen early in the season. This bush or tree will live in sandsoil; but it is one of those hardy kinds particularly eligible for our Alps.

Amygdalus communis, L.

The Almond Tree. Countries around the Mediterranean Sea and Orient. Both the sweet and bitter Almond are derived from this species. Their uses, and the value of the highly palatable oil, obtained by pressure from them, are well known. This oil can well be chosen as a means of providing a pleasant substitute for milk during sea voyages, &c., by mixing, when required, with it half its weight of powdered gum arabic, and adding then successively, while quickly agitating in a stone mortar, about double the quantity of

water. Thus a palatable and wholesome sort of cream for tea or coffee is obtained at any moment. There exist hard and soft shelled varieties of both the sweet and bitter Almond. In time, they should form an important article of our exports. Almonds can even be grown on sea shores. The crystalline Amygdalin can best be prepared from bitter Almonds, through removing the oil by pressure, then subjecting them to distillation with alcohol, and finally precipitating with Æther. The volatile bitter Almond oil—a very dangerous substance—is obtained by aqueous distillation. Dissolved in alocohol, it forms the Essence of Almonds. This can also be prepared from peach kernels.

Anacyclus Pyrethrum, Candolle.

Countries near the Mediterranean Sea. The root is used medicinally.

Andropogon avenaceus, Michaux.

(*Sorghum avenaceum,* Chapman.)

North and Central America. This tall perennial grass lives in dry, sandy soil, and shonld here be tried for growth of fodder.

Andropogon bicolor, Roxburgh.

Warmer parts of Asia. One of the annual tall Sorghums. It ripens its seeds in three or four months from the time of sowing, the produce in good soil being often upwards of one hundredfold. It is a wholesome grain.

Andropogon Calamus, Royle.

Central India. The Sweet Calamus of the Ancients. From this species the Gingergrass-oil of Nemaur is distilled, an article much used in perfumery.

Andropogon cernuus, Roxb. (*Sorghum cernuum,* Willd.)

One of the Guinea Corns. India, where it is much cultivated, and so also in other tropical countries. It is perennial, and forms the "staff of life of the mountaineers" beyond Bengal. It reaches a height of 15 feet, with leaves over 3 feet long. The thick stems are rooting at the lower joints, and cattle are very fond of them. The grain is white. The specific limits of the various Sorghums are not well ascertained.

Andropogon citratus, Candolle.

The Lemon Grass of India. It yields an essential oil for perfumery; besides it is occasionally used for tea. This applies as well to Andropogon Nardus, L., and some allied grasses.

Andropogon Haleppensis, Sibthorp.

South Europe, Orient. A rich perennial grass, cultivated often under the name of Cuba Grass.

Andropogon Ivarancusa, Roxb.

One of the fragrant grasses of North India, much used like A. Shœnanthus.

Andropogon Martini, Roxb. (*A. flexuosus*, Nees.)

On the mountains of India. The fragrant Citronella Oil is distilled in Ceylon and elsewhere from the leaves of this species. General Martin observed, that cattle are voraciously fond of this grass; but it imparts its fragrance to meat and milk.

Andropogon muricatus, Retz.

India. A Swamp-grass, with delightfully fragrant roots.

Andropogon nutans, L. (*Sorghum nutans*, Gray.)

North America. A tall, nutritious, perennial grass, content with dry and barren soil.

Andropogon saccharatus, Roxb. (*Sorghum saccharatum*, Pers.)

Tropical Asia. The Broom-Corn. A tall annual species, splendid as a fodder grass. From the saccharine juice sugar is obtainable. A sample of such, prepared from plants of the Melbourne Botanic Garden, was shown at the Exhibition of 1862. This Sorghum furnishes also material for a well-known kind of brooms. A variety or a closely allied species yields the Caffir Corn (*A. Caffrorum*, Kunth). The plant can be advantageously utilized for preparing treacle. For this purpose, the sap is expressed at the time of flowering, and simply evaporated; the yield is about 100 gallons from the acre. In 1860, nearly seven millions of gallons of sorghum treacle were produced in the United States.

Andropogon Shœnanthus, L.

Deserts of Arabia. A scented grass, allied to the Indian oil-yielding Andropogons. A similar species occurs in arid places of the interior of North Australia.

Andropogon Sorghum, Brotero. (*Sorghum vulgare*, Persoon.)

The large Indian Millet or Guinea Corn, or the Durra. Warmer parts of Asia. A tall annual plant. The grains can be converted into bread, porridge and other preparations of food. It is a very prolific corn and to us particularly valuable for green fodder. Many others of the numerous species of Andropogon, from both hemispheres, deserve our attention.

Anemone Pulsatilla, L.

Europe and Northern Asia. On limestone soil. This pretty perennial herb is of some medicinal importance.

Anona Cherimolia, Miller.

Tropical and sub-tropical South America. This shrub or tree might be tried in the frostless lower valleys of East Gipps Land, where humidity and rich soil will also prove favourable to its growth. It yields the Cherimoyer fruit. The flowers are very fragrant.

Anthemis nobilis, L.

The true Camomile. Middle and South Europe, North Africa. A well-known medicinal plant, here frequently used as edgings for garden plots. Flowers in their normal state are preferable for medicinal use to those, in which the ray-flowers are produced in increased numbers. They contain a peculiar volatile oil and two acids similar to Angelica and Valeriana acid.

Anthemis tinctoria, L.

Middle and South Europe, Orient. An annual herb. The flowers contain a yellow dye.

Anthistiria ciliata, L. fil. (*Anthistiria Australis*, R. Brown.)

The well-known Kangaroo Grass, not confined to Australia, but stretching through Southern Asia also, and through the whole of Africa. It is mentioned here, because its growth

should be encouraged by every means. There are several species of Anthistiria deserving introduction and naturalisation in our Colony.

Anthoxanthum odoratum, L.

The Scented Vernal Grass. Europe, North and Middle Asia, North Africa. A perennial, not of great value as a fattening grass, yet always desired for the flavor, which it imparts to hay. Perhaps for this purpose the scented Andropogons might serve here also. On deep and moist soils it attains its greatest perfection. It is much used for mixing among permanent grasses on pastures, where it will continue long in season. It would live well in our Alps. The lamellar-crystalline Cumarin is the principle, on which the odor of Anthoxanthemum depends.

Apios tuberosa, Moench.

North America. A climber, with somewhat milky juice. The mealy tubers are edible.

Apium graveolens, L.

The Celery. Europe, North Africa, North and Middle Asia. It is here merely inserted with a view of pointing out, that it might be readily naturalized on our sea shores.

Apium prostratum, La Billardiere.

The Australian Celery. Extra-tropical Australia, New Zealand, extra-tropical South America. This also can be utilized as a culinary vegetable.

Apocynum cannabinum, L.

On river banks in North America. This is recorded among plants yielding a textile fibre.

Arachis hypogaea, L.

The Earth-nut, Pea-nut or Ground-nut. Brazil. The seeds of this annual herb are consumed in a roasted state, or used for pressing from them a palatable oil. The plant is a very productive one, and yields a very quick return. It ranks also as a valuable fodder herb. A light somewhat calcareous soil is best fitted for its growth. On such soil, 50 bushels may be obtained from the acre.

Archangelica officinalis, Hoffmann.

Arctic zone and mountain regions of Europe. The stalks are used for confectionery; the roots are of medicinal use. Only in our Alps would this herb fully establish its value. The root is biennial and used in the distillation of some cordials.

Arctostaphylos uva ursi, Sprengel.

Alpine and Arctic Europe, North Asia and North America. A medicinal small shrub, which here could best be reared in the heath-moors of our Alpine regions.

Argania Sideroxylon, Roem. and Schult.

The Argan-tree. Western Barbary, on dry hills. Its growth is here found to be slow; but it is a tree of longevity. Though comparatively low in stature, its foliage occasionally spreads to a circumference of 220 feet. It sends out suckers from the root. The fruits serve as food for cattle in Morocco; but here the kernels would be more likely to be utilized by pressing the oil from them.

Aristolochia Serpentaria, L.

The Snake-root of North America. The root of this trailing herb is valuable in medicine; it contains a peculiar volatile oil. Several other Aristolochiæ deserve culture for medicinal purposes, for instance,—Aristolochia ovalifolia (Guaco), and A. anguicida, from the mountains of Central America, should they prove hardy.

Arnica montana, L.

Colder parts of Europe. This pretty herb is perennial, and of medicinal value. It is eligible for our sub-alpine regions. The active principles are:—Arnicin, volatile oil, cupron and capryl acid.

Arracacha xanthorrhiza, Bancroft.

Mountain regions of Central America. An umbelliferous herb. The roots are nutritious and palatable. There are yellow, purple and pale varieties.

Artemisia Absinthium, L.

The Wormwood. Europe, North and Middle Asia, and North Africa. A perennial herb, valuable as a tonic and

anthelminthic. Several other species of Artemisia deserve cultivation for medicinal purposes. Active principles:—Absinthin, an oily substance, indurating to a crystalline mass; a volatile oil peculiar to the species.

Artemisia Dracunculus, L.

The Tarragon or Estragon. North Asia. A perennial herb, used as a condiment. Its flavour rests on two volatile oils, one of them peculiar to the plant.

Arundinaria falcata, Nees.

Nepaul. One of the hardiest kinds of the Bamboo tribe. It rises to the height of 20 feet, the canes attaining a diameter of 4 inches.

Arundinaria macrosperma, Michaux.

Southern States of North America,—particularly on the Missisippi. This Bamboo-like reed forms there the cane-brakes. It requires to be replanted after flowering in the course of years. Height 20 feet.

Arundo Donax, L.

The tall evergreen lasting Bamboo-reed of South Europe and North Africa. It is one of the most important plants of its class for quickly producing a peculiar scenic effect in picturesque plantations, also for intercepting at once the view to unsightly objects, and for giving early shelter. The canes can be used for fishing-rods.

Arundo Pliniana, Turr.

On the Mediterranean and Adriatic Seas. A smaller plant than A. Donax, with more slender stems and narrower leaves, but similarly evergreen, and resembling the Donax reed also in its roots.

Arundo saccharoides, F. v. M.

(*Gynerium saccharoides*, Humboldt.)

Northern parts of South America. This species is here not yet introduced; but it is likely to prove hardy. Like the following, it is conspicuously magnificent.

Arundo Sellowiana, Schultes. (*Arundo dioica*, Spreng. *non* Louriero. *Gynerium argenteum*, Nees.)

The Pampas Grass of Uruguay, Paraguay and the La Plata State. A grand autumnal flowering reed, with gorgeous feathery panicles. As an industrial plant it deserves here a place, because paper can be prepared from its leaves.

Asparagus officinalis, L.

Europe, North Africa, North Asia. The well-known Asparagus plant, which, if naturalized on our coast, would aid in binding the sand. The foliage contains Inosit-Sugar; the shoots contain Asparagin.

Astragalus Cephalonicus, Fischer. (*A. aristatus*, Sibthorp.)

Cephalonia. A small shrub, yielding a good tragacanth; and so probably, also, the true A. aristatus of l'Heritier is producing it.

Artragalus Creticus, La Marck.

Candia and Greece. A small bush, exuding the ordinary vermicular Tragacanth. The pale is preferable to the brown sort.

Astragalus gummifer, La Billard.

Syria and Persia. This shrub also yields a good kind of Tragacanth.

Astragalus strabiliferus, Royle.

Asiatic Turkey. The brown Tragacanth is collected from this species.

Astragalus verus, Olivier.

Asiatic Turkey and Persia. This shrub furnishes the Takalor or Smyrna Tragacanth, or it is derived from an allied species.

Atriplex hortensis, L.

North and Middle Asia. The Arroche. An annual Spinage plant.

Atropa Belladonna, L.

The Deadly Nightshade. South and Middle Europe and Western Asia. A most important perennial medicinal herb.

The highly powerful Atropin is derived from it, besides another alkaloid, the Belladonnin.

Avena fatua, L.

Wild Oat. Europe, North Africa, North and Middle Asia, eastward as far as Japan. The experiments of Professor Buckman indicate, that our ordinary Culture-Oat (*Avena sativa*, L.) is descended from this plant.

Avena flavescens, L. (*Trisetum flavescens*, Beauv.)

Yellowish Oat Grass. Europe, North Africa, Middle and North Asia, eastward as far as Japan. One of the best of perennial meadow-grasses, living on dry soil; fitted also for our Alps.

Avena pratensis, L.

Meadow Oat Grass. Europe, North Asia. It thrives well on dry, clayey soil; it produces a sweet fodder, but not in so great proportion as several other less nutritious grasses. It is perennial, and well adapted for our snowy mountains, where it would readily establish itself, even on heathy moors.

Avena pubescens, L.

Downy Oat-Grass. Europe, North and Middle Asia. A sweet perennial grass, requiring dry but good soil, containing lime. It is nutritious and prolific. Several good Oat-grasses are peculiar to North America and other parts of the globe. Their relative value as fodder-grasses is in many cases not exactly known, nor does the limit assigned to this little treatise allow of their being enumerated on this occasion.

Bactris Gasipæs, Humboldt. (*Guilielma speciosa*, Mart.)

The Peach Palm of the Amazon River, ascending to the warm-temperate regions of the Andes. Stems clustered, attaining a height of 90 feet. Dr. Spruce describes the large bunches of fruits as possessing a thick, firm and mealy pericarp, which, when cooked, has a flavor between Potato and Chesnut, but superior to either. To us, however, this palm would be mainly an object of grandeur. It is likely to endure our clime in the fern-tree gullies.

Bambusa arundinacea, Roxb.

The Thorny Bamboo of India. It requires rich, moist soil, and delights on river banks. It is of less height than Bambusa vulgaris; it also sends up from the root numerous stems, but with bending branches, thorny at the joints. The seeds of this and some other Bamboos are useful as food for fowls.

Bambusa attenuata, Thwaites.

The Hardy Bamboo of Ceylon, there growing on the mountains at elevations between 4000 to 6000 feet. It attains a height of 25 feet.

Bambusa elegantissima, Hasskarl.

Java, on mountains about 4000 feet high. Very tall and exceedingly slender; the upper branches pendulous. A hardy species.

Bambusa monadelpha. (*Dendrocalamus monadelphus*, Thwaites.)

Ceylon, on mountains from 4000 to 6000 feet high. A dwarf but handsome Bamboo, reaching only a height of 12 feet.

Bambusa spinosa, Roxb.

Bengal. A Bamboo of considerable height. The central cavity of the canes is of less width than in most other species, thus the strength for many technic purposes is increased.

Bambusa stricta, Roxb. (*Dendrocalamus strictus*, Nees.)

India, particularly Bengal. Grows on drier ground than B. arundinacea. It is also smaller, and quite straight. Its strength and solidity renders it fit for many select technic purposes.

Bambusa verticillata, Blume.

The Whorled Bamboo of Java.

Bambusa vulgaris, Wendland.

The large unarmed Bamboo of Bengal. It attains a height of 70 feet, and stems may attain even a length of 40 feet in one season, though the growth is slower in our clime. It has proved to be capable of resisting the occasional night frost of the lowlands of Victoria. It is the best for building Bamboo-Houses. Immersion in water for some time ren-

ders the cane still firmer. To the series of large thornless Bamboos belong also Bambusa Tulda and Bambusa Balcooa of India, and Bambusa Thouarsii from Madagascar and Bourbon. These Bamboos are much used for various kinds of furniture, mats, implements and other articles. There are many other kinds of Bamboo eligible among the species from China, Japan, India, tropical America, and perhaps tropical Africa. One occurs in Arnhem's Land.

Barosma serratifolia, Willd.

South Africa. This shrub supplies the medicinal Buccoleaves. B. crenulata, Hook. (Diosma crenulata, L.), is only a variety of this species. Active principles—A peculiar volatile oil, a peculiar resin, and a crystalline substance called Diosmin.

Beta vulgaris, L.*

The Beet or Mangold Root. Middle and South Europe, Middle Asia, North Africa. This well-known perennial or biennial herb ought to engage the general and extensive attention of our farming population. The herb is most valuable as a palatable and nutritious spinage; the root is of importance not only as a culinary vegetable, but, as well known, also for its content of sugar, fit to be crystallised. That of Beet, indeed, is now almost exclusively consumed in Russia, Germany, Austria, France, Sweden and Belgium; and these countries not only produce the Beet Sugar, but also export it largely to the neighbouring States. The white Sicilian Beet is mainly used for salads, spinage and soups. The thick-ribbed variety serves like Asparagus or Seakale, dressed like Rhubarb. Cereal soil, particularly such as is fit for Barley, is generally adapted also for the culture of Beet. The rearing of the root, and the manufacture of the sugar, can be studied from manifold works; one has been compiled by Mr. N. Levy, of this city. A deeply stirred, drained soil, rich in lime, brings the saccharine variety of Beet to the greatest perfection. The Imperial Beet yields from 12 to 20 per cent. sugar. The Castelnauderry, the Magdeburg, the Siberian Whiterib and the Vilmorin Beet are other varieties rich in sugar. About

5 lbs. of seeds are required for an acre. In rotation of crops, the Beet takes its place best between Barley and Oats. In Middle Europe the yield averages 14 tons of Sugar Beet to the acre, and as many hundred weight of raw sugar. The mercantile value of the root, at our distilleries, ranged from 20s. to 30s. per ton. In our clime, the Beet harvest can be extended over a far longer time of the year than in Middle Europe. The extraction of the sap is effected generally by hydraulic pressure. The juice is purified with lime and animal coal. Excess of lime is removed by carbonic acid, and the purified and decolorized juice is evaporated in vacuum pans, with a view to preventing the extensive conversion of the crystallisable sugar into treacle. The production of Beet sugar needs far less labor than that of cane sugar, and the harvest is obtained in so short a time as eight months. Beet has shown itself subject neither to alarming diseases nor to extensive attacks of insects. Beet is grown in extra-tropical zones like ours, while the sugar-cane is a plant confined to tropical and sub-tropical latitudes. Beet culture, by directly or indirectly restoring the refuge, ameliorates the soil to such an extent, that in some parts of Germany land, so utilized, has risen to fourfold its former value. Beet, furthermore, affords one of the most fattening stable fodders; and thus again an ample supply of manure. In Middle Europe now about one-sixth of all the arable land is devoted to Beet, yet the produce of cereals has not become reduced, while the rearing of fattened cattle has increased. Notwithstanding a heavy tax on the Beet-sugar factories in Europe, the industry has proved prosperous, and assumes greater and greater dimensions. In 1865, the sugar consumption of Europe amounted to 31,676,497 cwt., one-third of which had been locally supplied by the Beet, from over one thousand beet-sugar factories. Treacle obtained from beet is distilled for alcohol. For establishing remunerative factories on a large and paying scale, it has been suggested that farmers' companies might be formed. For ascertaining the percentage of sugar in Beet, saccharometers are used. In Germany, some scientific periodicals are exclusively devoted to the fostering of this industry.

Boehmeria nivea, Gaudichaud.*

The Ramee or Rheea. Southern Asia, as far east as Japan. This bush furnishes the strong and beautiful fibre woven into the fabric, which inappropriately is called grass-cloth. The bark is softened by hot water or steam, and then separable into its tender fibres. The best is obtained from the young shoots; it is glossy, tough and lasting, combining to some extent the appearance of silk with the strength of flax. The ordinary market value of the fibre is about £40 per ton; but Dr. Royle mentions that it has realized, at times, £120. The seeds are sown on manured or otherwise rich and friable soil. In the third year, or under very favorable circumstances even earlier, it yields its crops, as many as three annually. The produce of an acre has been estimated at 2 tons of fibre. This latter, since Kaempfer's time, has been known to be extensively used for ropes and cordage in Japan. Our rich and warmest forest valleys seem best adapted for the Ramee, as occasional irrigation can be also there applied. In the open grounds of Victoria it suffers from the night frosts, although this does not materially injure the plant, which sends up fresh shoots, fit for fibre, during the hot season. The plant has been cultivated and distributed since 1854, in the Botanic Garden of Melbourne, where it is readily propagated from cuttings, the seeds ripening rarely there. Cordage of this Boehmeria is three times as strong as that of hemp. Other species require to be tested, among them the one which was recently discovered in Lord Home's Island, namely Boehmeria calophleba.

Boronia megastigma, Nees.

In West Australia on margins of swamps. This remarkable bush is recorded here as an emblem of mourning, its external blackish flowers rendering it especially eligible for graves. Industrially it interests us on account of its powerfully fragrant blossoms, for the sake of which this bush will deserve to be cultivated. The scent might be extracted by Mr. Bosisto's process.

Borrago officinalis, L.

South Europe, Orient. An annual herb, occasionally used for medicinal purposes or as an admixture to salad.

Brabejum stellatifolium, L.

South Africa. The nuts of this shrub are edible, resembling those of our Macadamia ternifolia, to which also in foliage and flowers Brabejum is closely allied. The nuts are also similar to those of the Chilian Guevina Avellana.

Brassica alba, Visiani. (*Sinapis alba*, L.)

White Mustard. Europe, North Africa, North and Middle Asia. An annual. The seeds are less pungent than those of the Black Mustard, but used in a similar manner. The young leaves of both are useful as a culinary and anti-scorbutic salad. Dr. Masters enumerates Brassica Chinensis, B. dichotoma, B. Pekinensis, B. ramosa and B. glauca among the Mustards, which undergo cultivation in various parts of Asia, either for the fixed oil of their seeds or for their herbage. From 15 lbs. to 20 lbs. of seeds of the White Mustard are required for an acre. In the climate of Callfornia, similar to ours, 1400 lbs. of seeds have been gathered from an acre.

Brassica nigra, Koch. (*Sinapis nigra*, L.)

The Black Mustard. Europe, North Africa, Middle Asia. An annual. The seeds, simply crushed and then sifted, constitute the Mustard of commerce. For medicinal purposes the seeds of this species are preferable for sinapism and other purposes. In rich soil this plant is very prolific; and in our forest-valleys it is likely to remain free from the attack of aphis. Chemical constituents: A peculiar fixed oil, crystalline sinapin, the fatty sinapisin, Myron-acid and Myrosin.

Brassica oleracea, L.

An annual or biennial coast plant, indigenous to various parts of Europe. It is mentioned here with a view of showing, that it might be naturalized on our rocky and sandy sea shores. From the wild plant of the coast originated various kinds of Cabbages, Broccoli, Cauliflower, Brussel Sprouts,

Kail, Kohlrabi, &c. Other races of this species are collectively represented by Brassica Rapa, L. (*B. campestris*, L.), the Wild Navew, yielding most of the varieties of Turnips, some with other cultivated forms transferred to us from ancient times. Again other varieties are comprehended within Brassica Napus, L., such as the Swedish and Teltower Turnips, while the Rape seed, so important for its oil (Colza), is also derived from a form of B. Napus. The Rape should be produced here as an agrarian produce, giving a rapid return, wherever it should remain free of aphis. The hardier turnips could be produced on our highest Alps, as they are grown still within the Arctic circle, and, according to Dr. J. Hooker, at a height of 15,000 feet in the Himalaya mountains.

Butomus umbellatus, L.

The Flowering Rush. Europe, North and Middle Asia. This elegant perennial water-plant is mentioned here more for its value in embellishing our lakes and watercourses than for the sake of its roots. The latter, when roasted, are edible. The plant would live in our subalpine rivulets.

Bromus unioloides, Humboldt.* (*B. Schraderi*, Kunth.)

Here called the Prairie Grass. From Central America it has spread over many parts of the globe. The writer saw it disseminated in the mountains of St. Vincent's Gulf as early as 1847. It is one of the richest of all grasses, grows continously and spreads readily from seeds, particularly on fertile and somewhat humid soil, and has proved as a lasting and nutritious fodder-grass or pasture-grass one of our best acquisitions.

Broussonetia papyrifera, Ventenat.

The Paper Mulberry. Islands of the Pacific Ocean, China, Japan, perhaps only truly indigenous in the last-named country. The bast of this tree or shrub can be converted into very strong paper. It can also be used as a textile fabric; furthermore the fabrics made from it can be dressed with linseed oil for waterproof coverings. In cultivation the plant is kept like an osier. The leaves cannot be used

for silkworms. European fabrics have largely superseded the clothing made of this plant in the South Sea Islands.

Caesalpinia Gilliesii, Wallich. (*Poinciana Gilliesii,* Hooker.)
La Plata States. This beautiful hardy bush can be utilized for hedges.

Cajanus Indicus, Candolle.
The Catjang; in Assam, called Gelooa-mah. A shrubby plant of India, probably available for profitable culture and naturalization in the warmer parts of our Colony. It sustains itself on dry ground, and yields the pulse known as Dhal, Urhur and Congo-pea. The plant lasts for about three years. Several species of Cajanus of the Atylosia section, indigenous to the warmer parts of Australia, might be tested here for the sake of the economic value of their seeds. The insect, active in the formation of lac, lives extensively on the Cajanus, according to Mr. T. D. Brewster of Assam. Silkworms live also on it.

Calamus montanus, T. Anderson.
Himalaya, up to 6000 feet. A hardy climbing palm. The aged canes are naked. "The light but strong suspension-bridges, by which the large rivers of Sikkim are crossed, are constructed of this palm. It supplies material for the strongest ropes for dragging logs of wood from the forests. The most durable baskets and the cane-work of chairs are manufactured from the slit stems. Walking-sticks and riding-canes made of this species are exported from Sikkim in considerable quantity." Many other Calami serve similar purposes, but probably few or perhaps none are equally hardy.

Camelina sativa, Crantz.
Middle and South Europe, temperate Asia. An annual herb, cultivated for the sake of its fibre and the oil of its seeds. It is readily grown after corn crops, yields richly even on poor soil and is not attacked by aphis. Mr. W. Taylor obtained 32 bushels of seeds from an acre, and from these 540 lbs. of oil. The return is within a few months.

Canna Achiras, Gillies.

Mendoza. One of the few extra-tropic Cannas, eligible for Arrow-root culture.

Canna coccinea, Roscoe.

West India. Yields with some other Cannas the particular Arrow-root, called "Tous les mois."

Canna edulis, Edwards.

The Adeira of Peru. One of the hardiest of Arrow-root plants, and thus well adapted for our clime. Seeds, even if many years old, will germinate. This species has yielded excellent starch at Melbourne. Western Port, Lake Wellington, Ballarat and other localities, from plants supplied at the Botanic Garden. The Rev. Mr. Hagenauer, of the Gipps Land Aboriginal Mission station, obtained 220 lbs. of Arrow-root from one-eighth of an acre of this Canna. The gathering of the roots is effected about April. The plants can be set out in ordinary ploughed land. Captain James Hall, of Hastings, prepared also largely the starch from this root. Starch grains remarkably large.

Canna flaccida, Roscoe.

Carolina. Probably also available for Arrow-root, though in first instance like many congeners chosen only for ornamental culture.

Canna glauca, Linne.

One of the West Indian Arrow-root Cannas.

Cannabis sativa, L.*

The Hemp-plant; indigenous to various parts of Asia, as far west as Turkey and as far east as Japan. Cultivated for its fibre since ancient times. Particularly in hot climes it exudes the "Churras," a resinous substance of narcotic intoxicating property. The foliage contains also a volatile oil, which the seeds yield by pressure—the well-known fixed Hemp-oil. The staminiferous plant is pulled for obtaining the fibre in its best state immediately after flowering; the seeding plant is gathered for fibre at a later stage of growth. Good soil, well drained, never absolutely dry, is needed for

successful Hemp culture. Hemp is one of the plants yielding a full and quick return within the season. The summer temperatures of St. Petersburg (67° F.) and of Moscow (62° F.) admit yet of the cultivation of this plant.

Capparis spinosa, L.

South Europe and North Africa. A somewhat shrubby and trailing plant, deserving even for the sake of its handsome flowers a place in any garden. It sustains its life in the most arid deserts. The frosts of our lowlands do not destroy this plant. The flower-buds and young berries preserved in vinegar with some salt form the Capers of commerce. Samples of Capers, prepared from plants of the Botanic Garden, are placed in our Industrial Museum, together with many other industrial products emanating from the writer's laboratory. A closely allied and probably equally useful plant, Capparis nummularia, is indigenous to Northern Australia. The Caper-plant is propagated either from seeds or suckers; it is well able to withstand either heat or drought. The buds after their first immersion into slightly salted vinegar are strained and afterwards preserved in bottles with fresh vinegar. Chemical principle: Glycosid.

Capsicum annuum, L.

Central America. An annual herb, which yields the Chillies and thus also the material for Cayenne Pepper. Chemical principle: Capsicin, an acrid soft-resinous substance.

Capsicum baccatum, L.

The Cherry-Capsicum. A perennial plant. From Brazil brought to tropical Africa and Asia, where now other Pepper-Capsicums are likewise naturalized.

Capsicum frutescens, L.

Tropical America. The berries of this shrubby species are likewise converted into Cayenne Pepper.

Capsicum longum, Candolle.

Some of the hottest parts of America An annual herb, also yielding Cayenne Pepper. Our summers admit of the successful growth of at least the annual species of Capsicum in all the lowlands.

Carthamus tinctorius, L.

From Egypt to India. The Safflower. A tall annual rather handsome herb. The florets produce yellow, rosy, ponceau and other red shades of dye, according to various admixtures. Pigment principles: Carthamin and Carthamus-yellow. For domestic purposes it yields a dye ready at hand from any garden. In India the Carthamus is also cultivated for the sake of the oil, which can be pressed from the seeds.

Carum Ajowan, Bentham. (*Ptychotis Ajowan*, Candolle.)

India. The fruits of this annual herb form an excellent culinary condiment with the flavor of thyme. Its peculiar oil is accompanied by Cymol and Thymol.

Carum Carui, L.

The Caraway-plant. Perennial. Europe, North and Middle Asia. It might be naturalized in our Alps and also along our sea shores. The Caraway-oil is accompanied by two chemical principles: Carven and Carvol.

Carum ferulifolium, Koch. (*Bunium ferulifolium*, Desfont.)

A perennial herb of the Mediterranean regions. The small tubers are edible.

Carum Petroselinum, Bentham. (*Apium Petroselinum*, L.)

The Parsley. The biennial well-known herb, indigenous to South Europe and the Orient. Essential oil peculiar with Stearopten.

Caryota urens, L.

India. One of the hardier Palms, ascending according to Dr. Thomas Anderson the Himalayas to an altitude of 5000 feet, yet even there attaining a considerable height, though the temperature sinks in the cooler season to 40° Fahrenheit. The trunk furnishes a sago-like starch. This Palm flowers only at an advanced age, and after having produced a succession of flowers dies away. From the sap of the flowers Toddy and palm-sugar are prepared, like from the Cocos and Borassus Palm, occasionally as much as 12 gallons of Toddy being obtained from one tree in a day. The fibre

of the leaf-stalks can be manfactured into very strong ropes, also into baskets, brushes and brooms. The outer wood of the stem serves for turnery.

Cassia acutifolia, Delile.

Indigenous or now spontaneous in Northern and tropical Africa and South-west Asia. Perennial. The merely dried leaflets constitute part of the Alexandrian and also Tinnevelly Senna. In Victoria it will be only in the warmest northern and eastern regions, where Senna can perhaps be cultivated to advantage.

Cassia angustifolia, Vahl.

Northern Africa and South-western Asia, indigenous or cultivated. Perennial. Yields Mecca-Senna.

Cassia Marylandica, L.

An indigenous Senna plant of the United States of North America. Perennial.

Cassia obovata, Colladon.

South-west Asia ; widely dispersed through Africa as a native or disseminated plant. Perennial. Part of the Alexandrian and also Aleppo Senna is derived from this species. Several of the Australian desert Cassias of the group of C. artemisioides may also possess purgative properties. The odor of their foliage is almost that of Senna.

Catha edulis, Forskoel.

Arabia and Eastern Africa. The leaves of this shrub under the designation Kafta or Cat are used for a tea of a very stimulating effect, to some extent to be compared to that of Erythroxylon Coca. To us here the plant would be mainly valuable for medicinal purposes.

Cedronella cordata, Bentham.

United States of North America. A perennial herb, fragrant like the foregoing.

Cedronella triphylla, Moench.

Madeira and Canary Islands. A shrubby plant with highly scented foliage. The volatile oil obtainable from it resembles that of Melissa, but is somewhat camphoric.

Cephaelis Ipecacuanha, Richard.

Brazil in woods of mountains, consociated with Palms and Fern-trees. It is not unlikely, that this herb, which is perennial and yields the important medicinal Ipecacuanha root, would live in our warmer forest regions, such as those of East Gipps Land. Active principles: Emetin and Ipecacuanha-acid.

Ceroxylon andicola, Humboldt.

The Wax-palm of New Granada, ascending the Andes to 11,000 feet. One of the most majestic and at the same time one of the most hardy of all palms, attaining occasionally a height of 180 feet. The trunk exudes a kind of resinous wax, about 25 lbs. being obtainable at a time from each stem; this by admixture to tallow is used for candles. There are several other andine palms, which could be reared in our forests or in sheltered positions at our dwellings, but some of them are not even yet phytographically circumscribed.

Cervantesia tomentosa, Ruiz and Pavon.

Forest-mountains of Peru. This tree yields edible seeds. It is likely to prove hardy in our lower forest regions.

Chaerophyllum bulbosum, Linné.

Middle Europe and Western Asia. The Parsnip-Chervil. A biennial herb. The root a good culinary esculent.

Chaerophyllum sativum, Lamarck.

(*Anthriscus Cerefolium*, Hoffm.)

The Chervil. Middle and South Europe, Western Asia. An annual herb, available for salads and condiments, but the root deleterious.

Chamaerops excelsa, Thunberg.

South China. This fan-palm is highly desirable, although not tall as the name would indicate.

Chamaerops Fortunei, Hooker.

North China. The Chusan-palm. It attains a height of about 12 feet and endures like the following species considerable frost. The leaves can be employed for plaiting

palm-hats. Other hardy palms might be naturalized and used for various purposes, irrespective of their ornamental features.

Chamaerops humilis, Linné.

The dwarf Fan-Palm of South Europe and North Africa. It is very decorative for garden plantations, particularly also eligible for scenic effect.

Chamaerops Hystrix, Fraser.

The Blue Palmetto of Florida and Carolina. Another dwarf Fan-Palm.

Chamaerops Martiana, Wallich.

Ascends the mountains of Nepaul to 5000 feet. Attains a height of 50 feet and is altogether a noble object.

Chamaerops Richieana, Griffith.

Arid mountains of Affghanistan. Has also proved hardy even in England.

Chelidonium majus, L.

Europe and Western Asia. The Celandine. A perennial herb of medicinal value. Chemical principles: Chelerythrin and Chelidonin; also a yellow pigment: Chelidoxanthin.

Chenopodium ambrosioides, L.

Tropical America. An annual medicinal herb. Chenopodium anthelminticum is a perennial variety of this species.

Chenopodium auricomum, Lindley.

From the Darling River to Carpentaria and Arnhem's Land. A tall perennial herb, furnishing a nutritious and palatable spinage. It will live in arid desert regions.

Chenopodium Quinoa, Willdenow.

From New Granada to Chili. A large-leaved quick-growing annual species, cultivated for the sake of its amylaceous seeds, but perhaps of more value as a culinary vegetable.

Cicer arietinum, L.

South Europe and Orient. The Gram. An annual herb, valuable as a pulse for pasture animals. The seeds can also be converted into peameal or be used otherwise for culinary purposes.

Cichorium Endivia, L.

South Europe, Orient, Middle Asia. A biennial plant, used since ancient times as a culinary vegetable.

Cichorium Intybus, L.

Chicory. A well-known perennial plant, indigenous to Europe, North Africa and North and West Asia. The roots can be used as a substitute for Coffee. This plant requires a rich deep loamy soil, but fresh manure is detrimental to the value of the root. It is also a good fodder-plant especially for sheep. The root can also be dressed and boiled for culinary purposes. The leaves useful for salad.

Cimicifuga racemosa, Elliot.

The Black Snake-root of North America. A perennial herb of medicinal value, the root possessing emetic properties.

Cinchona Calisaya, Ruiz.*

Yellow Perubark-tree. Andes of Peru and Bolivia, 5-6000 feet above the ocean. This tree attains a height of 40 feet. It yields the yellow bark, and also part of the crownbark. It is one of the richest yielder of quinin, and produces besides Cinchonidin.

Cinchona micrantha, Ruiz and Pavon.

Cordillieres of Bolivia and Peru. This tree attains a height of 60 feet, and from it part of the Grey and Huanuco Bark as well as Lima Bark are obtained. It is comparatively rich in Cinchonin and Quinidin, contains however also Quinin.

Cinchona nitida, Ruiz and Pavon.

Andes of Peru and and Ecuador. This tree rises to 80 feet under favorable circumstances. It also yields Grey Bark and Huanuco Bark, besides Loxa Bark. It will probably prove one of the hardiest species. It contains predominantly Cinchonin and Quinidin.

Cinchona officinalis, L. (partly.)*

(*Cinchona Condaminea*, Humboldt)

Andes of New Grenada and Peru, at a height of 6000 to 10,000 feet. Yields Crown or Brown Peru Bark, besides part of Loxa Bark. Comparatively rich in Quinin and

Cinchonidin. The temperature of the middle regions of the Andes, where this tree grows, is almost the same as that of the Canary Islands. Superabundance of moisture is particularly to this species pernicious. The Crispilla variety endures a temperature occasionally as low as 27° F.

Cinchona clancifolia Mutis is considered by Weddell a variety of C. officinalis. This grows on places, where the mean annual temperature is that of Rome, with however less extremes of heat and cold. It yields part of the Pitaya-Bark.

Cinchona Pitayensis must also be referred to C. officinalis as a variety. This attains a height of 60 feet and furnishes also a portion of the Pitaya Bark. It is this particular Cinchona, which in Upper India yielded in some instances the unprecedented quantity of 11 per cent. alkaloids, nearly 6 per cent. Quinin, the rest Quinidin and Cinchonin.

In Java some of the best results were obtained with Cinchona Hasskarliana Miq., a species seemingly as yet not critically identified.

Cinchona succirubra, Pavon.*

Middle andine regions of Peru and Ecuador. A tree, attaining a height of 40 feet, yielding the red Peru-Bark, rich in Quinin and Cinchonidin. It is this species, which is predominantly cultivated on the mountains of Bengal. All these Chinchonas promise to become of importance for culture in the warmest regions of our forest-land, on places not readily accessible or eligible for cereal culture. The Peruvian proverb that Cinchona trees like to be "within sight of snow" gives some clue of the conditions, under which they thrive best. They delight in the shelter of forests, where there is an equable temperature, no frost, some humidity at all times both in air and soil, where the ground is deep and largely consists of the remnants of decayed vegetable substances and where the subsoil is open. Drippage from shelter-trees too near will be hurtful to the plants. Closed valleys and deep gorges, into which cold air will sink, are also not well adapted for cinchona-culture. In our Colony we ought to consociate the Perubark-plants with naturally

growing fern-trees but only in our warmest valleys of richest soil. The best temperature for Cinchonas is from 53° to 66° F.; but they mostly will endure in open places a minimum of 32° F.; in the brush shades of the Botanic Garden of Melbourne, where years ago already Cinchonas were raised by the thousands, they have even resisted uninjured a temperatnre of a few degrees less, wherever the wind had no access, while under such very slight cover the Cinchonas withstood also a heat of a few degrees over 100° F. The plants are most easily raised from seeds, best under some cover such as mats and they are seeding copiously already several years after planting. The contents of alkaloids in the bark can be much increased by artificial treatment, if the bark is only removed on one side of the stem and the denuded part covered with moss, under which in one year as much bark is formed as otherwise requires three years' growth, such forced bark moreover containing the astounding quantity of as much as 25 alkaloids, because no loss of these precious substances takes place by gradual disintegration through age. The Cinchona-plants are set out at distances of about 6 feet. The harvest of bark begins in the fourth or fifth year. The price varies in Europe from 2s. to 9s. per lb. according to quality. The limits assigned to this small literary compilation do not admit of entering further into details on this occasion, but I may yet add, that in the Darjeeling district over three millions of Cinchona plants were in cultivation in 1869, raised in Government plantations.

Citrus Aurantium, L.*

The Orange (in the widest sense of the word). A native of South Asia. A tree of longevity, known to have attained an age of 600 years and more. Any specific differences, to distinguish C. Aurantium from C. medica, if they once existed, are obliterated now through hybridisation at least in the cultivated forms. As prominent varieties of C. Aurantium may be distinguished:—

Citrus Bigaradia, Duhamel. The Bitter Orange. This furnishes from its flowers the Neroli Oil so delicious and costly

as a scent. It is stated, that Orange-flowers to the value of £50 might be gathered from the plants of an acre within a year. The rind of the fruit is used for candied orange-peel. Bitter principle: Hesperidin in the rind, Limonin in the seed.

Citrus dulcis, Volkamer. The Sweet Orange, of which many kinds occur. The St. Michael Orange has been known to bear in the Azores on sheltered places 20,000 fruits on one tree in a year. Neroli Oil is obtained from the flowers of this and allied varieties.

Citrus Bergamium, Risso. From the fruit-rind of this variety Bergamotte Oil is obtained, but also oil from the flowers. The Mellarosa variety furnishes a superior oil and exquisite confitures.

Citrus decumana, Linné. The Shaddock or Pompelmos. The fruit will exceptionally attain a weight of 20 lbs. The pulp and thick rind can both be used for preserves.

Citrus nobilis, Loureiro. The Mandarin-Orange. The thin peel separates most readily from the deliciously flavored sweet pulp. There are large and small fruited Mandarin Oranges; the Tangerine variety is one of them.

Citrus medica, Linné.*

The Citron (in the widest sense of the word). Indigenous to Southern Asia. For convenience's sake it is placed here as distinct from the preceding species. As prominent varieties of the Citrus medica may be distinguished:—

Citrus Cedra, Gallesio. The real Citron. From the acid tubercular fruit essential oil and citric acid can be obtained, irrespective of the ordinary culinary use of the fruit. A large variety with thick rind furnishes candied the Citrionate or Succade. The Cedra oil comes from a particular variety.

Citrus Limonium, Risso. The real Lemon. From the fruit of this is largely pressed the Lemon juice, while the thin smooth aromatic peel serves for the production of volatile oil or for condiments. The juice of this fruit is particularly rich in citric acid. A large variety is the Rosaline Lemon.

Citrus Lumia, Risso. The sweet Lemon, including the Pear-Lemon with large pear-shaped fruit. Rind thick and pale; pulp not acid. This variety serves for particular condiments.

Citrus Limetta, Risso. The real Lime. The best lime-juice is obtained from this variety, of which the Perette constitute a form.

Citrus Australasica, F. von Mueller.

Coast forests of extra-tropic East Australia. A shrubby species with oblong or almost cylindrical fruits of lemon-like taste, measuring 2 to 4 inches in length. They are thus very much larger than those of Atalantia glauca of the coast and the desert-interior of tropic Australia, which are also of similar taste. These plants are entered together with the following on this list, merely to draw attention to them, as likely capable of improvement of their fruit through culture.

Citrus Planchoni, F. von Mueller.

(*C. Australis*, Planchon, partly.)

Forests near the coast of sub-tropic East Australia. A noble tree, fully 40 feet high with globular fruits about the size of a walnut, called Native Oranges. The species has first appeared under the above name in the "Report on the Vegetable Products of the Intercolonial Exhibition of 1867."

Citrus Japonica, Thunberg.

The Kumquat of Japan. A shrubby Citrus with fruits of the size of a Gooseberry, from which on account of their sweet peel and acid pulp an excellent preserve can be prepared.

Cochlearia Armoracia, L.

The Horseradish. Middle Europe and Western Asia. Perennial. The volatile oil of the root allied to that of Mustard.

Cochlearia officinalis, L.

Shores of Middle and North Europe, North Asia and North America. A biennial herb, like the allied C. Anglica and

C. Danica valuable as an antiscorbutic; hence deserving naturalization. It contains a peculiar volatile oil.

Coffea Arabica, L.

Mountains of South-west Abyssinia. The Coffee-plant. This shrub or small tree has been admitted into this list not without great hesitation, merely not to be passed. The cultivation within Victorian boundary can only with any prospect of success be tried in the warmest and simultaneously moistest regions, such as East Gipps Land, frost being detrimental to the Coffee-plant. In Ceylon the Coffee regions are between 1000 and 5000 feet above the ocean, but Dr. Thwaites observes that the plant succeeds best at an elevation from 3000 to 4500 feet, in places where there is a rainfall of about 100 inches a year. The temperature there rises hardly ever above 80° F., and almost never sinks below 45° F. Coffee requires moist weather whilst it ripens its fruit, and a season of drier weather to form its wood. For further particulars see the papers of the Planters' Association of Kandy. Chemical principles: Coffein, a peculiar tannic acid and Quina acid.

Colchicum auctumnale, L.

Middle and South Europe, West Asia. The Meadow Safron. The seeds and roots of this pretty bulbous-tuberous herb are important for medicinal use. The plant has heen introduced by the writer with a view of being cultivated on moist meadows in our ranges. Active principle: Colchicin.

Colocasia antiquorum, Schott.

From Egypt through South Asia to the South Sea Islands, apparently also indigenous in the warmer parts of East Australia. The Taro. The stem-like tuberous starchy roots lose their acridity by the process of boiling, roasting or baking. The plant proved hardy in the Botanic Garden of Melbourne. The tops of the tubers are replanted for a new crop. Taro requires a rich moist soil and would grow well on banks of rivers. For scenic culture it is a very decorative plant. Colocasia esculenta is a variety of this species.

Colocasia Indica, Kunth. (*Alocasia Indica,* Schott.)

South Asia, South Sea Islands and East Australia. Cultivated for its stem and tubers on swamps or rivulets. This stately plant will rise in favorable localities to a height of 12 feet, the edible trunk attaining a considerable thickness, the leaves sometimes measuring 3 feet in length. In using the stem and root for food great care is needed to expel by the heating process all acridity. Colocasia odora and C. macrorrhiza seem varieties of this species. Several other Aroid plants deserve attention for test-culture on account of their edible roots, among them Cyrtosperma edulis, Seemann, from the Feegee Islands.

Conium maculatum, L.

The Hemlock. Europe, North Africa, North and West Asia. A biennial herb, important for medicinal purposes. It should however not be allowed to stray from its plantations, as it is apt to be confounded with culinary species of Anthriscus, Chaerophyllum and Myrrhis, and may thus cause as a most dangerous plant disastrous mistakes. Active principles: Coniin, in the fruit also Conhydrin.

Conopodium denudatum, Koch.

Western Europe. The small tuberous roots of this herb, when boiled or roasted, are available for food and known as Earth Chesnuts. The plant is allied to Carum Bulbocastanum.

Convolvulus floridus, L. fil.

Canary Island. A shrubby not climbing or winding species. With the following it yields the Atlantic Rosewood from stem and root.

Convolvulus scoparius, L. fil.

Teneriffe. One of the Rosewood plants.

Convolvulus Scammonia, L.

Mediterranean regions and Asia Minor. A perennial herb. From the root is obtained the purgative resin Scammonia.

Corchorus capsularis, L.*

From India to Japan. One of the principal Jute plants. An annual, attaining a height of about a dozen feet, when closely grown, with almost branchless stem. A nearly allied but lower plant, *Corchorus Cunninghami*, F. v. Mueller, occurs in tropical and subtropical East Australia. Jute can be grown where cotton and rice ripen, be it even in localities comparatively cold in the winter, if the summer's warmth is long and continuous. The fibre is separated by steeping the full grown plant in water from five to eight days, and it is largely used for rice and cotton bags, carpets and other similar textile fabrics, and also for ropes. About 60,000 tons are annually exported from India to England, and a large quantity also to the United States. Jute is sown on good land, well ploughed and drained, but requires no irrigation, although it likes humidity. The crop is obtained in the course of four or five months, and is ripe when the flowers turn into fruit capsules. Good paper is made from the refuse of the fibre.

Corchorus olitorius, L.*

South Asia and North Australia. Furnishes, with the foregoing species, the principal supply of Jute fibre. As it also is an annual, it can be brought to perfection in our summers. The foliage can be used for spinage. The fibre is not so strong as hemp, but very easily prepared. It will not endure exposure to water. The allied *Corchorus trilocularis*, L., of Indian origin, is likewise a native of eastern tropical and subtropical Australia.

Cordyline Banksii, J. Hooker.

New Zealand. This lax and long leaved palm-lily attains a height of 10 feet; its stem is usually undivided. This and the following species have been admitted into this list for a double reason, because not only are they by far the hardiest, quickest growing and largest of the genus, and thus most sought in horticultural trade for scenic planting; but also because they furnish from the leaves a superior fibre for ropes and other purposes. The small seeds are produced in great abundance, and germinate with extreme

readiness. These Palm-lilies ought to be naturalized in our ranges by mere dissemination.

Cordyline Forsteri, F. v. Mueller.
(*C. Australis*, J. Hooker, not Endlicher.)
New Zealand. The stem of this noble thin-leaved plant attains a height of 40 feet, and is branched.

Cordyline indivisa, Kunth.
New Zealand. The stem of this thick and rigid-leaved palm-like species rises to a height of 20 feet, and remains undivided. Leaves finally 5 inches broad; yield the Toi-fibre.

Cordyline Baueri, J. Hooker.
(*C. Australis*, Endlicher, not J. Hooker.)
Norfolk Island. The stem of this stately species attains a height of 40 feet, and becomes in age ramified. It is very intimately allied to the New Zealand Cordyline Forsteri.

Coriandrum sativum, L.
Orient and Middle Asia. An annual or biennial herb, much in use for condiments. The essential oil peculiar.

Corynosicyos edulis. (*Cladosicyos edulis*, J. Hooker.)
Guinea. A new cucumber-like plant, with edible fruits about 1 foot long, and 3 inches in diameter.

Crambe maritima, L.
Sea Kale. Sand coasts of Europe and North Africa. A perennial herb; the young shoots used as a wholesome and agreeable vegetable.

Crambe Tataria, Wulfen.
From Southern Europe to the Orient. Perennial. Likewise used for culinary purposes.

Crataegus aestivalis, Torrey and Gray.
The Apple Haw. Southern States of North America. The small juicy fruit of an agreeable acid taste.

Crataegus apiifolia, Michaux.
North America. Highly serviceable for hedges.

Crataegus coccinea, L.

North American Whitethorn. A valuable hedge plant; also very handsome. Spines strong.

Crataegus cordata, Aiton.

Southern States of North America. Also much employed for hedges.

Crataegus Crus-Galli, L.

North America. The Cockspur Thorn. Regarded as one of the best species for hedges. Spines long and stout.

Crataegus Oxyacantha, L.

Europe, North Africa, North and West Asia. The ordinary Hawthorn or Whitethorn. Recorded here as one of the most eligible among deciduous hedge plants.

Crataegus parvifolia, Aiton.

North America. For dwarf hedges. Spines long, slender, sharp and numerous.

Crataegus pyracantha, Persoon.

The Firethorn. South Europe. This species is evergreen. It is likewise adapted for hedges, but slower in growth than Hawthorn, but not difficult to rear.

Crataegus tomentosa, L.

North America. Fruit edible. By the species mentioned the list of American Hedgethorns is, probably, not yet exhausted.

Crithmum maritimum, L.

The real Samphir. Sea shores of Middle and South Europe, North Africa and the Orient. A perennial herb. Settlers on the coast might readily disseminate and naturalize it. It is held to be one of the best plants for pickles, the young leaves being selected for that purpose.

Crocus sativus, L.

The Dye-Safron. South Europe and Orient. The Stigmata of this particular autumnal flowering Crocus constitute the costly dye substance. The best is collected from the flowers, just as they daily open in succession. At our stage

of colonisation it would not be remunerative to grow Safron commercially; but as the plant is well adapted for our clime, it might be planted out into various unoccupied mountain localities, with a final view to naturalize it, and to render it thus available at a later period from native sources.

Crotalaria juncea, L.

The Sunn Hemp. Indigenous to South Asia, and also widely dispersed through tropical Australia. An annual herb, rising under favourable circumstances to a height of 10 feet. In our colony Sunn can only be cultivated in the warmest and moistest localities. It comes in four or five months to maturity. The plant can also be grown as a fodder-herb for cattle. It requires rich friable soil. If a superior soft fibre is desired, then the plant is pulled while in flower; if strength is the object, then the plant is left standing until it has almost ripened its seeds. The steeping process occupies about three days. For the purpose of obtaining branchless stems it is sown closely.

Crotalaria retusa, L.

Asia, America and Australia within the tropics. A perennial herb. Its fibre resembles that of C. juncea, and is chiefly used for ropes and canvas. Others of the multitudinous species of Crotalaria deserve to be tested for their fibres.

Crozophora tinctoria, Necker.

South Europe, North Africa and Orient. An annual herb. The turnsole-dye is prepared by exposure of the juice to the air, or by treating it with Ammonia.

Cucumis cicatrisatus, Stocks.

Scinde, where it is called "Wungee." The edible ovate fruit is about 6 inches long.

Cucumis Citrullus, Seringe.

(*Citrullus vulgaris*, Schrader.)

Mediterranean regions. The Water-Melon. It is simply mentioned here, to indicate the desirability of naturalizing it in the interior-deserts, where no Cucurbita and only a

single kind of edible Cucumis (*C. acidus*, Jacquin), with fruits not larger than a pigeon's egg, is indigenous. In South African deserts it has become spontaneously established, and retained the characters of the cultivated fruit.

Cucumis Colocynthis, L.

(*Citrullus Colocynthis*, Schrader.)

From the Mediterranean regions to India. An annual herb. The medicinal extract of Colocynth is prepared from the small gourd of this species. Active principle: Colocynthin.

Cucumis Conomon, Thunberg.

Japan. An annual. The large fruit is used for preserves.

Cucumis Melo, L.

The Melon. Originally from the country about the Caspian Sea. The best varieties might also be naturalized in our sand-deserts, particularly on places where some moisture collects. Some of the Bokhara varieties are remarkably luscious and large. Apparently remunerative results have been gained in Belgium from experiments to cultivate Melons for sugar and treacle. The seeds, thus obtained in quantity, become available for oil-pressing. The root contains Melonemetin.

Cucumis Momordica, Roxburgh.

Cultivated in India. It produces Cucumbers 2 feet long, bursting slowly when ripe into several divisions. Young the fruit is used like Cucumbers, aged like Melons.

Cucumis sativus, L.

The Cucumber. Egypt. Indicated here merely for completeness' sake, also because Gherkin pickling ought to become a more extended local industry.

Cucumis utilissimus, Roxburgh.

Mountains of Bengal. An annual like the other species. Fruit of the size and shape of an ostrich's egg with the flavor of Melons. These fruits will keep for several months.

Cucurbita maxima, Duchesne.

Large Gourd. Turkey. Instances are on record of fruits having weighed over 2 cwt. Also this species is eligible for naturalization in the interior. Amongst other purposes it serves for calabashes.

Cucurbita Melopepo, L.

The Squash. May be regarded as a variety of C. Pepo. It will endure storage for months.

Cucurbita moschata, Duchesne.

The Musky Gourd. Doubtless also from the Orient.

Cucurbita Pepo, L.

The Pumpkin and Vegetable Marrow. Countries on the Caspian Sea. Its naturalization in the desert would be a boon. The seeds on pressure yield a fixed oil; they are also anthelmintic. *C. melanosperma*, A. Braun, is not edible.

Cuminum Cyminum, L.

North Africa. The fruits of this annual herb are known as Cumin and used for certain condiments, as also in medicine. *Cuminum Hispanicum*, Merat, is similar. Essential oil peculiar.

Cycas revoluta, Thunberg.

The Japan Fern-palm. The trunk attains in age a height of about 6 feet, and is rich in sago-like starch. The slow growth of this plant renders it to us valuable for no other purpose than scenic decorative culture. *Cycas angulata*, R. Br., may also prove hardy, and would prove a noble horticultural acquisition, as it is the most gigantic of all Cycadeæ, attaining a height of 70 feet in tropical East Australia. Possibly like the Zamia stems also the trunks of Cycas admit of translocation even at an advanced age.

Cynara Cardunculus, L.

The Cardoon. Mediterranean regions. A perennial herb. The bleached leaf-stalks serve as esculents.

Cynara Scolymus, L.

The Artichoke. South Europe and North Africa. The receptacles and the base of the flower scales well known as

a vegetable. The plant is perennial and here merely mentioned as entitled to extended culture in grouping this with other stately plants. Several other species are worthy of cultivation.

Cynosurus cristatus, L.

The Crested Dogstail-Grass. Europe, North Africa, West Asia. A perennial grass, particularly valuable as withstanding drought, the roots penetrating to considerable depth. The stems can also be used for bonnet plaiting. Though inferior in value for hay this grass is well adapted for permanent pasture, as it forms a dense turf without suffocating other grasses or fodder-herbs.

Cyperus corymbosus, Rottboell.

India. This stately perennial species may be chosen to fringe our lakes and ponds. It is extensively used for mats in India.

Cyperus Papyrus, L.

The Nile Papyrus. Though no longer strictly an utilitarian plant, as in ancient times, it could scarcely be passed on this occasion, as it ought to become valuable in horticultural trade. Its grand aspect recommends it as very decorative for aquatic plantations.

Cyperus Syriacus, Parlatore.

The Syrian or Sicilian Papyrus. This is the Papyrus-plant usual in garden cultivation. The plants in our Botanic Garden attain a height of 8 feet, but suffer somewhat from frost. Other tall Cyperi deserve introduction, for instance *C. giganteus*, Rottboell, from West India and Guiana, these kinds of plants being hardier than others from the tropics. I have not ventured to recommend the introduction of *Cyperus esculentus*, L., a Mediterranean species, remarkable for its sweet tubers, known as Earth Almonds. It is stoloniferous like the allied *Cyperus rotundus*, L., which has invaded the culture ground of many countries as an obnoxious irrepressible weed. The tubers of Cyperus esculentus contain about 16 per cent. oil.

Cyperus vaginatus, R. Brown.

Widely dispersed over the Australian continent, but not yet noticed in Tasmania and New Zealand. It is restricted to swampy localities, and thus is not likely to stray into ordinary fields. It is our best indigenous fibre-plant, and it is likewise valuable as being with ease converted into pulp for good writing paper, as shown by me some years ago. Its perennial growth allows of regular annual cutting. Within Victorian territory this Galingale-rush is particularly common on the Murray-flats.

Cytisus scoparius, Link. (*Spartium scoparium*, L.)

The Broom-bush. Europe, North Asia. Of less significance as a broom plant than as one of medicinal value. It can also be used for tanning purposes. An alkaloid (Spartein) and a yellow dye (Scoparin) are obtainable from this Broom-bush.

Dactylis caespitosa, Forster. (*Poa Forsteri*, Steudel.)

Fuegia, Falklands Island, South Patagonia. The Tussock-grass. Thrives in cold countries near the sea in pure sand, at the edge of peat-bogs. It would likely prosper in our alpine moors. It is perennial, and reaches to a height of 7 feet. It is very nutritious, and much sought by herds. The base of the stem is nutty and edible.

Dactylis glomerata, L.*

Europe, North Africa, North and Middle Asia. The Cocksfoot-grass. Perennial. One of the best of tall pasture grasses, adapted as well for dry as moist soil, thus even available for wet clays. It will live also under the shade of trees in forests. Its yield of fodder is rich and continuous, but its stems are hard. It is already largely cultivated, and has become naturalized.

Daucus Carota L.

Europe, North Africa, extra-tropic Asia east to Japan. The Carrot. Admits of naturalization along our shores. Beyond the ordinary culinary utilization it serves for the distillation of a peculiar oil. The chemical substances Carotin and Hydrocarotin are derived from it.

Digitalis purpurea, L.

Greater part of Europe. The Fox-glove. A biennial and exceedingly beautiful herb of great medicinal value, easily raised. Chemical principles: Digitalin, Digitaletin and three peculiar acids.

Dioscorea aculeata, L.*

The Kaawi-Yam. India, Cochin-China, South Sea Islands. Stem prickly, as the name implies, not angular. Leaves alternate, undivided. It ripens later than the following species, and requires no reeds for staking. It is propagated from small tubers. This Yam is of a sweetish taste, and the late Dr. Seemann regarded it as one of the finest esculent roots of the globe. A variety of a blueish hue, cultivated in Central America (for instance at Caracas), is of very delicious taste. In the warmest parts of our colony this and the following species are likely to come to perfection.

Dioscorea alata, L.*

The Uvi-Yam. India and South Sea Islands. The stems are four-angled and not prickly. The tubers, of which there are many varieties, will attain under favorable circumstances a length of 8 feet, and the prodigious weight of one hundred pounds! This species, and the preceding one, are the two principal kinds cultivated in tropical countries. D. alata is in culture supported by reeds. It is propagated from pieces of the old root, and comes in warm climes to perfection in about seven months. The tubers may be baked or boiled. It is this species, which has been successfully cultivated in New Zealand, and also in the Southern States of North America.

Dioscorea globosa, Roxburgh.

India. Roxburgh states this to be the most esteemed Yam in Bengal.

Dioscorea hastifolia, Nees.

Extra-tropic Western Australia, at least as far south as 32°. It is evidently one of the hardiest of the Yams, and on that

account deserves particularly to be drawn into culture. The tubers are largely consumed by the aborigines for food; it is the only plant on which they bestow any kind of cultivation, crude as it is.

Dioscorea Japonica, Thunberg.* (*D. Batatas*, Decaisne.)

The hardy Chinese and Japan Yam. This species, which is not prickly, has been cultivated some years in our Botanic Garden. The material here for comparison is not complete, but seems to indicate, that *D. transversa*, R. Br. and *D. punctata*, R. Br., are both referable to D. Japonica. If this assumption should prove correct, then we have this Yam along the coast tracts of North and East Australia as far south as latitude 33°. In Australia we find the wild root of good taste.

Dioscorea nummularia, Lamarck.

The Tivoli Yam. Continental and Insular India, also South Sea Islands. A high climbing prickly species, with opposite leaves. Roots cylindrical as thick as an arm; their taste exceedingly good.

Dioscorea oppositifolia, L.

India and China. Not prickly. One of the edible Yams.

Dioscorea pentaphylla, L.

Continental and Insular India, also South Sea Islands. Likewise a good Yam. A prickly species, with alternate divided leaves.

Dioscorea purpurea, Roxb.

India. In Bengal considered next best to D. alata.

Dioscorea sativa, L.

South Asia, east as far as Japan, also in the South Sea Islands, and North and tropical East Australia, likewise recorded from tropical Africa. Stem cylindrical, not prickly. The acrid root requires soaking before boiling. It has proved hardy in the Southern States of North America.

Dioscorea spicata, Roth.

India. Root used like those of other species.

Dioscorea tomentosa, Koenig.

Ooyala Yam. India. The nomenclature of some of the Asiatic species requires further revision.

Dioscorea trifida, L. fil.

Central America. One of the Yams there cultivated. Various other tuberous Dioscoreæ occur in tropical countries; but their respective degree of hardiness, taste and yield are not recorded or ascertained. The length of the Victorian warm season is probably sufficient for ripening all these Yams.

Diospyros Kaki, L. fil.

The Date-plum of China and Japan. A slow growing not very productive tree, here recorded for completeness. The fruit is yellow or pink or dark purple, variable in size, but never larger than an ordinary apple. It has ripened at Sydney. *D. Virginiana*, L., has been recorded among the timber-trees.

Dipsacus fullonum, L.

Fuller's Teazel. Middle and South Europe and Middle Asia. A tall biennial herb. The thorny fruit-heads in use for fulling in cloth factories. The import during one of the last years into England was valued at £5000. The plant is most easily raised. The use of these Teazels has not yet been superseded by any adequate machinery.

Dolichos Lablab, L.

Warmer parts of Africa; probably thence spread widely through the tropics. An annual herb, sometimes lasting through several years. The young pods as well as the ripe seeds available for culinary use, but not of all varieties. It delights in rich soil, and ripens in hot countries within three months; its yield is about fortyfold according to Roxburgh. The whole plant forms excellent stable-feed for cattle.

Dracocephalum Moldavica, L.

North and Middle Asia. An annual showy scent-herb.

Ecballion Elaterium, Richard.

Mediterranean regions and Orient. The Squirting Cucumber. An annual. The powerful purgative Elaterium is prepared from the pulp of the fruit. Chemical principles: Elaterid, Elaterin, Hydroelaterin.

Ehrharta Diplax, F. v. Mueller.

(*Microlaena avenacea*, J. Hooker.)

New Zealand. This tall perennial grass is fond of woodlands and deserves introduction. It is likely to prove a rich pasture-grass. A few other Australian species, particularly of the section Tetrarrhena, are readily accessible to us, and so indeed also the South African Ehrhartas, all adapted for our clime, the majority perennial and several of superior value. *Ehrharta caudata*, Munro, is indigenous in Japan.

Ehrharta stipoides, Labillardière.

Extra-tropic Australia, also New Zealand. A perennial grass, which keeps beautifully green all through the year. For this reason its growth for pasturage should be encouraged, particularly as it will live on poor soil. Mr. W. H. Bacchus, of Bacchus-Marsh, considers it nearly as valuable as Kangaroo-Grass, and in the cool season more so. He finds it to bear over-stocking better than any other native grass, and to maintain a close turf. It is however not always copiously seeding.

Eleusine Coracana, Gaertner.

Southern Asia, east to Japan. Though annual, this grass is worthy of cultivation on account of its height and nutritiveness. The large grains can be used like Millet.

Eleusine stricta, Roxburgh.

India. The increase of grain of this annual grass in rich soil is at times five hundredfold. *E. Tocusso*, Fresenius, is a valuable kind from Abyssinia, seemingly allied to E. stricta. The Arabian and Himalaian *E. flagellifera*, Nees, is perennial. Other species of Eleusine are deserving of trial.

Elymus arenarius, L.*

The Sea Lyme-Grass. Europe and North Asia, on sand-coasts. One of the most important and vigorous of grasses for binding drift-sand on the sea shores. The North American *E. mollis,* Trinius, is allied to this species.

Elymus condensatus, Presl.

The Bunch-Grass of British Columbia and California. This is favorably known as adapted for sandland.

Ervum Lens, L. (*Lens esculenta,* Moench.)

Mediterranean regions, Orient. The Lentil. Annual, affording in its seeds a palatable and nutritious food.

Euclea myrtina, Burchell.

South Africa. Berry small, black, but edible. To us this plant would hardly be more than an ornamental bush.

Euclea undulata, Thunberg.

South Africa. Berry small, red, edible. Other shrubby species from the same portion of the globe yield also esculent fruits, which under superior culture may vastly improve.

Erythroxylon Coca, Lamarck.*

Peru. This shrub is famed for the extaraordinarily stimulating property of its leaves, which pass under the names of Spadic and Coca. They contain two alkaloids, Cocain and Hygrin, also a peculiar tannic acid. Whether any of the many other species of Erythroxylon possess similar properties seems never yet to have been ascertained.

Eupatorium triplinerve, Vahl. (*E. Ayapana,* Ventenat.)

Central America. A perennial somewhat shrubby herb, possibly hardy in the warmer parts of our Colony. It is used as a medicinal plant, also as an alexipharmic. It contains Eupatorin and much essential oil, peculiar to the plant.

Fagopyrum cymosum, Meissner.

The perennial Buck-Wheat or rather Beech-Wheat of the Indian and Chinese Highlands.

Fagopyrum emarginatum, Babington.

Chinese and Himalaian Mountains, where it is cultivated for its seeds. Annual.

Fagopyrum esculentum, Moench.

Central Asia. The ordinary Buck-Wheat. This annual herb succeeds on the poorest soil. The crushed amylaceous seeds can be converted by boiling or baking into a palatable and wholesome food. As an agrarian plant it can with advantage be raised as a first crop on sandy heath-land, newly broken up, for green manure. The period, required for the cyclus of its vegetation, is extremely short. Thus it can be reared on our higher Alps.

Fagopyrum Tataricum, Moench.

Middle and North Asia. Yields for the higher mountain regions a still safer crop than the foregoing, otherwise the remarks offered in reference to F. esculentum apply also to T. Tataricum.

Fagopyrum triangulare, Meissner.

In the Himalaian Mountains, ascending naturally to regions 11,500 feet high. An annual. *F. rotundatum*, Babington, seems a variety of this species. It is cultivated for food like the rest.

Festuca elatior, L.*

The Meadow Fescue. Europe, North Africa, North and Middle Asia. A perennial grass, attaining a height of several feet. There are several varieties of this species. The tallest follows rivers readily as far down as the tides reach. The ordinary form is well adapted for permanent pastures, has tender leaves, produces excellent hay and is early out in the season. It can be mixed advantageously with F. ovina. It is superior to ryegrass in produce and improves with age. *F. arundinacea*, Schreb., *F. pratensis*, Huds. and *F. loliacea*, Huds. are varieties of this species.

Festuca Hookeriana, F. v. Mueller.

Alps of Australia and Tasmania. A tall perennial grass, evidently nutritious, required to be tried for pastoral cul-

ture, and perhaps destined to become a meadow grass of colder countries.

Festuca ovina, L.

Sheep-Fescue. Europe, North and Middle Asia, North America, found also in South America and the Alps of Australia and New Zealand. This species like F. elatior is obtainable with facility. *F. duriuscula*, L. and *F. rubra*, L. are varieties. A perennial grass, thriving on widely different soil, even moory and sandy ground. It yields a good produce, maintains its virtue, resists drought, and is also well adapted for lawns and the swards of parks.

The space does not admit of entering here into further details of the respective value of many species of Festuca, which might advantageously be introduced from various parts of the globe for rural purposes.

Ficus Carica, L.*

Orient. The ordinary Figtree. It attains an age of several hundred years. In our latitudes and clime a prolific tree. The most useful and at the same time the most hardy of about a thousand recorded species of Ficus. The extreme facility with which it can be propagated from cuttings, the resistance to heat, the comparatively early yield and easy culture recommend the Figtree to be chosen, where it is an object to raise masses of tree-vegetation in widely treeless landscapes of the warmer zones. Hence the extensive plantations of this tree made in formerly woodless parts of Egypt; hence the likelihood of choosing the Fig as one of the trees for extensive planting through favorable portions of our desert-wastes, where moreover the fruit could be dried with particular ease. Caprification is unnecessary, even in some instances injurious and objectionable. Two main-varieties may be distinquished, that which produces two crops a year and that which yields but one. The former includes the grey or purple Fig, which is the best, the white Fig and the golden Fig, the latter being the finest in appearance but not in quality. The main-variety, which bears only one crop a year, supplies the greatest quantity of Figs for drying, among which the Marseillaise and Bellonne are

considered the best. The Damascus and the Arabian produce delicious large fruits, but they must be dried with fire-heat, and are usually consumed fresh. The ordinary drying is effected in the sun. For remarks on this and other points concerning the Fig, the valuable work, recently published by the Rev. Dr. Ebenezer, should be consulted. The first crop of figs grows on wood of the preceding year, the last crop however on wood of the current year. Varieties of particular excellence are known from Genoa, Savoy, Malaga, Andalusia.

Flemingia tuberosa, Dalzell.

Western India. The tubers of this herb are said to be edible. Another species, F. vestita, is on record as cultivated in North-western India for its small esculent tubers.

Foeniculum officinale, Allioni.

The Fennel. Mediterranean regions, particularly on limestone soil. A perennial or biennial herb, of which two primary varieties occur—the so-called sweet variety having fruits almost twice as large as the other. The herb and fruits are in use as condiments and the latter also for medicine. The fruits are rich in essential oil, containing much Anethol.

Fourcroya Cubensis, Haworth.

West India and continental tropical America. A smaller species than the following, but equally utilized for fibre and impenetrable hedges. *F. flava-viridis*, Hooker, from Mexico, is still smaller.

Fourcroya gigantea, Ventenat.

Central America. With species of Yucca, Agave, Dracæna, Cordyline, Phormium, Dorycnthes and this and a few other Fourcroyas, we have gigantic liliaceous plants available industrially for fibre. Frost injures the leaves of this species. Scape up to 30 feet high.

Fourcroya longæva, Karw. and Zucc.

High mountains of Guatemala and Mexico, at an elevation of about 10,000 feet. One of the most gigantic and magnificent of all liliaceous or amaryllideous plants, in volumen

only surpassed by Dracæna Draco, the Dragon-tree of the Canary Islands. This is the only known high-stemmed species, the trunk attaining a height of 50 feet and the huge panicle of flowers 40 feet more. It dies, like many allied plants, after flowering. The species is recorded here as a fibre plant, but with us would mainly or solely be kept for its ornamental grandeur.

Fragaria Chilensis, Ehrh.

In various of the colder parts both of North and South America. Chili-Strawberry.

Fragaria collina, Ehrhart.

In various parts of Europe. Hill-Strawberry.

Fragaria grandiflora, Ehrhart. (*F. Ananas*, Miller.)

Various colder parts of America. Closely allied to F. Chilensis. Ananas Strawberry.

Fragaria Illinoensis, Prince.

North America. Hovey's Seedling and the Boston fruit from this plant.

Fragaria praëcox, Duchesne. (*Fragaria elatior*, Ehrhart.)

In mountain-forests of Europe. Cinnamon-Strawberry. Hautbois.

Fragaria vesca, L.

Naturally very widely dispersed over the temperate and colder parts of the Northern Hemisphere. Wild Wood Strawberry. From this typical form probably some of the other Strawberries arose. Middle forms and numerous varieties now in culture were produced by hybridization. These plants, though abounding already in our gardens, are mentioned here, because even the tenderest varieties could be naturalized in our woods. Any settler living near some brook or rivulet might readily set out some plants, which with others, similarly adapted, would gradually spread with the current.

Fragaria Virginiana, Miller.

North America. Scarlet Strawberry.

Gaultieria Shallon, Pursh.

North-western America. This handsome spreading bush would yield its pleasant edible berries in abundance, if planted on our snowy mountains, where it would likely become naturalized.

Gaylussacia frondosa, Torrey and Gray.

The Blue Tangleberry of North America. A bush with deciduous foliage. Berry sweet.

Gaylussacia resinosa, Torrey and Gray.

The Black Huckleberry of North America. A dwarf shrub with deciduous leaves. It likes swampy woodlands, and thus would find ample space in our forest-ranges. Berry of pleasant taste. Perhaps some of the South American species produce also edible fruits.

Geitonoplesium cymosum, All. Cunningham.

Through the whole East Australian forests. It is mentioned here to draw attention to the fact, that special culture may convert this into an Asparagus plant, as Mr. P. O'Shanesy has found, that the young shoots offer a fair substitute for Asparagus

Genista monosperma, Lamarck.

Mediterranean regions. One of the best of broom-bushes for arresting sand-drift. *G. sphaerocarpa*, Lam., is of like use, and comes also from the Mediterranean Sea.

Gentiana lutea, L.

Sub-Alpine tracts of Middle and South Europe. A perennial most beautiful herb, yielding the medicinal Gentian-root. It could be easily raised in our higher mountains. Chemical principles: Gentian-bitter and Gentianin.

Gladiolus edulis, Burchell.

Interior of South Africa. The bulb-like roots are edible, and taste like chesnuts, when roasted.

Glycine hispida, Bentham. (*Soja hispida*, Moench.)

An annual herb of India, China and Japan. The beans are one of the main ingredients of the condiment known as Soja. *Glycine Soja*, Siebold and Zuccarini, is said to be a distinct plant, but probably serving the same purpose.

Glycyrrhiza echinata, L.

South Europe and Orient. From the root of this herb at least a portion of the Italian Liquorice is prepared. The root is thicker than that of the following. The Russian Liquorice root is derived from this species. It is less sweet.

Glycyrrhiza glabra, L.

South Europe. The extract of the root of this herb constitutes the ordinary Liquorice. The plant grows here most vigorously. The liquorice is of some utility in medicine, but also used in Porter Breweries. Chemical principle: Glycyrrhizin.

Gossypium arboreum, L.*

The Tree-Cotton. India, Arabia. A tall perennial species, but not forming a real tree, yielding cotton in the first season already. Leaves long-lobed. Bracts with few teeth. Petals yellow or in age pink or purple. Seeds brown, disconnected, after the removal of the cotton-fibre greenish-velvety. The cotton of long staple, but a variety occurs with short staple. The New Orleans Cotton (*G. sanguineum,* Hassk.,) belong to this species. Dr. Seemann connects also the ordinary *G. herbaceum,* L., as a variety with *G. arboreum.* The cotton-fibre is crisp, white, opaque, and not easily separable.

Gossypium Barbadense, L.*

West India. Sea Island Cotton. Leaves long-lobed. Petals yellow. Seeds disconnected, black, after the removal of the cotton-fibre naked. The cotton of this species is very long, easily separable and of a silky lustre. This species requires low-lying coast tracts for attaining to perfection. Perennial, and yielding like the rest a crop in the first season. Cultivated largely in the Southern States of North America, also in South Europe, North Africa, Queensland and various other countries.

Gossypium herbaceum, L.*

Scinde, Cabul and other parts of tropical and sub-tropical Asia, much cultivated in the Mediterranean countries.

Perennial. Leaves short-lobed. Petals yellow. Seeds disconnected, after removal of the cotton-fibre grey-velvety. Distinguished and illustrated by Parlatore as a species, regarded by Seemann as a variety of *G. arboreum*. Staple longer than in the latter kind, white, opaque, not easily seceding. Even this species, though supposed to be herbaceous, will attain a height of 12 feet. A variety with tawny fibre furnishes the Nankin Cotton.

Gossypium hirsutum, L.*

Upland or Short-staple Cotton. Tropical America, cultivated most extensively in the United States, Southern European and many other countries. Perennial. Seeds brownish-green, disconnected, after the removal of the cotton-fibre greenish-velvety. Staple long, white, almost of a silky lustre, not easily separable. A portion of the Queensland Cotton is obtained from this species. It neither requires the coast tracts nor the highly attentive culture of G. Barbadense.

Gossypium religiosum, L.* (*G. Peruvianum*, Cavan.)

Tropical South America. Kidney Cotton, Peruvian or Brazilian Cotton. Leaves long-lobed. Petals yellow. Seeds black. connected. The cotton is of a very long staple, white, somewhat silky and easily seceding from the seeds. A tawny variety occurs. This is the tallest of all cotton-bushes, and it is probably this species, which occurs in the valleys of the Andes as a small tree, bearing its cotton while frosts whiten the ground around.

Gossypium Taitense, Parlatore.

(*G. religiosum*, Banks and Solander.)

In several islands of the Pacific Ocean. A shrub. Petals white. Seeds disconnected, glabrous after the removal of the fulvous cotton-fibre, which secedes not with readiness.

Gossypium tomentosum, Nuttall.*

(*G. Sandvicense*, Parlat. *G. religiosum*, A. Gray.)

Hawaia. Perennial. Petals yellow. Seeds disconnected, after the removal of the tawny cotton-fibre fulvous-velvety, not easily parting with their cotton.

For limitation of species and varieties Parlatore's specie *dei cotoni* (Florence, 1866,) and Todaro's asservazioni su cotone may be consulted; information on culture may be sought in Porter's "Tropical Agriculturist" and in Mallet's work on "Cotton" (London, 1862).

There are many parts of our Colony, in which all these species of Gossypium could be cultivated, and where a fair or even prolific cotton crop may be obtained. Good cotton for instance has been produced on the Goulbourn River, the Loddon, the Avoca and the Murray Rivers, particularly in places where water could be applied. All cultivated kinds of Cotton-plants are either naturally perennials or become such in favorable climes, although they may be treated strictly as annuals. Some of them will indeed in particular instances grow to the height of 20 feet. The geographic parallels, between which cotton-culture is usually placed, are stretching in various girdles between the 36° N.L. and 36° S.L. The primary advantages of this important culture are: A return in a few months, comparatively easy field operations, simple and not laborious process of collecting the crop, and requirement of but little care in the use of the gin-machine in finally preparing the raw material for the market, the woolly covering of the seeds constituting the cotton of commerce. The oil obtained by pressure from the seeds is useful for various technic purposes, and the oil-cake can be used like most substances of similar kind for very fattening stable-feed. Sea Island Cotton was raised in splendid perfection in the northern parts of Victoria fully 15 years ago from seeds, extensively distributed by the writer; but the want of cheap labor has hitherto militated against the extensive cultivation of the Cotton, and so also against the culture of Tea and many other industrial plants. Cotton having been raised far away from the influence of the sea-air, it would be worthy of attempts, to naturalize various kinds of Cotton in the oases of our deserts, irrespective of regular culture. Our native Gossypium of the interior produces no fibre, worth collecting. Cotton-plants have a predilection for gently undulating or sloping ground, with light soil and a moderate supply of

moisture. In the most favorable climes, such as that of Feegee, Cotton produces flowers and fruits throughout the year, but the principal ripening falls in the dry season. From 200 to 300 plants or more can be placed on an acre. As many as 700 pods have been gathered from a single plant at one time, 12 to 20 capsules yielding an ounce of mercantile cotton. Weeding is rendered less onerous by the vigorous growth of the plants. Cotton comes well in for rotation of crops. Major Clarke has aseertained that crossing cannot be effected between the Oriental and Occidental kinds of cotton. A high summer temperature is needed for a prolific cotton harvest. Intense heat, under which even maize will suffer, does not injuriously affect cotton, provided the atmosphere is not dry in the extreme. The soil should not be wet, but of a kind that naturally absorbs and retains humidity, without over saturation. In arid regions it is necessary to irrigate the cotton-plant. Heavy rains at the ripening period are injurious if not destructive to the Cotton crop. Dry years produce the best returns, yet aqueous vapour in the air is necessary for the best yield. In colder localities the balls or capsules continue to ripen after the frosts prevent the formation of new ones. Porous soils resting on limestones and metamorphic rocks are eminently adapted for cotton culture. The canebrake soil of the North American cotton regions absorbs ammonia to a prodigous extent.

Guadua angustifolia, Kunth.

(*Bambusa Guadua*, Humboldt and Bonpland.)

New Granada, Ecuador and probably others of the Central American States. This Bamboo attains a height of 40 feet, and might prove hardy in sheltered places of our lowlands.

Guadua latifolia, Kunth.

(*Bambusa latifolia*, Humb. and Bonpl.)

One of the tall Bamboos of Central America, from whence several other lofty Bamboos may be obtained, among them the almost climbing Chusqueas. This Gadua is stouter than any Indian Bamboo. In tropical America native Bamboos are planted for hedges.

Guizotia oleifera, Candolle.

India and probably also Abyssinia. The Ramtil oil is pressed from the seeds of this annual herb, which yields its crop in three months. The oil is much used like Sesamum oil, as well for culinary as technic purposes.

Hedeoma pulegioides, Persoon.

The Pennyroyal of North America. An annual herb of aromatic taste, employed in medicine.

Hedysarum coronarium, L.*

The Soola Clover. South Europe. One of the best of perennial fodder-herbs. It carries with it also the recommendation of being extremely handsome.

Helianthus annuus, L.*

The Sunflower. Peru. This tall showy and large-flowered annual is not without industrial importance. As much as 50 bushels of seeds or rather seed-like nutlets have been obtained from an acre under very favorable circumstances, and as much as 50 gallons of oil can be pressed from such a crop. The latter can be used not only for machinery, but even as one of the best for the table. Otherwise the seeds afford an excellent fodder for fowl. The stalks furnish a good textile fibre and the blossoms yield a brilliant lasting yellow dye. About 6 lbs. of seeds are required for an acre. The plant likes calcareous soil. Several allied North American species deserve perhaps rural culture. The return from a Sunflower field is attained within a few months.

Helianthus tuberosus, L.

Brazil. Sunflower Artichoke. Inappropriately passing under the name Jerusalem Artichoke. The tubers are saccharine and serve culinary purposes. The stem is rich in textile fibre. The percentage of crystalline sugar is largest during the cold season, namely 5–6/100. During the summer the starch-like Inulin prevails. This plant can only be brought to full perfection in a soil rich in potash.

Heliotropium Peruvianum, L.

Andes of South America. A perennial somewhat shrubby plant. Among various species of Heliotrop this one can best be utilized for the distillation of the scented oil.

Helleborus niger, L.

Forest mountains of Middle and South Europe. The Christmas Rose of British gardens. A perennial handsome herb. The roots are used in medicine.

Hibiscus cannabinus, L. (*H. radiatus,* Cavanill.)

Tropical Asia, Africa and Australia. An annual showy herb. The stem yields a hemp-like fibre; the leaves serve as sorrel-spinage. Several other Hibisci can be utilized in the same manner.

Hibiscus esculentus, L.

West India and Central America. A tall herb. The mucilaginous seed-capsules are known as Ochro, Bandakai or Gobbo, and used as culinary vegetables. Our summers bring them to maturity. The leaves of this and allied species can be used as pot-herbs.

Hierochloa redolens, R. Br.

South-eastern Australia, almost confined to the Alps; in Tasmania and New Zealand also found in the lowlands, occurring likewise in the Antarctic islands and the southern extremity of America. A tall perennial nutritious grass, with the odor of Anthoxanthum. It is worthy of dissemination on moist pasture land. H. borealis of the colder regions of the Northern Hemisphere accompanies here in the south H. redolens, but is a smaller grass.

Hordeum deficiens, Steudel.

The Red Sea Barley. One of the two-rowed Barleys, cultivated in Arabia and Abyssinia. Allied to this is *H. macrolepis,* A. Br., a native of Abyssinia.

Hordeum distichon, L.

Central Asia. The ordinary two-rowed Barley. To this species belong: the ordinary English Barley, the Chevalier, the Annat, the Dunlop, the long-eared, the black, the

Italian and the Golden Barley along with other kinds. A variety with grains free from the sepals constitutes the Siberian and the Haliday Barley, which however is less adapted for malt. Dry Barley-flour, heated at the temperature of boiling water during several hours, constitutes Hufeland's meal for invalids. Barley-culture might be carried on in many parts of our Alps.

Hordeum hexastichan, L.

Orient. The regularly six-rowed Barley. This includes among other varieties the Scotch, the Square and the Bear Barley. Seeds less uniform in size than those of H. distichon. The so-called skinless variety is that, in which the grain separates from the calyx.

Hordeum secalinum, Schreber.

(*H. pratense,* Hudson.)

Europe, North and Middle Asia, North America. Perennial. Famed as the best fattening grass of many of the somewhat brackish marsh pastures on the North Sea. It never fruits when kept down by cattle, and surpresses finally nearly all other grasses and weeds.

Hordeum vulgare, L.

Orient. The four-rowed Barley, though rather six-rowed with two prominent rows. Several varieties occur, among them: the Spring, Winter and Black Barley, the Russian, the French, the Naked and the Wheat Barley. Chemical principles of malt: Asparagin; a protein substance: Diastase; an acid and Cholesterin-fat.

Hordeum zeocriton, L.

Central Asia. Also a two-rowed Barley. To this species belong the Sprat, the Battledore, the Fulham and the Putney Barley.

Hovenia dulcis, Thunberg.

Himalaia, China, Japan. The pulpy fruit-stalks of this tree are edible. *H. inaequalis,* D. C., and *H. acerba,* Lindl., are mere varieties of this species.

Humulus Lupulus, L.*

The Hop-plant. Temperate zone of Europe, Asia and North America. This twining perennial unisexual plant has proved to yield enormously on river banks in rich soil or on fertile slopes, where irrigation could be effected, particularly so within our territory along the river valleys of Gipps Land and in other similar localities. A pervious especially alluvial soil, fertile through manure or otherwise, appliances for irrigation natural or artificial, and also shelter against storms are some of the conditions for success in hop-growth, and under such conditions the rearing of hops will prove thus far profitable in countries and localities of very different mean temperature. A dry summer-season is favorable to the ripening and gathering of hops. On the Mitchell River, in Gipps Land, 1500 lbs. have been obtained from an acre. In Tasmania large crops have been realized for very many years. The plant might be readily naturalized on river banks and in forest valleys. The scaly fruit cones form the commercial hops, whose value largely depends on the minute glandular granules of Lupuline. Hops impart their flavor to beer, and principally by their tannic acid prevent acetous fermentation and precipitate albuminous substances from the malt. Hop-pillows are recommended to overcome want of sleep. Many of the substitutes of hops are objectionable or deleterious. The refuse hops of breweries possess double the value of stable manure. Active principles of hop leaves and fruits: A peculiar volatile and a bitter acid substance. The fibre of the stem can be made into cords and paper.

Hydrastis Canadensis, L.

North America. The Yellow Poccoon. A perennial herb, utilized in medicine. The root contains two alkaloids: Berberin and Hydrastin.

Hyascyamus niger, L.

The Henbane. Europe, North Africa, extra-tropic Asia. An important medicinal herb of one or two years' duration. It contains a peculiar alkaloid: Hyoscyamin.

Hyphæne Argun, Martius.

Nubia. Probably hardy in the warmer parts of our Colony.

Hyphaene coriacea, Gaertner.

Equatorial Eastern Africa. The dichotomous Palm of the seacoast-regions. It attains a height of 80 feet.

Hyphaene crinita, Gaertner. (*H. Thebaica,* Martius.)

Abyssinia, Nubia, Arabia and Egypt as far as 31° N., and southward to the Zambesi, Nyassa and Sofala. The Gingerbread-palm or Doum-palm. It is much branched and attains a height of about 30 feet. The mealy husk of the fruit is edible. Grows away from the sea.

Hyphaene ventricosa, Kirk.

Zambesi. Loftier than the other species. Stem turgid towards the middle. Fruit large.

Hypochœris apargioides, Hook and Arn.

Chili. A perennial herb. The root is used for culinary purposes like that of the Scorzonera Hispanica.

Hyphochœris Scorzoneræ, F. v. M.

(*Achyrophorus Scorzonerae,* Cand.)

Chili. Of the same use as H. apargioides. Allied species of probably similar utility exist in Western South America.

Ilex Paraguensis, St. Hilaire.

Uruguay, Paraguay and Southern Brazil. The Maté. This Holly-bush is inserted into this list rather as a stimulating medicinal plant, than as a substitute for the ordinary Tea-plant. Chemical principles: Coffein, Quina-acid and a peculiar tannic acid, which latter can be converted into Viridin-acid.

Illicium anisatum, L.

China and Japan. The Star-Anis. An evergreen shrub or small tree. The starry fruits used in medicine and as a condiment. Their flavour rests on a peculiar volatile oil with Anethol. This species and a few others deserve culture also as ornamental bushes.

Indigofera Anil, L.

Recorded as indigenous to West India, and as extending naturally through Continental America from Carolina to Brazil. A shrub several feet high. Pods sickle-shaped, short, compressed. One of the principal Indigo plants under cultivation both in the eastern and western hemispheres. Only in the warmest parts of our Colony can we hope to produce Indigo with remunerative success. But many of the hardier species seem never yet tested for pigment. Already 114 are recorded alone from extra-tropical Southern Africa. An Indigofera of Georgia, said to be wild, perhaps I. Anil, yields an excellent product. The pigment in all instances is obtained by maceration of the foliage, aeration of the liquid and inspissation of the sediment.

Indigofera argentea, L. (*I. coerulea,* Roxb.)

Tropical and extra-tropical Northern Africa, Arabia, India. A shrub several feet high, closely allied to I. Anil, and likewise a good Indigo-plant.

Indigofera tinctoria, L.

Warmest part of Asia, as far east as Japan, recorded also from tropical Africa and even Natal. A shrubby plant, attaining a height of 6 feet. Pods straight, cylindrical, many-seeded. Extensively cultivated in warm zones for Indigo, and probably hardy in our northern and eastern lowland regions.

Inula Helenium, L.

The Elecampane. Middle and South Europe, Middle Asia eastward to Japan. A perennial herb. The bitter and somewhat aromatic root, for the sake of its stimulating and tonic properties, is used in medicine. It contains also the amylaceous Inulin and the crystalline Helenin.

Ipomœa Batatas, Poiret.* (*Batatas edulis,* Choisy).

The Sweet Potato. Tropical South America. First brought to Europe from Brazil. It proved well adapted also for our part of Australia and for New Zealand. The tubers afford a patatable food, more nutritious than ordinary potatoes. Varieties with red, white and yellow roots occur.

Each tuber weighs generally from 3 lbs. to 5 lbs., but may occasionally attain to 56 lbs. The yield is from 200 to 300 bushels from an acre.

Ipomœa paniculata, R. Brown.

Almost a cosmopolitan plant on tropical coasts; thus indigenous to North Australia and the warmer parts of East Australia. The tubers also of this species are edible. If hardy, the plant would deserve cultivation.

Ipomœa purga, Wenderoth.

Mountains of Mexico. The true Jalap. This species yields the medicinal Jalap root. It has recently been cultivated with apparent success even at New York. Thus it is entitled to a trial in our warm woodlands. Active principle: the resinous Convolvulin.

Ipomœa simulaus, Hanbury.

Mexico. From this species the Tampico Jalap, or rather the Sierra Gorda Jalap, is derived. *I. operculata,* Mart., yields the Brazilian Jalap.

Isatis indigotica, Fortune.

North China. Perennial, almost shrubby. The use is similar to that of the following plant.

Isatis tinctoria, L.

Dyer's Woad. From the Mediterranean regions through part of the Orient, apparently extending as far as Japan. A tall herb of two years' duration. The blue dye is obtained from the fermented leaves. Many other species of Isatis, mostly Asiatic, may produce perhaps dye with equal advantage. Boissier enumerates merely as Oriental 28 kinds.

Jasminum grandiflorum, L.

From India to Japan. Flowers white. Extensively cultivated in South Europe. The delicate scent is withdrawn either by fixed oils or alcoholic distillation. The pecuniary yield obtainable from Jasmin cultivation seems vastly over-rated, even if inexpensive labour should be obtainable.

Jasminum odoratissimum, L.

Madeira. Shrubby like the rest. Flowers yellow. Used like the foregoing and following for scent. This may be prepared by spreading upon wool or cotton, slightly saturated with olive oil or other fixed oil, the flowers, and covering them with other layers so prepared. The flowers are renewed from time to time until the oil is thoroughly pervaded by the scent, when the latter is withdrawn by Alcohol. Other modes of extracting the oil exist.

Jasminum officinale, L.

From the Caucasus to China. Flowers white. This is the principal species cultivated in South Europe for its scent.

Jasminum Sambac, Aiton.

From India to Japan. It would probably endure our cool season in the northern and eastern regions. It has the richest perfume of all. The bush attains a height of 20 feet, and is almost climbing. The flowers are white, and must be collected in the evening before expansion. The relative value of many other species of Jasmin, nearly all from the warmest parts of Asia, seems in no instance to have been ascertained, as far as their oils or scents are concerned. Our Australian species are also deliciously fragrant, amongst which *J. lineare*, Br., occurs in our Victorian deserts, while also *J. didymum*, Forst.; *J. racemosum*, F. v. M.; *J. simplicifolium*, Forst.; *J. calcareum*, F. v. M., and *J. suavissimum*, Lindl., reach extra-tropic latitudes.

† **Jubæa spectabilis,** Humboldt.

The tall and stout Coquito-Palm of Chili. Well adapted for our extra-tropic latitudes. A kind of treacle is obtained from the sap of this Palm. The small kernels are edible.

Justicia Adhatoda, L.

India; enduring the climate of the lowlands of Victoria. This bush possesses anti-spasmodic and febrifugal properties. It can be utilized also as a hedge-plant.

Kentia Baueri, Seemann.

The Norfolk Island Palm. Height 40 feet.

Kentia Belmoriana, M. and M.

The Curly Palm of Lord Howe's Island. About 40 feet high. With its congeners, evidently destined to grace our gardens, and to become also important for horticultural traffic abroad.

Kentia Canterburyana, M. and M.

Umbrella Palm of Lord Howe's Island. Likewise a tall and hardy palm.

Kentia Mooreana, F. v. M.

Dwarf Palm of Lord Howe's Island, where it occurs only on the summits of the mountains.

Kentia sapida, Blume.

The Nika Palm of New Zealand and the Chatham Islands. It also attains a height of 40 feet and is one of the hardiest of all palms. The unexpanded flower-spikes can be converted as palm-cabbage into food.

Lactuca virosa, L.

Middle and South Europe, North Africa, Middle Asia. A biennial. The inspissated juice of this Lettuce forms the sedative Lactucarium.

Lathyrus pratensis, L.

Europe, North and Middle Asia. The Meadow Pea. A good perennial pasture-herb.

Lathyrus sativus, L.

Middle and South Europe. The Jarosse. An annual forage-herb; the pods also available for culinary purposes. Probably other species of Lathyrus could advantageously be introduced.

Lavandula angustifolia, Ehrhart. (*L. vera,* Candolle.)

Countries around and near the Mediterranean Sea. The Lavender-plant of somewhat shrubby growth, from which by distillation the best oil of Lavender is prepared. It lives on dry soil, but is less hardy than the following.

Lavandula latifolia, Villars. (*L. spica,* Candolle.)

South Europe, North Africa. Also from this species much Lavender oil is obtained.

Lavandula Stœchas, L.

South Europe, North Africa. This shrub can also be utilized for oil distillation and other purposes, for which the two other Lavenders are used. The quality of the oil of these species seems to differ according to their locality of growth.

Lawsonia alba, Lamarck.

North and Middle Africa, Persia, Arabia, India and North-western Australia. The Henne or Henna-Bush. It may become of use as a dye-plant in parts of our Colony free of frost. The orange pigment is obtained from the grinded foliage.

Lavatera arborea, L.

Tree-Mallow of Middle Europe and the countries at the Mediterranean Sea. A tall biennial plant of rapid growth. The ribbon-like bast is produced in greater abundance than in most other malvaceous plants. The Tree-Mallow might easily be naturalized on our shores. Perhaps it might serve with allied plants for green manure.

Leersia oryzoides, Swartz.

Middle and South Europe, various parts of Asia, Africa and America. A perennial nutritious swamp-grass. Other Leersias from both hemispheres are deserving of introduction.

Lepidium sativum, L.

The Cress. Orient. Annual. Irrespective of its culinary value Cress is of use as one of the remedies in cases of scurvy. Active principle: A volatile oil and the bitter Lepidin.

Lepidosperma gladiatum, La Billard.

The Sword-Sedge of the sea coasts of extra-tropic Australia. One of the most important plants for binding sea-sand, also yielding a paper material as good as Sparta.

Leptospermum lævigatum, F. v. M.

(*Fabricia laevigata,* Gaertner.)

The "Sandstay." Sea-shores and sand-deserts of extra-tropic Australia, but not extending to Western Australia.

This shrub or small tree is the most effectual of all for arresting the progress of drift-sand in a clime like ours. It is most easily raised by simply scattering in autumn the seeds on the sand and covering them loosely with boughs.

Ligustrum Japonicum, Thunberg.

The Japan Privet. A shrub, evergreen or nearly so, promising to become a valuable hedge-plant. It grows like the ordinary European Privet readily from cuttings.

Linum usitatissimum, L.*

The Flax-plant. Orient. A well-known annual, which yields the fibre for linen and the linseed oil. Flax-culture is doubtless destined to become an important industry among us. Few plants find a wider congeniality of soil and climate, and few give a quicker return. Good and deep soil well drained is requisite for successful flax-culture. Change of seed-grain is desirable. Thick sowing extends the length of the fibre. To obtain the best fibre, the plant must be pulled when the seeds commence to ripen. If the seeds are allowed in part to mature, then both fibre and seed may be turned to account. If the seed is left to ripen completely, then the fibre is generally discarded. The seed yields by pressure about 22 per cent. of oil. The residue can either be prepared as Linseed Meal or be utilized as admixture to stable-fodder. The demand for both fibre and oil is enormous. The value of our import of raw fibre in 1871 was already £15,634, while the import of oil was £22,469. Two principal varieties are under culture: a tall sort, with smaller flowers, closed capsules and dark seeds; a dwarf sort, more branched (even if closely sown) with larger flowers and capsules, the seed-vessels opening spontaneously and with elasticity, while the seeds are of a a pale color. None of the perennial species of Linum are so manageable in culture as the ordinary annual flax.

Lippia citriodora, Kunth.

Peru, Chili, La Plata States, Brazil. An evergreen shrub, yielding scented oil.

Lithospermum hirtum, Lehmann.

North American Alkanna. A showy perennial herb; the root yields a red dye.

Lithospermum canescens, Lehmann.

North American Alkannet. This, as the vernacular name indicates, offers also a dye root.

Lithospermum longiflorum, Sprengel.

North America. A red pigment can also be extracted from the root of this species.

Livistona Australis, Martius.

East Australia. Our own and only Palm-tree in Victoria, occurring in East Gipps Land (in the latitude of Melbourne), and there attaining a height of 80 feet. The young leaves can be plaited as a material for cabbage-tree hats.

Livistona Chinensis, R. Brown.

South China and Japan. A very decorative fan-palm, hardy in our lowlands.

Lolium perenne, L.*

Europe, North Africa, Western Asia. The perennial Rye-Grass, mentioned here for completeness' sake. *L. Italicum*, Al. Br., the Italian Rye-Grass, seems to be only a variety. One of the most important of all pasture-grasses, also almost universally chosen for lawn-culture. It produces an abundance of seeds, which are readily collected and easily vegetate. It arrives early to perfection. Nevertheless the produce and nutritive powers are considerably less than those of Dactylis glomerata, Alopecurus pratensis and Festuca elatior; but it pushes forward earlier than the last mentioned grass, while the ripening of seeds is less defective than in Alopecurus. Rye-grass though naturally living but a few years, maintains its ground well by the ease, with which it disseminates itself spontaneously. Several sorts, which scarcely can be called varieties, are under cultivation. Rye-grass stands the dry heat of our summers well. It is likely to spread gradually over the whole of the Australian continent, and may play an important part in our pastoral

affairs and also in ameliorating the clime of the desert districts.

Lupinus albus, L.

The White Lupine. Countries at the Mediterranean Sea, also in the Orient. An annual quick-growing herb, valuable for fodder and for green manure. The lentil-like seeds, after the bitter principle (Lupinin) has become removed through boiling, become edible. It would lead too far, to enumerate here many others of the numerous species of Lupines, of which unquestionably very many are eligible for agrarian purposes, while all are acceptable as hardy, elegant and easily grown garden plants. One (*L. perennis*, L.) extends in America to the Northern States of the Union and Canada; fourteen are recorded from South Europe, seventeen from Brazil, and numerous species from other parts of America, where the limits of the genus are about Monte Video southward and about Nootka Sound northward. The majority of the species is perennial. The Egyptian *L. Termis*, Forsk., is closely allied to L. albus, and of equal use.

Lupinus luteus, L.

The Scented Yellow Lupine. Countries in the vicinity of the Mediterranean Sea. This likewise annual species is predominently in use through Middle Europe, to improve sandy soil. It can also be employed like some other Lupines as a fodder herb. About 90 lbs. of seeds are required for an acre.

Lupinus varius, L.

The Blue Lupine. Also a Mediterranean annual, used like the above congeners; but a few others are under cultivation as Blue Lupines. Some of the American, particularly Californian species, are regarded for agrian purposes superior to the Mediterranean kinds.

Maclura aurantiaca, Nuttall.

The Osage Orange, or North American Bow-wood, or Yellow-wood. Texas, Arkansas, Louisiana. This thorny deciduous shrub or tree can be well trained into hedges.

It is unisexual, and will in favourable localities on rich river banks attain a height of 60 feet, with a stem 2 to 3 feet thick, thus becoming available as a timber-tree. Here it is recorded as a hedge plant; as such our own thorny Maclura Calcar Galli (*Morus Calcar Galli*, A. Cunningh.) of extra-tropical East Australia, which moreover possesses small edible fruits, deserves attention for live fences. Neither of the two is readily subject to blight or attacks of insects. The latter produces suckers and from the root a yellow dye.

Maharanga Emodi, A. de Candolle.

Nepaul. The root produces like that of Alkanna tinctoria a red dye.

Mallotus Philippinensis, J. M.

(*Rottlera tinctoria*, Roxburgh.)

South Asia and East Australia, in jungle-country, extending into New South Wales. Though not of great importance this bush should not be passed on this occasion, inasmuch as the powdery substance, investing the seed-capsules, constitutes the Kamala, which can be employed not only as an orange dye, but also as an anthelminthic remedy. The Hindoo silk-dyers use it for an orange colour, obtained by boiling the Kamala with carbonate of soda.

Manihot Aipi, Pohl.

The Sweet Cassava. Tropical South America, but traced as far south as the Parana River. The root is reddish and harmless; it can therefore be used, unlike those of the following species, without any further preparations than boiling, as a culinary esculent, irrespective of its starch being also available for tapioca. Both are somewhat woody plants, several feet high, and they are too important to be left altogether unnoticed on this occasion, although we have no evidence, that they will prove productive even in those parts of Victoria, which are free of frost. The Aipi has ligneous tough fibres, stretching along the axis of the tubers, while generally the roots of the following species are free of this central woody substance.

Manihot utilissima, Pohl.

The Bitter Cassava or Tapioca-plant. Tropical South America. Closely allied to the former, producing varieties with roots of poisonous acridity, and with tubers perfectly harmless. The tubers attain a length of 3 feet; they can be converted into bread or cakes, the volatile poison of the milky sap being destroyed through pressing of the grated root in first instance, and the remaining acridity is expelled by the heating process. The starch, heated in a moist state, furnishes the Tapioca. Manihot is abundantly cultivated at Caracas, where the singularly uniform temperature throughout the year is only 60° to 70° F. It is a very exhausting crop, and stands thus in need of rich soil and manuring. The propagation is effected by cuttings from the ligneous part of the stem. The soil, destined for Cassava, must not be wet. In warm countries the tubers are available in about 8 months, though they still continue to grow afterwards. The growth of the plant upwards is checked by breaking off the buds. The Bitter Cassava is the more productive of the two. The yellowish tubers attain sometimes a weight of 30 lbs. They do not become soft by boiling like Aipi.

Maoutia Puya, Weddell.

India, on mountains up to 4000 feet. It is taller than Boehmeria nivea, and furnishes a similar fibre. This shrub belongs to a tribe of the nettle order, not possessing burning acridity. None of the true nettles, such as the Girardinias, nor allied stinging plants have been recommended in this index, although from some an exquisite fibre is derived, as the writer wishes to guard against the introduction of any burning species, which possibly might disseminate itself in a mischievous manner in our ranges, and then probably could not again be suppressed.

Maranta arundinacea, L.

The true Arrow-root plant. West India. The plant is introduced into this list not without hesitation, as it seems to require a warmer clime than ours to attain perfection. It furnishes most of the genuine West Indian Arrowroot, although other

species, such as M. nobilis, M. Allouya, M. ramosissima, are also cultivated for a similar starch of their tubers.

Matricaria Chamomilla, L.

The annual Chamomile. Europe, North and Middle Asia. A highly useful herb in medicine. In many parts of the European continent it is much more extensively used than the ordinary perennial Chamomile. The infusion of the flowers has rather a pleasant taste without strong bitterness. The flowers serve as a tonic and especially as a sudorific, and possess a peculiar volatile oil. *Marrubium vulgare*, L., is not prominently mentioned, as it is already rather copiously naturalized.

Medicago sativa, L.*

Orient; now spread through Middle and South Europe and Middle Asia. The purple Medick, Alfalfa or Lucerne. A perennial fodder-herb of great importance, and already largely utilized in our colony, perhaps descended from the English Medicago falcata, which also deserves naturalization. Lucerne keeps here green and fresh in the hottest season of the year, even in dry and comparatively barren ground, but developes itself for field-culture with the greatest vigour on river banks, particularly in soil rich in lime. Its deeply penetrating roots render the plant particularly fit for fixing fenced embankments or hindering the washing away of soil subject to occasional inundations.

Melilotus alba, Desrouss.

The Cabul or Bockhara Clover. Middle and Southern Europe, North Africa, Middle Asia. A biennial herb. On account of its fragrance it is of value for admixture to hay. It is also a good bee-plant. Flowers white. Odorous principle: Cumarin.

Melilotus officinalis, Desrouss.

Europe and Middle Asia. Also biennial, or lasting through several years if prevented from flowering. Contains also Cumarin. An allied species is *M. macrorrhiza*, Pers. Both serve purposes similar to those for which M. alba is employed.

Melissa officinalis, L.

The Balm-herb. South Europe and Middle Asia. A perennial herb, valuable for its scent, which depends on a peculiar volatile oil. It is also valuable as a bee-plant.

Melocanna bambusoides, Trinius. (*Beesha Rheedei*, Kunth.)

The berry-bearing Bamboo, from Chittagong and other mountainous parts of India. It is a thornless Bamboo, growing on dry slopes of hills. Height up to 70 feet; circumference towards base 1 foot; growth beautifully erect.

Melocanna humilis, Roeper.

India. More slender than the preceding species, and attaining only a height of 20 feet.

Melocanna Travancorica. (*Beesha Travancorica*, Beddome.)

A new Bamboo from Travancore, worthy of introduction.

Mentha piperita, L.*

The Peppermint. Middle Europe. This well-known perennial herb is important for its peculiar essential oil, which here by culture is produced in good quality. This distilled oil is in considerable demand, and would be best obtained from plants cultivated in the mountain regions or naturalized along the forest rivulets. Eminent authorities refer the Peppermint as a variety to Mentha aquatica, L., the Water-mint of Europe, North Africa, West and North Asia, from which the true Crisp Mint (*M. crispa*, L.) is again derived, as well as the Bergamot-mint (*M. citrata*, Ehrh.)

Mentha Pulegium, L.

The true Penny-royal. Europe, Western Asia, North Africa. A perennial scent herb, yielding a peculiar ethereal oil. It likes moist soil.

Mentha rotundifolia, L.

Middle and South Europe, North Africa, Western Asia. Fond of wet places, which by the culture of this and other mints may be profitably utilized. In odor this mint approaches to Melissa. The French and Italian Crisp Mint is partly derived from this species. Closely allied to the following, and often regarded as a variety of *M. viridis*, L.

Mentha silvestris, L.

The Horse Mint. Europe, North Africa, temperate Asia. Perennial. One of the Crisp Mints is derived from this species.

Mentha viridis, L.

The Spear Mint. Middle and South Europe. Perennial. A particular sort of Crisp Mint (*M. crispata,* Schrad.) belongs to this species.

Our native Mints, M. Australis, M. gracilis and M. saturejoides, R. Br., yield also oil of good flavor. M. Australis is far the largest and most abundant of these plants.

Menyanthes trifoliata, L.

Inappropriately called the Bog-bean. Europe, North and Middle Asia, North America. In springy and spongy bogs. A perennial herb of great beauty, which could be naturalized with facility in our Alps. The root is starchy. The whole plant is pervaded with a bitter principle, largely derived from Menyanthin. The plant is used medicinally as a tonic and febrifuge.

Microseris Forsteri, J. Hooker.

The Native Scorzonera of extra-tropical Australia and New Zealand. A perennial herb deserving attention, as likely its roots would enlarge and improve through culture. On the summits of our snowy mountains the plant developes itself most luxuriantly. The aborigines use the root for food. The plant would prove hardy in Middle Europe.

Morus alba, L.*

The White Mulberry-tree. China. This tree in several varieties provides the food for the ordinary Chinese Silk-insect (*Bombyx Mori*). Silk was produced in Italy already 600 years ago, and there this branch of industry has florished ever since. In China, Silk was reeled since 4500 years. This may demonstrate the permanency of an industry, which we wish to establish here extensively under a similar sky. "One pound of silk is worth its weight in silver, and this pound may be produced (so far as the food of the Bombyx is concerned) from 30 lbs. of Mulberry leaves

or from a single tree, which thus may be brought to yield annually the material for 16 yards of Gros de Naples." The White Mulberry-tree is of extremely easy growth from cuttings, also readily raised from well-matured seeds. It is usually unisexual, and attains finally a very large size. It can be grown in climes, where no longer Olives will thrive. Spots for Mulberry-culture must not be over-moist, when the leaves are to be utilized for the Bombyx. In 1870, according to the *British Trade Journal*, the produce of cocoons amounted in Europe to £16,588,000; in Asia to £28,112,000; in Africa to £44,000; in the South Sea Islands to £24,000; in America to £20,000;—thus giving a general total of £44,788,000. Superior varieties of Mulberry can be grafted with ease on ordinary stock. *M. Indica* L., *M. macrophylla* Morett., *M. multicaulis* Perott., *M. Morettiana* Jacq., *M. Chinensis* Bertol., *M. latifolia* Poir., *M. Italica* Poir., *M. Japonica* Nois., *M. Byzantina* Sieb., *M. nervosa* Del., *M. pumila* Nois., *M. tortuosa* Audib., as well as the Constantinople Mulberry, are merely forms of M. alba, to which probably also *M. Tatarica*, L. and *M. pabularia*, Jacquem., belong. The variety known as M. Indica produces black fruits. The planting of Mulberry-trees has recently assumed enormous dimensions in California, where in 1870 between seven and eight millions were planted. The process of rearing the silk-insect is simple and involves no laborious exertions. The cocoons, after they have been properly steamed, dried and pressed, find readily purchasers in Europe, the price ranging according to quality from 3s. to 6s. per lb. The eggs of the Silkworm sell at a price from 16s. to £2 per ounce, and in 1870 Japan had to provide two millions of ounces of Silk-ova for Europe, where the worms had extensively fallen victims to disease. Instances have been recorded in California, where 8 tons of leaves were gathered in the first year from the Mulberry-trees of 1 acre, and 30 tons in the next year. As an example of the profit thus to be realized, a Californian fact may be cited, according to which £700 were the clear gain from 3½ acres, the working expenses having been £93. The Commissioner of Agriculture of the United States has

estimated, that under ordinary circumstances an acre should support from 700 to 1000 Mulberry-trees, producing 5000 lbs. of leaves fit for food, when four years old. On this quantity of leaves can be reared 140,000 worms, from which ova at a nett profit ranging from £80 to £240 per acre will be obtained by the work of one person. Mr. C. Brady, of Sydney, thinks the likely proceeds of silk-culture to be from £60 to £150 for the acre. The discrepancies in calculations of this kind are explained by differences in clime, soil, attention and treatment.

The White Mulberry-tree has been very copiously distributed from the Melbourne Botanic Garden since many years. A very palatable fruit is obtained from a variety cultivated in Beloochistan and Affghanistan. *Morus Tatarica*, L., resembles M. alba. Its juicy fruit is insipid and small. The leaves are not generally used for Silkworms.

The results of Mr. Brady's experience on the varieties of the Morus alba are as follows :—In the normal form the fruits are white with a purplish tinge more or less deep, the bark is pale, the leaf is also of a pale hue, not very early nor very tender, nor very abundant. It may be grown on moist ground as long as such is drained, or it will live even on poor loose gravelly soil bordering on running water. The Cevennes variety is a free grower, affords a large quantity of leaves though of rather thick consistence ; all varieties of the Morus Bombyx like these leaves at all stages of their age. It is also called the rose-leaved variety. The silk which it yields is substantial in quantity and also good in quality. It does best on rich dry slopes. The bushy Indian variety has a fine leaf of beautifnl green, which though light in weight is abundantly produced. It can be cut back to the stem three or four times a year ; the leaves are flat, long and pointed, possess a fine aroma, and are relished by every variety of the ordinary Silk-insect, though not all thrive equally well on it. The silk derived from this variety is excellent, but not always so heavy in quantity as that produced from the rosy variety. It prefers rich low-lying bottoms, is a greedy feeder, but may thus be made to

cover an extraordinary breadth of alluvial or manured land in a marvellous short space of time. At Sydney, Mr. Brady can provide leaves from this Indian variety all through the year by the removal of cuttings, which will strike their root almost at any season. It ripens also seeds readily, and should be kept at bush size. It requires naturally less space than the other kinds. A fourth variety comes from North China; it has heart-shaped flat thickish leaves, which form very good food for the Silkworm. Mr. Brady, as well as Mr. Martelli, recommend very particularly the variety, passing under the name Morus multicaulis for the worms in their earliest stages. The former recommends the Cape variety also; the latter wishes also the variety, called Morus Morettiana, to be used on account of its succulent nutritious foliage, so well adapted for the insect while yet very young, and also on account of producing the largest amount of food within the shortest time. The Manilla variety, known as Morus multicaulis, comes several weeks earlier into bearing than most other sorts, and should therefore be at hand for early hatched worms.

Morus nigra, L.*

The Black Mulberry-tree. South Russia and Persia. Highly valuable for its pleasant refreshing fruits. It is a tree of longevity, instances being on record of its having lived through several centuries. It is also very hardy. The leaves also of this species afford food for the ordinary silkmoth. The tree occurs usually unisexual. *M. atropurpurea*, Roxb., from Cochin-China, is an allied tree. The cylindrical fruit-spike attains a length of two inches.

Morus rubra has been recorded already in the Appendix to our Acclimatisation Society's Report for 1870-1871, among the timber-trees.

Musa Cavendishii, Lambert.

(*M. regia*, Rumph.; *M. Chinensis*, Sweet.)

The Chinese Banana. A comparatively dwarf species, the stem attaining only a height of about 5 or 6 feet. Its robust and dwarf habit render it particularly fit for exposed

localities, and this is one of the reasons, why it is so extensively cultivated in the South Sea Islands. The yield of fruit is profuse (as much as 200 to 300 fruits in a spike), and the flavor excellent. This as well as M. sapientum and M. paradisiaca ripen still their fruits in Madeira and Florida.

Musa Ensete, Gmelin.

Bruce's Banana. From Sofala to Abyssinia, in mountain regions. This magnificent plant attains a height of 30 feet, the leaves occasionally reaching to the length of 20 feet, with a width of 3 feet, being perhaps the largest in the whole empire of plants, exceeding those of Strelitzia and Ravenala, and surpassing even in quadrat-measurement those of the grand water-plant Victoria Regia, while excelling in comparative circumference also the largest compound frond of Angiopteris evecta, or divided leaf of Godwinia Gigas, though the compound leaves of some palms are still larger. The inner part of the stem, and the young spike of the Ensete can be boiled to serve as a table esculent, but the fruit is pulpless. This plant produces no suckers, and requires several years to come into flower and seed, when it dies off like the Sago plant, the Caryota palm and others, which flower but once without reproduction from the root.

Musa Livingstoniana, Kirk.

Mountains of Sofala, Mozambique and the Niger regions. Similar to M. Ensete; seeds much smaller. Possibly requiring no protection here in favorable places.

Musa paradisiaca, L.

The ordinary Plantain or Pisang. India. Among the most prolific of plants, requiring the least care in climes adapted for its growth. Stem not spotted. Bracts purple inside. In this as well as the foregoing and the following new shoots are produced from the root, to replace annually the fruit-bearing stem. The fruit of this is chiefly prepared by some cooking process. Only a few varieties are distinguished, and they seem to have sprung from the wild state of M. sapientum. The writer did not wish to pass this and the

allied plants unnoticed, as they will endure our clime in the warmest localities of the colony, where under more careful attention they are likely to mature with regularity their fruit. They require rich and humid soil. Plantain meal is prepared by simply reducing the dried pulp to powder. It is palatable, digestible and nourishing.

Musa sapientum, L.

The ordinary Banana or Sweet Plantain. India. One of the most important plants yielding nutritious delicious fruits. The stem is spotted. Bracts green inside. The leaves and particularly the stalks and the stems of this and other species of Musa can be utilized for producing a fibre similar to Manilla Hemp. The fruit of this is used chiefly unprepared; it is generally of a yellow color. Numerous varieties are distinguished. As much as a hundredweight of fruit is obtained from a plant annually in tropical climes. At Caracas, where the temperature is seldom much above or below 60° F., the Plantain and Banana plants are very productive, being loaded with fruits 12 to 15 inches long, on mountains about 5000 feet high. In our dry Murray regions the winter temperature seems too low for the successful development of these plants, except on sheltered spots.

Musa troglodytarum, L. (*M. uranoscopos,* Rumph.)

India, and apparently indigenous also in the Feegee and other islands of the Pacific Ocean. The fruit-stalk of this species stands upright; the edible fruits are small, reddish or orange-colored. The Chinese *M. coccinea,* Ait., a dwarf ornamental species, has also the fruit-spike straight.

Myrica Faya, Aiton.

Madeira, Azores and Canary Islands. A small tree. The drupaceous fruits are used for preserves. *M. sapida,* Wallich., an Indian mountainous species, has also edible fruits.

Myrtus Ugni, A. Gray.

The Chilian Guava. A hardy shrub, freely bearing its small but pleasantly aromatic berries.

Nardostachys Jatamansi, Cand.

Mountains of Bengal and Nepaul. A perennial herb, famous already at ancient times as a medicinal plant. The root contains an ethereal oil and bitter principle. This drug is often also obtained from *N. grandiflora*, Cand.

Nelumbo lutea, Caspary.* (*Nelumbium luteum*, Willd.)

In North America, north to 44° ; also in Jamaica. This magnificent perennial water-plant carries with it the type of Nelumbo nucifera, but seems more hardy and thus better adapted for our latitudes, the Pythagorean Bean not descending in Australia naturally beyond the 23°, although also this species may perhaps live in the warmer parts of our Colony. The tuberous roots of both species resemble the Sweet Potato and are starchy: the seeds are of particularly pleasant taste. To us the plants would be of great value as ornamental aquatics. The leaves of N. lutea are from 1 foot to 2 feet in diameter. The flowers measure one-half to one foot across. The capsular fruit contains from 20 to 40 nut-like seeds. The plant in congenial spots displaces nearly all other water vegetation by the vigor of its growth.

Nelumbo nucifera, Gaertner.* (*Nelumbium speciosum*, Willd.)

The Pythagorean Bean. Egypt; at the Caspian and Aral Seas (46° N.) ; Persia ; through India, where in Cashmere it occurs at an elevation of 5000 feet; China ; Japan ; Amur (46° N.); tropical Australia as far south as 23°. The occurrence of this grand plant at the Ima, at Pekin and at Astrachan proves sufficiently, that we can naturalize it in Victoria. The Nelumbo requires deep water with a muddy bottom. The large white or rosy flowers are very fragrant. The seeds retain their vitality for several years. According to the ancient Egyptian method they are placed in balls of muddy clay and chaff and then sunk into the water.

Nephelium Litchi, Cambess.

South China, Cochin-China and Philippine Islands. An evergreen tree, producing the Litchi-fruit. The pulpy arillus is of extremely pleasant taste, though not large.

Nephelium Longanum, Cambess.

India and Southern China. The Longan-fruit is obtained from this tree; it is smaller than that of the Litchi-tree.

Nicotiana multivalvis, Lindley.

The Native Tobacco of the Columbia River. An annual. This with the following species can be utilized for certain kinds of Tobacco.

Nicotiana Persica, Lindley.

The Shiraz Tobacco. Persia. Annual. This can be brought to perfection only in cool mountain regions. The mode of culture is somewhat different to that of the ordinary Tobacco. Moderate irrigation is favorable. The plants when ripe are cut off and stuck into the ground again until they become yellow. They are then heaped together for a few days in the drying-house. They are then packed into thin strata and placed into bags, for pressure and daily turning.

Nicotiana quadrivalvis, Pursh.

The Native Tobacco of the Missouri. An annual.

Nicotiana repanda, Willd.

Cuba, Mexico, Texas. Annual. It is utilized for some of the Havannah Tobaccoes.

Nicotiana rustica, L.

Tropical America. Annual. Some sorts of Eastern India Tobacco, of Manilla Tobacco and of Turkey (for instance Latakia) Tobacco are derived from this particular species.

Nicotiana Tabacum, L.*

The ordinary Tobacco-plant of Central America. Annual. Various districts with various soils produce very different sorts of Tobacco, particularly as far as flavor is concerned, and again various climatic conditions will affect vastly the Tobacco-plant in this respect. We can thus not hope to produce for instance Manilla or Havannah Tobacco in our latitudes, but we can anticipate to produce good sorts of our own, more or less peculiar, or we may aspire to producing in our rich and frostless forest valleys a Tobacco

similar to that of Kentucky, Maryland, Connecticut and Virginia, parts of Victoria resembling in climate very much these countries. Frost is detrimental to the Tobacco-plant; not only particularly when young must it be guarded against it, but frost will also injure the ripe crop. Mr. Politz considers the scarcity of dew in some of our districts to militate against the production of the best kinds, otherwise the yield as a rule is large, and the soil in many places well adapted for this culture. Leaves of large size are frequently obtained. The moister and warmer northern and eastern regions of our Colony are likely to produce the best Tobacco, if the final preparation of the leaf for the manufacturer is effected by experienced skill. The cruder kinds are obtained with ease, and so leaves for covering cigars. Virgin soil with rich loam is the best for Tobacco-culture, and such soil should also contain a fair proportion of lime and potash, or should be enriched with a calcareous manure and ashes, or with well decomposed stable manure. The seedlings, two months or less old, are transplanted. When the plants are coming into flower the leading top-shoots are nipped off, and the young shoots must also be broken off. A few weeks afterwards the leaves will turn to a greenish yellow, which is a sign that the plants are fit to be cut, or that the ripe leaves can gradually be pulled. In the former case the stems are split; the drying is then effected in barns by suspension from sticks across beams. The drying process occupies four or five weeks and may need to be assisted by artificial heat. Stripped of the stalks the leaf-blades are then tied into bundles to undergo sweating or a kind of slight fermentation. It does not answer to continue tobacco-culture beyond two years on the same soil uninterruptedly. A prominent variety is *Nicotiana latissima*, Miller, or *N. macrophylla*, Lehm., yielding largely the Chinese, the Orinoco and the Maryland Tobacco. The dangerously powerful Nicotin, a volatile acrid alkaline oily liquid, and Nicotianin, a bitter aromatic lamellar substance, are both derived from Tobacco in all its parts and are therapeutic agents.

Niemeyera prunifolia, F. v. Mueller.

The Australian Cainito. An evergreen tree, sparingly dispersed from the North of New South Wales through the coast forests of Queensland. The fruit is of plum-like appearance and edible. Culture is likely to improve its quality.

Ocimum Basilicum, L.

The Basil. Warmer parts of Asia and Africa. An annual herb, valuable for condiments and perfumery. Several varieties exist, differing considerably in their scent. A crystalline substance is also obtained from this and similar species. *O. canum*, Sims, is closely allied.

Ocimum gratissimum, L.

Recorded from India, the South Sea Islands and Brazil, as indigenous. Somewhat shrubby. This is also a scent-plant like the following, and is one of the best of the genus. *O. viride*, Willd., from tropical Africa seems a variety.

Ocimum suave, Willd.

East Africa. A shrubby species.

Ocimum sanctum, L.

Arabia, India, tropical Australia. A perennial herb. The odor of the variety occurring in North Australia reminds of Anis; the smell of the variety growing in East Australia resembles cloves. *O. tenuiflorum*, L., seems to be another variety. Probably other species, as well cis- as trans-Atlantic, can be used like Basil.

Olea Europæa, L.*

The Olive-tree. From South-western Asia; naturalized in the countries around the Mediterranean Sea. A tree not of great height, but of many centuries' duration and of unabating fecundity. The well-known Olive Oil is obtained from the fruit. Certain varieties of the fruit, preserved in vinegar or salt liquid before perfectly ripe, are also much used for the table. For this purpose the fruit is generally macerated previously in water containing potash and lime. The gum-resin of the Olive-tree contains the crystalline Olivil. The oil of the drupaceous fruit is a most important

product of countries with climates similar to that of Victoria. Its chemical constituents are:—30 per cent. crystalline Palmitin; 70 per cent. Olein, through which Olive-oil belongs to those kinds, which are not drying. The wild variety of the Olive-tree has usually short blunt leaves and thorny branches. Long continued droughts, so detrimental to most plants, will affect the Olive but slightly. It thrives best on a free loamy calcareous soil, even should it be strong and sandy, but it dislikes stiff clay. Proximity to the sea is favorable to it, and hill-sides are more eligible for its culture than plains. The ground must be deeply trenched. Manuring with well decayed substances is requisite annually, or every second or third year according to circumstances. Irrigation will add to the productiveness of the plant. Mons. Riondet distinguishes three main varieties, of which he recommends two: 1, the Cayon, a small-sized tree, which comes into bearing already after three or four years, but it bears fully only every second year; its oil is fine with some aroma. 2, the Pendulier, a larger tree, with long drooping branches, yielding an oil of first-rate quality. Mons. Reynaud "Culture de l'Olivier," separates 12 varieties, as cultivated in France, and recommends among them:—1, the Courniau or Courniale, also called Plante de Salon, bearing most prolificly a small fruit and producing an excellent oil. 2, the Picholine, which by pruning its top branches is led to spread over eight square yards or more. It is of weeping habit, yields a good oil in fair quantity and resists well the attack of insects. 3, the Mouraou or Mourette, a large tree furnishing also oil of a very fine quality. Olive-trees require judicious pruning immediately after the fruit is gathered, when the sap is comparatively at rest. They may be multiplied from seeds, cuttings, layers, suckers, truncheons or estacas and old stumps, the latter to be split. The germination of the seeds is promoted by soaking the nutlets in a solution of lime and woodash. The seedlings can be budded or grafted after a few years. Truncheons or estacas may be from one to many feet long and from one inch to many inches thick; they are placed horizontally into the ground. Olive plantations at

Grasse are worth from £200 to £250 per acre. For many details the tract on the "Culture of Olive and its Utilization," here recently issued by the Rev. Dr. Bleasdale should be consulted, as it rests largely on its author's observations during a long stay in Portugal. The olive oil imported last year into Victoria was valued at £15,538.

The following notes are derived from the important "Tratado del Cultivo del Olivo en Espana," by the Chev. Capt. José de Hidalgo-Tablada (second edit., Madrid 1870). The Olive-tree will resist for a short time considerable frost (— 15° C.) provided the thawing takes place under fogs or mild rain (or perhaps under a dense smoke). It requires for ripening its fruit about one-third more annual warmth than the Vine. The Olive zones of South Europe and North Africa are between the 18° and 44° N.L. An elevation of about 550 feet corresponds in Spain, as far as this culture is concerned, to one degree further north. Olives do not grow well on granitic soil. The fruit produced on limestone formations is of the best quality. Gypsum promotes the growth of the tree (which thus may perhaps prosper in parts of the Murray-desert, underlaid with Gypsum). An equable temperature serves best; thus exposure to prevailing strong winds is to be avoided. The winter temperature should not fall below — 7° C. The content of oil in the fruit varies from 10 to 20 per cent.; sometimes it even exceeds the latter proportion. In the Provence at an average 24 lbs. of Olive Oil are consumed by each individual of the population; in Southern Germany nearly 60 lbs., in Andalusia about 30 lbs. For obtaining the largest quantity of oil the fruit must be completely ripe. Hand-picked Olives give the purest oil. Knocking the fruits from the branches with sticks injures the tree and lessens its productiveness in the next year. About 30 Olive-trees can be planted conveniently on an acre for permanence; each tree under ordinary circumstances will produce fruits for 4 lbs. to 5 lbs. of oil annually. Spain alone produces about 250,000,000 lbs. of Olive Oil a year.

SPANISH VARIETIES.

A.—Varieties of early maturation, for colder localities :—

1. Var. *pomiformis*, Clem.
   Manzanillo. (French: Ampoulleau.) Fruit above an inch in diameter, spherical, shining black. Putamen broad and truncate.
2. Var. *regalis*, Clem.
   Sevillano. (French: Pruneau de Catignac.) Fruit about an inch in diameter, ovate-spherical, blunt, bluish-black.
3. Var. *Bellotudo* or Villotuda.
   Fruit about an inch long, egg-shaped; pericarp outside dark-red, inside violet.
4. Var. *Redondillo*.
   Fruit ovate-spherical, nearly an inch long. Pericarp outside bluish-black, inside whitish. A rich yielder.
5. Var. *ovalis*, Clem.
   Lechin, Picholin, Acquillo. (French: Saurine.) Fruit broad-oval, two-thirds of an inch long. A copious yielder.
6. Var. *argentata*, Clem.
   Nevadillo blanco; Doncel; Zorzalena; Moradillo; Oji-blanco; Olivo lucio. Fruit broad-ovate, an inch long, very blunt, not oblique. Quality and quantity of oil excellent.
7. Var. *Varal blanco*.
   (French: Blanquette.) Fruit ovate, globular, three-fourths of an inch long, neither pointed nor oblique, outside blackish-red.
8. Var. *Empeltre*.
   Fruit ovate, an inch long, equable. Rich in oil of excellent quality, also one of the best for pickles. Pericarp outside violet, inside white.
9. Var. *Racimal*.
   (French: Bouteillan, Boutiniene, Ribien, Rapugette.) Fruit violet-colored, globose-ovate, about an inch long; neither pointed nor oblique. Bears regularly also on less fertile soil, and is one of the earliest to ripen.

10. Var. *Varal negro.*

Alameno. (French: Cayon, Nasies.) Fruit violet-black, spotted, globose-ovate, nearly an inch long, somewhat pointed. Bears richly.

11. Var. *Colchonudo.*

Fruit spheric, outside red, inside white, one inch in diameter, slightly pointed. Produces a large quantity of good oil.

12. Var. *Ojillo de Liebre.*

Ojo de Liebre. Fruit nearly spheric, outside violet-black; about one inch long, somewhat oblique. One of the less early varieties.

13. Var. *Carrasquena.*

(French: Redouan de Cotignat.) Fruit black-red, almost spherical, slightly oblique, about an inch long. Valuable both for oil and preserves, but liable to be attacked by various insects.

14. Var. *Hispalensis*, Clem.

Gordal; Ocal; Olivo real. Fruit black-grey, oblique, spherical, measuring fully an inch. Rather a large and quick-growing tree. Fruit used in the green state for preserves, not used for table-oil.

15. Var. *Verdejo.*

Verdial. (French: Verdal, Verdan.) Fruit black-violet, oblique-spheric, pointed, about one inch long. Furnishes good oil and resists best of all the cold.

B.—Varieties of late maturation, for warmer localities:—

16. Var. *maxima*, Clem.

Madrileno; Olivo morcal. Fruit over an inch long, cordate-globose, strongly pointed. Less valuable for oil than for preserves.

17. Var. *rostrata*, Clem.

Cornicabra. (French: Cournaud, Corniaud, Courgnale, Pl. de Solon, Pl. de la Fane; Cayon, Rapunier, Grasse.) Strong and tall, less tender. Fruit black-reddish, over an inch long, oval, much pointed. Good for oil.

18. Var. *ceratocarpa*, Clem.

Cornezuelo. (French: Odorant, Luquoise, Luques.) Fruit fully an inch long, oval, pointed.

19. Var. *Javaluno.*
Fruit black-grey, over an inch long, egg-shaped, somewhat oblique, gradually pointed. Rich in good oil; can also be chosen for preserves; much subject to attacks of insects.

20. Var. *Picudo.*
Fetudilla. Fruit fully an inch long, egg-shaped, blunt at the base, pointed at the apex, with black-grey pulp. Pericarp easily separable. Employed both for oil and preserves.

21. Var. *Nevadillo negro.*
Fruit egg-shaped, fully an inch long, with turned pointed apex. One of the richest of all varieties in yield. Endures considerable cold and ripens not quite late.

All these Spanish varieties show rather long lanceolate leaves of more or less width.

FRENCH VARIETIES.

(Some verging into the Spanish kinds.)

22. Var. *angulosa*, Gouan.
Gallininge, Laurine. For preserves.

23. Var. *Rouget.*
Marvailletto. Produces a fine oil.

24. Var. *atrorubens*, Gouan.
Salierne, Sayerne. Fruit dusted white. Furnishes one of the best of oils.

25. Var. *variegata*, Gouan.
Marbée, Pigale, Pigau. Purple fruit with white spots.

26. Var. *Le Palma.*
Oil very sweet, but not largely produced.

27. Var. *atrovirens*, Ros.
Pointue, Punchuda. Fruit large with good oil.

28. Var. *rubicans*, Ros.
Rougette. Putamen small. Yield annual and large.

29. Var. *alba*, Ros.
Olive blanche, Blancane, Vierge. This with many others omitted on this occasion is an inferior variety.

30. Var. *Caillet Rouge.*
Figanier. Small tree. Fruit large, red. Oil good and produced in quantity.

31. Var. *Caillet Blanche.*
Fruit almost white, produced annually and copiously, yielding a rather superior oil.

32. Var. *Raymet.*
Fruit large, reddish. Oil copious and fine. This variety prefers flat country.

33. Var. *Cotignac.*
Pardignière. Fruit middle-sized, blunt. Oil obtained in quantity and of excellent quality. This wants much pruning.

34. Var. *Bermillaon.*
Vermillon. Yields also table-oil and resists cold well.

Many other apparently desirable varieties occur, among which the Italian Oliva d'ogni mese may be mentioned, which ripens fruits several times in the year, and furnishes a pleasant oil and also berries for preserves.

Onobrychis sativa, La Marck.*
The Sanfoin or Cocks-head Plant. South and Middle Europe, Middle Asia. A deep-rooting perennial fodder-herb, fond of marly soil, and living in dry localities. It is thus well adapted also for the limestone formation of the lower Murray River.

Ophelia Chirata, Grisebach. (*Agathotes Chirata*, D. Don.)
Widely dispersed over the higher mountain regions of India. A perennial herb, considered as one of the best of tonics; it possesses also febrifugal and antarthritic properties. Its administration in the form of an infusion, prepared with cold water, is the best. Besides *O. elegans*, Wight., some of the other Upper Indian, Chinese and Japanese species deserve probaly equal attention.

Opuntia coccinellifera, Miller.
Mexico and West India. The Cochineal Cactus. On this and O. Tuna, O. Hernandezii and perhaps a few others subsists the Coccus, which offers the costly Cochineal dye. Three gatherings can be effected in the year. About 1200

tons used to be imported annually into Britain alone, and a good deal also to other countries, valued at about £400 for the ton. The precious Carmin-pigment is prepared from Cochineal.

Opuntia elatior, Miller.

Central America. A hedge plant with formidable thorns.

Opuntia Ficus Indica, Miller.

Central America, north as far as Florida. Serves for hedges. Pulp of fruit edible.

Opuntia Hernandezii, Candolle.

Mexico. Affords also food for the Coccus Cacti.

Opuntia spinosissima, Miller.

Mexico and West India. Stem columnar with pendant branches. Also a good hedge-plant.

Opuntia Tuna, Miller.

West India, Ecuador, New Granada, Mexico. Irrespective of its value as the principal Cochineal plant, this Cactus is also of use for hedges. It will attain a height of 20 feet. The pulp of the fruit is edible. With the other species hardy at least in our lowlands.

Opuntia vulgaris, Miller.

Central America, northward to Georgia, southward to Peru. Adapted for hedges and like the rest inflammable, thus particularly valuable along Railway-lines. The fruit almost smooth, also eatable. A dye can also be prepared from its pulp and that of allied species. Numerous other species are here industrially eligible for hedging purposes.

Origanum Dictamnus, L.

Candia. Like the following a scent-plant of somewhat shrubby growth.

Origanum Majorana, L.

North Africa, Middle Asia, Arabia. A perennial herb, used for condiment, also for the distillation of its essential oil.

Origanum Maru, L.

Palestine. Perennial and very odorous.

Origanum Onites, L.

Countries at the Mediterranean Sea. Somewhat shrubby and strongly scented.

Origanum vulgare, L.

The ordinary Marjoram. All Europe, North Africa, North and Middle Asia. A scented herb of perennial growth, containing a peculiar volatile oil. It prefers limestone soil. *O. hirtum*, Link., *O. virens* Hoffmannsegg and *O. normale* D. Don, are closely allied plants of similar use. Several other Majorams, chiefly Mediterranean, are of value.

Ornithopus sativus, Brotero.

South Europe and North Africa. An annual herb, larger than the ordinary Birdsfoot-clover. It is valuable as a fodder-plant on sterile soil.

Oryza sativa, L.*

The Rice-plant. South Asia and North Australia. Annual like most cereals. The many rivulets in our ranges afford ample opportunities for irrigating rice-fields: but these can be formed with full advantage only in the warmer parts of the colony, where rice will ripen as well as in Italy, China, or the Southern States of the American Union. Among the numerous varieties of Indian Rice may be noted as prominent sorts: The Early Rice, which ripens in four months and is not injured by saline inundations. The hardier Mountain Rice, which can be raised on comparatively dry ground, and which actually perishes under lengthened inundation, but which is less productive. The Glutinous Rice, which succeeds as well in wet as almost dry places, and produces black or reddish grains. In the rich plains of Lombardy, irrigated from the Alps, the average crop is estimated at 48 bushels for the acre annually. The spirit distilled from Rice and molasses is known as Arrack.

Oryza latifolia, Humb. and Bonpl.

Central America. This species is said to be perennial and to attain a height of 18 feet. It deserves here trial-culture, and may prove a good fodder-grass on wet land in warm localities. *O. perennis*, Moench., seems closely allied.

Oxalis crassicaulis, Zuccar.

Peru. This seems one of the best of those Woodsorrels, which yield a tuberous edible root. Amongst others *O. tuberosa*, Mol. and *O. succulenta*, Barn. from Chili, as well as *O. carnosa* Mol. and *O. conorrhiza* Jacq. from Paraguay, might be tried for their tubers.

Pachyrrhizus angulatus, Rich.

From Central America rendered spontaneous in many tropical countries. A climber, the horizontal starchy roots of which attain a length of 8 feet and a thickness of many inches. It requires rich soil. The root is edible, though inferior to Yam. From the stems a tough fibre is obtained. The plant proved hardy at Sydney.

Paliurus ramosissimus, Poir. (*P. Aubletia*, Schult.)

China and Japan. A thorny tree, which could be utilized for hedging.

Paliurus Spina Christi, Mill. (*P. aculeatus*, Lam.)

The Christ Thorn. From the Mediterranean Sea to Nepaul. A deciduous bush or finally tree, which can be trimmed into hedges.

Panicum amarum, Elliot.

North America. A perennial species, fit to be grown on drifting coast-sand.

Panicum barbinode, Trinius.

Brazil. Valuable as a fodder-grass.

Panicum ciliare, Retzius.

From South Europe and Southern Asia spread through all countries with a warm climate, but apparently also indigenous in East Australia. It readily disseminates itself on barren ground, and is likely to add to the value of our desert-pastures, although it is annual. Stock relish this grass. *P. sanguinale*, L. and *P. glabrum*, Gaudin, are allied species.

Panicum Crus-Galli, L.

The Barn-yard Grass. Occurring now in all warm countries, but probably of Oriental origin, as it seems not recorded in

ancient classic literature. A rich but annual grass of ready spontaneous dispersion. *P. colonum*, L. and *P. Crus-Corvi* L. are varieties of it. Regarded by R. Brown as indigenous to Eastern and Northern Australia, where many other excellent fodder-species occur, some perennial. It will succeed also on somewhat saline soil, particularly on brackish water-courses.

Panicum decompositum, R. Brown. (*P. laevinode*, Lindl.)
The Australian Millet. One of the most spacious of native nutritious grasses. The aborigines convert the small millet-like grains into cakes. This grass will thrive on poor soil.

Panicum frumentaceum, Roxb.
The Shamalo or Deccan Grass. Probably introduced from tropical Africa into South Asia. It serves as a fodder-grass and produces also a kind of millet.

To this species is allied *P. sarmentosum*, Roxb. from Sumatra, which is now likewise much cultivated in tropical countries. It is perennial.

Panicum Italicum, L.
This grass notwithstanding its specific name is of Indian origin, but appears to be likewise a native of North Australia. It is annual and worthy to be cultivated as a tender green-fodder, attaining a height of 5 feet. The grain is not only one of the best for poultry, but that of some varieties can also be utilized as millet. *P. Germanicum*, Roth. is a form of this species.

Panicum Koenigii, Spreng. (*P. Helopus*, Trin.)
India. A good fodder-grass.

Panicum maximum, Jacq.* (*P. jumentorum*, Pers.)
The Guinea-Grass. Tropical Africa; elsewhere not indigenous. This perennial grass attains a height of 8 feet in tropical countries. It is highly nutritious and quite adapted for the warmer parts of our colonial territory.

Panicum miliaceum, L.* (*P. miliare*, Lam.)
The true Millet. South Asia and North Australia, but cultivated in Southern Europe already at Hippocrates's

and Theophrastos' time. Annual, attaining a height of 4 feet. Several varieties occur, one with black grains. They all need a rich but friable soil. It is one of the best of all grains for poultry, but furnishes also a palatable and nutritious table-food. It ripens still in Middle Europe.

Panicum pilosum, Swartz.

Tropical America. A perennial fodder-grass.

Panicum repens, L.

At the Mediterranean Sea, also in South Asia and North Australia. Regarded by the Cinghalese as a good fodder-grass. It is perennial and well suited for naturalization on moist soil or river-banks or swamps.

Panicum prostratum, Lam. (*P. setigerum*, Retz.)

Egypt, South Asia, North Australia, perhaps also indigenous to tropical America. Perennial. Recommendable for pastures.

Panicum spectabile, Nees.*

The Coapim of Angola. From West Africa transferred to many other tropical countries. A rather succulent very fattening grass, attaining a height of about 4 feet. It may be assumed, that hitherto about 300 well-defined species of Panicum are known, chiefly tropical and subtropical, thus very few extending naturally to Europe, or the United States of North America, or Japan, or the southern part of Australia. Though mostly from the hot zones these grasses endure in many instances our clime, and some of them would prove great acquisitions, particularly the perennial species. Numerous good kinds occur in Queensland and North Australia spontaneously. Panicum is the genus richest in species among grasses.

Papaver somniferum, L.*

The Opium-Poppy. Orient. The capsules of this tall annual, so showy for its flowers, are used for medicinal purposes; from the minute but exceedingly numerous seeds, oil of a harmless and most palatable kind can be pressed remuneratively; but a still more important use of the plant is that for the preparation of Opium, of which a quantity valued in

the Custom's returns at £94,455 was imported during 1871 into Victoria, and this does not provide for a large portion of Morphia used in medicine. Both the black and pale seeded varieties can be used for the production of Opium. The return of Poppy-culture, whether for opium or for oil, is within a few months. Our milder and somewhat humid open forest tracts proved most productive for obtaining opium from this plant; but it can be reared also in colder localities, good Opium, rich in Morphia, having even been obtained in Middle Europe and the northern United States, the summers there being sufficiently long to ripen the Poppy with a well elaborated sap. The Morphia contents in Opium from Gipps Land was at an average somewhat over 10 per cent. Opium was prepared in our Botanic Garden for the Exhibition of 1866; but palticularly Mr. J. Bosisto and Mr. J. Hood have given to this branch of rural industry here commercial dimensions. The Smyrna variety is particularly desirable for Opium; it enables the cultivator to get from 40 lbs. to 75 lbs. of Opium from an acre, generally worth 30s. to 35s. per pound. The ground for poppy-culture must be naturally rich, or otherwise be well manured; dressing with ashes increases the fecundity of the plant. The seed, about 9 lbs. to an acre, is generally sown broadcast, mixed with sand. In the most favorable places as many as three crops are obtained during a season. The collecting of the Opium, which consists merely of the indurating sap of the seed-vessels, is commenced a few days after the lapse of the petals. Superficial, horizontal or diagonal incisions are made into the capsules as they successively advance to maturity. This operation is best performed in the afternoons and evenings, and requires no laborious toil. The milky opium-sap thus directed outward, is scraped off next morning into a shallow cup, and allowed to dry on a place away from sunlight; it may also be placed on Poppy-leaves. From one to six successive incisions are made to exhaust the sap, according to season, weather, locality or the knife-like instrument employed. In the Department of Somme (France) alone Opium to the value of £70,000 annually is produced, and poppy-seed to the value of £170,000. Our

seasons here, as a rule, are favorable for collecting Opium, and thus this culture is here rendered less precarious than in many other countries. Our Opium has proved as good as the best Smyrna kinds. The petals are dried for packing the Opium, The main value of Opium depends on its contents of Morphia, for which the genus Papaver, as far as hitherto known, remains the sole source. But not less than eleven Alkaloids have been revealed in Opium by the progressive strides of organic chemistry: Codein, Metamorphin, Morphia or Morphin, Narcein, Narcotin, Opianin, Papaverin, Porphyroxin, Pseudo-morphin and Thebain. It contains besides an indifferent bitter principle: Meconin and Meconic Acid (*Vide* "Wittstein's Chemische Analyse von Pflauzentheilen.") Various species of Papaver produce more or less Opium and Morphia.

Parinarium Nonda, F. v. Mueller.

The Nonda-tree of North-east Australia. It may prove hardy in East Gipps Land, and may live perhaps in the dry and hot air of our deserts, where it deserves trial-culture for the sake of its edible mealy plum-like fruit. A few other species with esculent drupes occur in different tropical countries.

Parkinsonia aculeata, L.

From California to Monte Video. A thorny shrub, clearly adapted for the warmer parts of Victoria, where it might be utilized with the following plant for evergreen hedges. The flowers are handsome.

Parkinsonia Africana, Sonder.

South Africa. A tall bush. A third species, *P. microphylla*, Torr., occurs on the Colorado.

Paspalum distichum, Burm.

From India to South-eastern Australia. A creeping swamp-grass, forming extensive cushions. It keeps beautifully green throughout the year, affords a sufficiently tender blade for feed, and is exqusitely adapted to cover silt or bare slopes on banks of ponds or rivers.

Paspalum scrobiculatum, L.

Through the tropics of the Eastern Hemisphere widely dispersed, extending to South-east Australia. A valuable pasture-grass. A superior variety is cultivated in India for a grain crop. This grass furnishes a good ingredient to hay. The stem sometimes attains a height of 8 feet.

Passiflora alata, Aiton.

Peru and Brazil. This Passion-flower and all the following (and probably other species) furnish Granadilla fruits.

Passiflora coccinea, Aublet.

From Guiana to Brazil.

Passiflora coerulea, L.

South Brazil and Uruguay. One of the hardiest of all Passion-flowers, and with many others well adapted for covering bowers, rookeries aud similar structures. Many of the Equatorial species come from mountainous regions and may thus endure our lowland clime.

Passiflora edulis, Sims.

Southern Brazil.

Passiflora filamentosa, Willd.

Southern Brazil.

Passiflora incarnata, L.

North America from Virginia and Kentucky southward. The fruits are called Maypops.

Passiflora laurifolia, L. (*P. tinifolia*, Jussieu.)

The Water-Lemon. From West India to Brazil.

Passiflora ligularis, Juss.

From Mexico to Bolivia.

Passiflora lutea, L.

North America from Pennsylvania and Illinois southward. Berries small.

Passiflora maliformis, L.

From West India to Brazil.

Passiflora quadrangularis, L.

Brazil. One of the most commonly cultivated Granadillas.

Passiflora serrata, L.

From West India to Brazil.

Passiflora suberosa, L. (*P. pallida*, L.)

From Florida to Brazil. A careful investigator, Dr. Maxw. Masters, has recently defined about 200 species of Passion-flowers.

Peireskia aculeata, Miller.

West India. The Barbadoes Gooseberry. A tall shrub, adapted for hedges in localities free of frost. The Cochineal Insect can be reared also on this plant. The berries are edible. Several other species exist in tropical America, among which *P. Bleo*, Humb., is particularly handsome, but they may not all be sufficiently hardy for utilitarian purposes in our clime. Otherwise the Bleo is used for salad.

Peireskia portulacifolia, Haw.

West India. This attains the size of a fair tree.

Pennisetum thyphoideum, Rich.*

(*Penicillaria spicata*, Willd. *Panicum coeruleum*, Miller.)

Tropical Asia, Nubia and Egypt. The Bajrée. An annual, ripening its millet crop in about three months in warm countries. The stems are thick and reach a height of 6 feet. This grass requires a rich and loose soil, and on such it will yield upwards of a hundred fold. It furnishes also a good hay, and is also valuable as green-fodder. Some of the many other species of Pennisetum are doubtless of pastoral value. A plant allied to P. thyphoideum occurs in China: namely *P. cereale*, Trin. This affords also millets or corn for cakes.

Pentzia virgata, Lessing,

South Africa. A small bush, recommended to be established in our deserts for sheep-fodder. Several other species occur in South Africa.

Perilla arguta, Benth.

Japan. An annual herb. An infusion of this plant is used to impart to table vegetables and other substances a deep red color. *P. ocimoides*, L., of Upper India, serves probably similar purposes.

Persea gratissima, Gaertner.

From Mexico to Peru and Brazil in forest-tracts near the coast. The Avocado Pear. Suggestively mentioned here as likely available for East Gipps Land, French Island and other mild localities of our country, inasmuch as it has become naturalized in Madeira, the Azores and Canary Islands. A noble evergreen spreading tree. The pulp of the large pear-shaped fruit is of delicious taste and flavor. Persea Teneriffæ (*P. Indica*, Spreng.), indigenous to Madeira, the Canary Islands and Azores, is a tree with hard and remarkably beautiful wood.

Peucedanum graveolens, Benth. (*Anethum graveolens*, L.)

The Dill. South Europe, North Africa, Orient. Annual. The well-known aromatic fruitlets used as a condiment. *P. Sowa*, Benth. (*Anethum Sowa*, Roxb.) is a closely allied Indian annual herb.

Peucedanum officinale, L.

The Sulphur Root. Middle and South Europe, North Africa, Middle Asia. Perennial. The root used in veterinary medicine. It contains like that of the following species the crystalline Peucedanin.

Peucedanum Ostruthium, Koch. (*Imperatoria Ostruthium*, L.)

Mountains of Middle Europe. A perennial herb, which could be grown in our Alps. The acrid aromatic root is used in medicine, particularly in veterinary practice. It is required for the preparation of some kinds of Swiss Cheese. *P. Cervaria*, Cuss. and *P. Oreoselinum*, Moench., are also occasionally drawn into medicinal use.

Peucedanum sativum, Benth. (*Pastinaca sativa*, L.)

The Parsnip. Europe, North and Middle Asia. Biennial. The root palatable and nutritious.

Phalaris Canariensis, L.

The Canary Grass. An annual grass from the Canary Islands, now widely dispersed as a spontaneous plant over the warmer zones of the globe. Thus it has also become naturalized in Australia. It is grown for its seeds, which form one of the best kinds of fodder for many sorts of small cage-birds. The flour is utilized in certain processes of cotton manufacture, and liked for some kinds of cakes. The soil for the culture of the Canary-grass must be friable and not too poor. It is an exhaustive crop. As allied annual species of similar use, but mostly of less yield, may be enumerated: *P. brachystachys* Link., from Italy; *P. minor* Retz, and *P. truncata* Guss., from various countries at the Mediterranean Sea. Other species, including some from Asia, are deserving of trial; but the perennial British *P. arundinacea*, L., is too harsh to serve for wholesome fodder, nor does it furnish Canary seed.

Phaseolus adenanthus, G. Meyer.

(*P. Truxillensis*, Humb. *P. rostratus*, Wallich).

Almost cosmopolitan within the tropics, where irrespective of navigation and other traffic it becomes dispersed by migrating birds; truly spontaneous also in tropical Australia. A perennial herb with large flowers, resembling those of *Vigna vexillata*, Benth. Cultivated for its seeds, which are rather small ,but copiously produced.

Phaseolus coccineus, Kniphof.* (*P. multiflorus*, Willd).

The Turkish Bean or Scarlet-Runner. A native of the Orient, if Sprengel's identification is correct, according to which this plant was known in Arabia and Persia at Avicenna's time; but according to other opinions it is a native of Mexico. A twining showy perennial, as useful as the ordinary French Bean. Its seeds usually larger than those of the latter plant, purple with black dots, but sometimes also pure blue and again quite white. The flowers occur sometimes white. The root contains a narcotic poison.

Phaseolus lunatus, L.

Considered as a native of tropical America, but also recorded as wild from many parts of tropical Africa and Asia. Biennial according to Roxburgh. Much cultivated in the warm zone for its edible beans, which are purple or white. A yellow-flowered variety or closely allied species is known as the Madagascar Bean and proved hardy and productive here. *P. perennis*, Walt., from the United States of North America, is another allied plant.

Phaseolus Mungo, L. (*P. Max*, L.)

The Green Gram. South Asia and tropical Australia. An annual very hairy plant, not much climbing. Frequently reared in India, when rice fails or where that crop cannot be produced. The seeds are but small, and the herb is not available for fodder. This plant requires no irrigation, and ripens in two and a-half to three months. The grain tastes well and is esteemed wholesome. The harvest is about thirtyfold.

Phaseolus vulgaris, L.*

The ordinary Kidney Bean or French Bean or Haricot. India, from whence it came to Europe through the conquest of Alexander the Great; but apparently it is also wild in North-western Australia. Though this common and important culinary annual is so well known, it has been deemed desirable, to refer to it here with a view of reminding, that the Kidney-bean is nearly twice as nutritive than wheat. The meal from Beans might also find far augmented use. As constituents of the Beans should be mentioned a large proportion of starch (nearly half), then much Legumin, also some Phaseolin (which like Amygdalin can be converted into an essential oil) and Inosit-Sugar. Lentils contain more Legumin but less starch, while Peas and Beans are in respect to the proportion of these two nourishing substances almost alike. *Phaseolus nanus*, L., the Dwarf-bean, and *P. tumidus*, Savi, the Sugar-bean or Sword-bean or Egg-bean, are varieties of P. vulgaris. Several other species of Phaseolus seem worthy of culinary culture.

Phleum pratense, L.*

The Catstail or Timothy Grass. Europe, North Africa, North and Middle Asia. One of the most valuable of all perennial fodder-grasses. Its production of early spring-herbage is superior to that of the Cocksfoot-grass. It should enter largely into any mixture of grasses for permanent pasturage. It will live also on moist and cold clay-ground. This grass and perhaps more yet the allied *Phleum alpinum*, L., are deserving of an extensive transfer to our moory Alps. For hay it requires mowing in a young stage. The seed is copiously yielded and well retained.

Phœnix dactylifera, L.*

The Date-Palm. North Africa, also inland; Arabia, Persia. This noble palm attains finally a height of 80 feet. It is unisexual and of longevity:—"Trees of from 100 to 200 years old continue to produce their annual crop of dates." Though from the sap sugar or palm wine can be obtained, and from the leaves hats, mats and similar articles can be manufactured, we here would utilize this palm beyond scenic garden ornamentation only for its fruits. It is in the oases of our desert-tracts, swept by burning winds, where the Date-palm would afford in time to come a real boon, although it might be grown also in the valleys of our mountains and in any part of our lowlands. Several bunches of flowers are formed in a season, each producing often as many as 200 dates. Many varieties of dates exist, differing in shape, size and color of the fruit; those of Gomera are large and contain no seed. The unexpanded flower-bunches can be used for palm-cabbage; the fibre of the leaf-stalks for cordage. The town Elche in Spain is surrounded by planted forest of about 80,000 Date-palms, and the sale of leaves for decorative purposes produces irrespective of the value of the date-fruits a considerable income to the town, and so it is at Alicante. As far north as the Gulf of Genoa exists also a date-forest. The ease, with which this palm grows from seeds, affords facility in adapted climes to imitate these examples, and we certainly ought to follow them in all parts of Australia.

Phœnix paludosa, Roxb.

India. A stout species, not very tall. Of value at least for decorative culture.

Phœnix pusilla, Gaertner.

India and South China. A dwarf species, likely also to be hardy here. *P. farinifera,* Roxb., appears to be identical. It is adapted for sandy and otherwise dry and barren land, but prefers the vicinity of the sea. Berry shining black, with a sweet mealy pulp.

Phœnix reclinata, Jacquin.

South Africa in the eastern districts. A hardy species, but not tall, often reclining. It is adapted for ornamentation. The seeds are frequently drawn into local use as a substitute for coffee.

Phœnix silvestris, Roxb.

India, almost on any soil or in any situation. It has proved at Melbourne a very hardy species. Its greatest height is 40 feet. Berries yellowish or reddish, larger than in P. pusilla. Where this palm abounds much sugar is obtained from it by evaporation of the sap, which flows from incisions into the upper part of the trunk, a process not sacrificing the plant, as for 20 years the sap can thus be withdrawn. A kind of Arack is obtained by fermentation and distillation of this sap. Each plant furnishes the juice for about 8 lbs. of Date-sugar annually, but in some instances much more. About 50,000 tons of sugar are produced a year in Bengal alone from this and some other palms.

Phœnix spinosa, Thonning.

Tropical Africa, ascending mountain regions, thus perhaps hardy here with us. Dr. Kirk found the green bunches, if immersed in water for half a day, suddenly to assume a scarlet hue, and then the astringent pulp to become edible and sweet.

Phormium tenax, J. R. and G. Forster.*

The Flax-lily of New Zealand, where it occurs as far south as 46° 30′, occurring also in the Chatham Islands and Norfolk Island, though not on Lord Howe's Island. It

seems important, that this valuable plant should here be brought universally under culture, particularly on any inferior spare ground or on the sea-beaches or any rocky declivity, where it may be left unprotected to itself, as no pastoral animal will touch it. It is evident, that the natural upgrowth will soon be inadequate to the demand for the plant. Merely torn into shreds the leaves serve at once in gardens and vineyards as cordage, and for this purpose, irrespective of its showy aspect, the Phormium has been distributed from our Botanic Garden since the last 14 years. From the divided roots any plantation can gradually be increased, or this can be done more extensively still by sowing the seeds. In all likelihood the plant would thrive and become naturalized in the Auckland's and Campbell's Group, in Kerguelen's Land, the Falkland Islands, the Shetland Islands and many continental places of both hemispheres. Among the varieties three are better characterized than the rest: The Tehore, the Swamp and the Hill variety. The first and the last mentioned produce a fibre fine and soft, yet strong, and the plants attain a height of only about 5 feet, whereas the Swamp-variety grows to double that height, producing a larger yield of a coarser fibre, which is chiefly used for rope or paper making. As might be expected, the richer the soil the more vigorous the growth of the plant; it likes moreover now and then to be overflown by fresh or brackish water, but it will not live if permanently sunk into wet. In swampy ground trenches should be dug to divert the surplus of humidity. Fibre free from gum-resin properly dressed withstands moisture as well as the best Manilla rope. Carefully prepared the fibre can also be spun into various textile durable fabrics, either by itself or mixed with cotton, wool or flax. In October last, the sale of Phormium fibre in London was 11,500 bales, ranging in price from £19 to £31. The tow can also be converted into paper, distinguished for its strength and whiteness. The London price of Phormium fibre for this purpose is from £10 to £20 per ton.

For further details on the utilization of this plant the elaborate reports of the New Zealand Commission for Phormium

should be consulted. One of the dwarf varieties is *Phormium Colensoi*, J. Hook.

Physalis Alkekengi, L.

The Strawberry-Tomato or Winter-Cherry. Middle and South Europe, North Africa, Middle Asia, extending to Japan, said to have come originally from Persia. A perennial herb. The berry, which is red and of a not unpleasant taste, has some medicinal value. The leaves contain a bitter principle: Physalin.

Physalis angulata, L.

In many tropical countries, extending as a native plant to the northern parts of the United States and to Japan. An annual herb. Yellowish; the berries edible. *P. minima* L. (*P. parviflora*, R. Br.) appears to be a variety and extends also into tropical Australia.

Physalis Peruviana, L.

Temperate and tropical America, widely naturalized in many countries of the warmer zones. With double inaptness called the Cape Gooseberry. A perennial herb; but for producing its fruit well, it requires early renovation. The acidulous berries can be used as well as a table-fruit as for preserves. Doubtless several other kinds of Physalis can be utilized in the same manner. In colder countries the P. Peruviana becomes annual.

Pimpinella Anisum, L.

The Anise Plant. Greece, Egypt, Persia. An annual. The seed-like fruits enter into various medicines and condiments, and are also required for the distillation of oil, rich in Anethol.

Pimpinella Saxifraga, L.

Europe, North and Middle Asia. A perennial herb; its root used in medicine; a peculiar volatile oil can be distilled from the root. *P. magna*, L., is a closely allied species, and *P. nigra*, W., is a variety. The root of the last is particularly powerful.

Pimpinella Sisarum, Benth. (*Sium Sisarum*, L.)

East Asia. A perennial herb. The bunches of small tubers afford an excellent culinary vegetable.

Pipturus propinquus, Weddell.

Insular India, South Sea Islands and warmer parts of East Australia. This bush is higher and rather more hardy than Boehmeria nivea; but in fibre it is similar to that plant. *P. velutinus*, Wedd., is closely allied. The few other species serve probably as well for fibre.

Pistacia Lentiscus, L.

The Mastix Tree. Mediterranean regions. A tall evergreen bush, exuding the Mastix Resin mostly through incisions into its bark. In Morocco it is extensively used for hedges.

Pistacia Terebinthus, L.

Countries around the Mediterranean Sea. A tall bush or small tree with deciduous foliage. The fragrant Cyprian or Chio Turpentine exudes from the stem of this species. *P. vera*, L., is inserted already among the timber trees.

Pisum sativum, L.*

The Common Pea. Mediterranean countries and Western Asia. This annual of daily use could hardly be left disregarded on this occasion. Suffice it to say, that the herbage as a nutritious fodder deserves more attention than it receives. The green fruit contains Inosit-sugar and Cholesterin-fat. A second species, *P. Aucheri*, Jaub. and Spach., which is perennial, occurs in alpine elevations on the Taurus.

Plectocomia Himalaiana, Griffith.

Sikkim, up to 7000 feet. This Rattan-Palm requires moist forest-land. Its canes are not durable, but this palm is an object worthy of horticulture and would prove the hardiest among its congeners.

Poa angustifolia, L. (*P. serotina*, Ehrh. *P. fertilis*, Host.)

Europe, North Asia, North America. A perennial pasture-grass, allied to P. nemoralis. An excellent grass for moist meadows and river-banks.

Poa aquatica, L. (*Glyceria aquatica*, Sm.)

Europe, North and Middle Asia, North America. This conspicuous water-grass attains a height of 6 feet. It is perennial, and deserves naturalization in our swamps.

Poa Brownii, Kunth. (*Eragrostis Brownii*, Nees.)

Tropical and Eastern extra-tropical Australia, extending rather widely through our Colony. It is here mentioned as a valuable perennial species, keeping beautifully green in our driest summers, even on poor soil. The section Eragrostis of the genus Poa contains numerous species in the hotter parts of the globe. Of these many would doubtless be hardy here and prove of pastoral value.

Poa cynosuroides, Retz.

North-eastern Africa, South Asia. A harsh perennial grass, not serviceable for fodder, but mentioned by Royle as a fibre-plant of North-western India, where it is valued as a material for ropes. In this respect it may not surpass the rough tufty variety of our own *Poa Australis*, R. Br., so common on our river-bankss, from the leaves of which excellent nets are made by the natives.

Poa distans, L.

Europe, North Africa, Middle and Northern Asia, North America. Perennial. It is one of the limited number of tender grasses, suited for moist saline soil, and thus affords pasturage on coast marshes.

Poa fluitans, Scopoli. (*Glyceria fluitans*, R. Brown.)

Europe, North Africa, Middle and North Asia, North America. The Manna-Grass. Perennial. Excellent for stagnant water and slow-flowing streams. The foliage is tender. The seeds are sweet and palatable, and are in many countries used for porridge.

Poa maritima, Hudson.

Europe, North Africa, North Asia, North America. Its long creeping roots help to bind the coast-sand. This grass can also be depastured.

Poa nemoralis, L.

Europe, North and Middle Asia, North America. This perennial grass can be grown on shady forest-land, as the name implies, but it accommodates itself also to open places, and will grow even among rocks. It endures alpine winters.

Poa pratensis, L.

The ordinary English Meadow-Grass. A perennial species, fit for any meadows, thriving early, and able to live also in alpine localities. Better adapted for pasture than hay, but by no means one of the very best grasses, though it resists drought. It forms excellent sward, and with advantage can be used for intermixing it with other pasture-grasses.

Poa trivialis, L.*

Europe, North Africa, Middle and Northern Asia. Also a good perennial grass for mixture on pasture-land. One of the best grasses for sowing on ground recently laid dry. Sinclair regarded the produce of this Poa as superior over many other kinds, and noticed the marked partiality, which horses, oxen and sheep evince towards it. To thrive well it wants rather moist and rich soil and sheltered places.

These few species of Poa have been singled out as recommendable, because they are well tested. Future experiments beyond Europe will add others to lists of recommendations like this.

Podophyllum peltatum, L.

North America. A perennial forest-herb, not without importance for medicinal purposes. The root contains the bitter alkaloid Berberin. *Podophyllum Emodi*, Wall., occurring in the Indian mountains at a height from 6000 to 14,000 feet, can probably be used like the American species. The berries of both are edible, though the root and leaves are poisonous.

Pogostemon Patchouli, Pellet.

Mountains of India. A perennial herb, famed for its powerful scent arising from a volatile oil. *P. parviflorus*, Benth. and *P. Heyneanus*, Benth. belong to this species.

Polygala Senega, L.

North America. A perennial herb. The root is of medicinal value; its acrid principle is Saponin.

Prangos pabularia, Lindley.

Plateaus of Mongolia and Tibet. A perennial fodder-herb, much relished by sheep, eligible for cold and arid localities, and deserving naturalization on our alpine pasture-ground. Other perennial species exist near the Mediterranean Sea, on the Atlas, the Caucasus and the Indian Highlands. P. pabularia is regarded by some as the Silphium of Arrianus.

Pringlea antiscorbutica, W. Anderson and R. Br.*

The Cabbage or Horse-Radish of Kerguelen's Island. The perennial long roots taste somewhat like Horse-Radish. The leaves in never-ceasing growth are crowded cabbage-like into heads, beneath which the annual flower-stalks arise. The plant ascends mountains in its native island to the height of 1400 feet, but luxuriates most on the sea-border. To Arctic and other Antarctic countries it would be a boon. Probably it would live not only on our shores, but also on our Alps. Whalers might bring us the roots and seeds of this remarkable plant, which seems to have never entered into culture yet. Not even its flowers in a perfect state are known. The plant was used by the celebrated Captain Cook and all subsequent navigators, touching at yonder remote spot, as Cabbage, and it proved to possess powerful properties against scurvey. Dr. Hooker observes, that Pringlea can sectionally be referred to Cochlearia. The whole plant is rich in a pungent volatile oil. Through culture important new culinary varieties may likely be raised from this plant. The taste of this vegetable in its natural growth is like Mustard and Cress, and the Kerguelen's Land Cabbage, when boiled, proved a wholesome and agreeable substitute for the ordinary Cabbage.

Prosopis dulcis, Kunth.

From Mexico to the southern parts of the La Plata States. A thorny shrub, growing finally to a tree, adapted for live-fences. This is one of the species, yielding the sweetish

Algaroba-pods for cattle-fodder, and utilized even in some instances for human food. As allied plants, besides the following, may be mentioned: *P. horrida*, Humb., occurring from the base of the Andes to the sand-shores of Peru; *P. juliflora*, Cand., growing from Mexico and West India to Ecuador; *P. Siliquastrum*, Cand., extending from the Chilian Andes apparently into the Argentine Province Catamarka. A short communication on the American Algaroba-trees was presented to our Parliament by the writer in 1871.

Prosopis glandulosa, Torrey.

Colorado, Arkansas, Texas. The pods of this thorny ever green shrub or tree are also succulent. It exudes a gum, not unlike Gum Arabic, and this is obtained so copiously, that children could earn from 2 dollars to 3 dollars a day in Texas while gathering it, latterly about 40,000 lbs. being bought by druggists there. The tree attains a height of 30 feet, and its wood is excessively hard. The pods of several species are rich in tannin.

Prosopis pubescens, Bentham.

Texas, California, New Mexico. Likely available for hedges, with other species of other countries.

Prosopis spicifera, L.

India. A thorny tree, also with edible pods, possibly hardy here.

Prosopis Stephaniana, Kunth.

Syria and Persia. A shrubby species for hedge-growth.

Prunus Americana, Marshall. (*P. nigra*, Aiton.)

Canada, Eastern United States of America. A thorny tree, furnishing the Yellow and Red Plum of North America. The fruit is roundish and rather small, but of pleasant taste.

Prunus Chisasa, Michaux.

North America, west of the Missisippi. On the prairies it is only 3 to 4 feet high. Fruit spherical, red, rather small, with a tender usually agreeable pulp. Other species with edible fruit occur in North America, such as *P. pumila*, L.,

P. Pennsylvanica, L., *P. Virginiana*, L., *P. serotina*, Ehrh., but their fruits are too small to render these plants of importance for orchard culture, though they may also become enlarged by artificial treatment.

Prunus maritima, Wangenheim.

The Beach Plum of North America. A shrubby species, of service not only for covering coast-sands, but also for its fruit, which is crimson or purple, globular and measuring from a-half to one inch. It is not necessary to enter here any notes on the generally known species of Prunus, which have engaged already for years the keen attention of many orchard-cultivators also in this Colony. Thus we possess in this country numerous though not all the best varieties of the Cherry (*P. avium*, L. and *P. Cerasus*, L.), of the Plum (*P. domestica*, L.), of the Apricot (*P. Armeniaca*, L.) and of the Cherry-Plum (*P. myrobalana*, L.), the latter Canadian, the others European and Oriental. Information on these and other varieties, to which we have added independently also here, may be sought in "Hogg's Fruit Manual." The Almond (*Amygdalus communis*, L.) and the Peach (*Amygdalus Persica*, L.) belong also generically to Prunus, as indicated in 1813 by F. G. Hayne ("Arznei Gewaechse," iv., 38) and finally settled by J. D. Hooker (Benth. and Hook., gen. pl. i., 610), for which therefore now the names P. Amygdalus and P. Persica should be adopted.

Prunus spinosa, L.

The Sloe or Blackthorn. Wild in many parts of Europe. With its flowers it is one of the earliest plants to announce the spring. Its tendency to throw out suckers renders the bush less adapted for hedges of gardens than of fields, but these suckers furnish material for walking-sticks. The small fruits can be made into preserves. *P. insititia*, L., the Bullace, with larger and sometimes yellow fruits, extends to North Africa and Middle Asia. Dr. Hooker and other phytographers consider P. domestica not specifically distinct from P. spinosa. Of medicinal value are *P. Lauro-Cerasus*, L., the evergreen Cherry-Laurel from the Orient, and *P. Padus*, L., the deciduous Birds Cherry, which extends

from Europe to North Africa and West Asia. These and most other species contain in their foliage and in some other parts Amygdalin. Perhaps some of the species from Eastern Asia, California and tropical America are eligible for improving their fruit through horticultural skill. The Sloe and others might with advantage be naturalized on our forest streams.

Psamma arenaria, Roem. and Schult.

(*P. littoralis*, Beauv. *Calamagrostis arenaria*, Roth.)

The Moram or Marrem or Bent Grass. Sand-coasts of Europe, North Africa and Middle North America. One of the most important of reed grasses, with long creeping roots, for binding the moving drift sands on the sea shore, for the consolidation of which in Europe chiefly this tall grass and Elymus arenarius are employed *Psamma Baltica*, R. and S., from the Baltic and North Sea, serves the same purpose. Both can also be used in the manner of Sparta for paper material.

Psidium Araca, Raddi.

From West India and Guyana to Peru and Southern Brazil, where it is found in dry high-lying places. This is one of the edible Guavas, recorded already by Piso and Marcgrav. The greenish-yellow berry is of exquisite taste.

Psidium arboreum, Vellozo.

Brazil; province Rio de Janeiro. This Guava-fruit measures about one inch, and is of excellent flavor.

Psidium Cattleyanum, Sabine.*

The Purple Guava. Brazil and Uruguay. One of the hardiest of the Guava-bushes, attaining finally a height of 20 feet. The purple berries are seldom above an inch long, but of delicious flavor and taste, resembling thus far strawberries. *P. buxifolium*, Nutt., of Florida, seems nearly related to this species.

Psidium cinereum, Martius.

Brazil; provinces Minas Geraes and Sao Paulo. Also yielding an edible fruit.

Psidium cordatum, Sims.

The Spice Guava. West India. This one attains the height of a tree. Its fruit edible.

Psidium cuneatum, Cambess.

Brazil; province Minas Geraes. Fruit greenish, of the size of a Mirabelle Plum.

Psidium grandifolium, Martius.

Brazil; provinces Rio Grande do Sul, Parana, Sao Paulo, Minas Geraes, where the climate is similar to Southern Queensland. A shrub of rather dwarf growth. The berries edible, size of a walnut.

Psidium Guayava, Raddi.*

(*P. pomiferum*, L. *P. pyriferum*, L.)

The large Yellow Guava. From West India and Mexico to South Brazil. For this handsome evergreen and useful bush universal attention should be secured anywhere in our warm lowlands, for the sake of its aromatic wholesome berries, which will attain the size of a hen's egg and can be converted into a delicious jelly. The pulp is generally cream-colored or reddish, but varies in the many varieties, which have arisen in culture, some of them bearing all the year round. Propagation is easy from suckers, cuttings or seeds. Many other berry-bearing Myrtaceae (of the genera Psidium, Myrtus, Myrcia, Marliera, Calyptranthes, Eugenia) furnish edible fruits in Brazil and other tropical countries, but we are not aware of their degrees of hardinesss. Berg enumerates as esculent more than half a hundred for Brazil alone, of which the species of Campomanesia may safely be transferred to Psidium.

Psidium incanescens, Martius.

Brazil; from Minas Geraes to Rio Grande do Sul. This Guava-bush attains a height of 8 feet. Berry edible.

Psidium polycarpon, Al. Anderson.*

From Guiana to Brazil, also in Trinidad. A comparatively small shrub, bearing prolifically and almost continuously its yellow berries, which are of the size of a large cherry and of exquisite taste.

Psidium rufum, Martius.

Brazil, in the province Minas Geraes, on sub-alpine heights. This Guava-bush gains finally a height of 10 feet, and is likely the hardiest of all the species, producing palatable fruit.

Ptychosperma Alexandrae, F. v. Mueller.

The Alexandra Palm. Queensland, as well in tropical as extra-tropical latitudes. The tallest of Australian Palms, and one of the noblest form in the whole empire of vegetation. It exceeds 100 feet in height, and is likely destined to grace any shady moist grove free from frost in this and other countries, as it seems less tender than most palms. The demand for seeds has already been enormous.

Ptychosperma Cunninghami, Wendland.

East Australia, as far south as Illawarra; thus one of the most southern of all palms. This also is a very high species, destined to take here a prominent position in decorative plantations. Several species occur in Feegee and other islands of the Pacific Ocean, and again others might be obtained from India, but they are probably not so hardy as ours. Though strictly speaking of no industrial value these palms are important for horticultural trade, and are objects eminently fitted for experiments in acclimation.

Ptychosperma elegans, Blume.

(*P. Seaforthia*, Miq. *Seaforthia elegans*, R. Br.)

Litoral forests of tropical Australia. Also a lofty magnificent Feather-Palm. Its leaflets are erose. It may prove hardy.

Pycnanthemum incanum, Michaux.

North America. A perennial herb, in odor resembling both Pennyroyal and Spearmint. It likes to grow on rocky woodland, and on such it might be easily naturalized.

Pycnanthemum montanum, Michaux.

The Mountain-Mint of North America. A perennial herb of pleasant aromatic mint-like taste. These two particular species have been chosen from several North American

kinds to demonstrate, that we may add by their introduction to the variety of our odorous garden herbs. They may also be subjected with advantage to distillation.

Pyrularia edulis, Meissner.

Nepaul, Khasia, Sikkim. A large umbrageous tree. The drupaceous fruit is used by the inhabitants for food. A few other species occur in Upper India, one on the high mountains of Ceylon and one in North America. The latter, *P. pubera*, Mich., can be utilized for the oil of its nuts.

Pyrus coronaria, L.

The Crab-Apple of North America. This showy species is mentioned here as worthy of trial-culture, since it is likely, that it would serve well as stock for grafting. It seems unnecessary to refer here to any of the forms of *Pyrus communis*, L., *P. Malus*, L., *P. Cydonia*, L., and *P. Germanica*, J. Hook. (*Mespilus Germanica*, L.), but it may passingly be observed, that curious fruits have been produced latterly in North America by the hybridisation of the Apple with the Pear. A bitter Glycosid, namely Phlorrhizin, is obtainable from the bark of Apple and Pear Trees, particularly from that of the root, while a volatile Alkaloid, namely Trimethylamin, can be prepared from the flowers.

Quercus Mongolica, Fischer.*

Mandschuria. One of the two species, on which mainly (if not solely) the silk insect peculiar to Oak trees is reared, as shown by Dr. Hance. *Q. serrata*, Thunb. (*Q. obovata*, Bunge), the second of the principal Oaks for the production of silk, has been mentioned previously in the Acclimatisation Society's list of trees yielding timber, and has through the exertions of the writer found its way already to Australia.

Rafnia amplexicaulis, Thunberg.

South Africa. The root of this bush is sweet like Liquorice, and is administered in medicine. *Rafnia perfoliata*, E. Meyer, also from South Africa, furnishes likewise a medicinal root.

Reseda Luteola, L.

The Weld. Middle and South Europe, Middle Asia, North Africa. A herb of one or two years' duration. A yellow dye (Luteolin) pervades the whole plant.

Reseda odorata, L.

The true Mignonette. North Africa and Syria. A herb of one or very few years' duration. The delicate scent can best be concentrated and removed by enfleurage.

Rhamnus catharticus, L.

The Buckthorn. Middle and South Europe, North Africa, Middle Asia. It can be utilized as a hedge-plant. The berries are of medicinal value, as indicated by the specific name. The foliage and bark can be employed for the preparation of a green dye.

Rhamnus chlorophorus, Lindl.

China. From the bark a superior green pigment is prepared. *R. utilis*, from the same country, serves for the like purpose. This kind of dye is particularly used for silk, and known as Lokao.

Rhamnus infectorius, L.

On the Mediterranean Sea, and in the countries near to it. The berry-like fruits of this shrub are known in commerce as Graines d'Avignon and Graines de Perse, and produce a valuable green dye. Other species seem to supply a similar dye material, for instance *R. saxatilis*, L., *R. amygdalinus*, Desf., *R. oleoides*, L.

Rhapis flabelliformis, L. fil.

China and Japan. This exceedingly slender palm attains only a height of a few feet. The stems can be used for various small implements. It is one of the best plants for table decoration.

Rhaponticum acaule, Cand.

On the Mediterranean Sea. A perennial herb. The root is edible.

Rheum australe, Don.*

(*R. Emodi*, Wall. *R. Webbianum*, Royle.)

Himalaian regions up to 16,000 feet. From this species at least a portion of the medicinal Rhubarb is obtained, most likely several species furnish Rhubarb-root, and its quality depends probaby much on the climatic region and the geologic formation, in which the plant grows. Should we wish to cultivate any species here for superior medicinal roots, then clearly localities in our higher and drier alpine tracts should be chosen for the purpose. Hayne regards the presence of much yellowish pigment in the seed-shell as indicating a good medicinal Rhubarb-plant. As much as 5 lbs. of the dried drug are obtained from a single plant, several years old. An important orange-red crystalline substance, Emodin, allied to Crysophanic acid, occurs in genuine Rhubarb.

Rheum Rhaponticum, L.

From the Volga to Central Asia. This species together with *R. Tataricum*, L. fil., *R. undulatum*, L., and a few others, all Asiatic (one extending to Japan) provide their acidulous leaf-stalks and unexpanded flower-mass for culinary purposes. Rhubarb leaves can also be used in the manner of Spinage. *R. palmatum*, L., often considered to yield the best Rhubarb root, is an insular plant of North-eastern Asia, but may in the alpine deserts far inland become a source of the genuine root, so long ascribed to it. That is the only one with deeply jagged leaves.

Rhus copallina, L.

North America, extending to Canada. A comparatively dwarf species. This can also be used for tanning. A resin for varnishes is also obtained from this shrub.

Rhus Coriaria, L.*

The Tanner's Sumach. Countries around the Mediterranean Sea. The foliage of this shrub or small tree, reduced to powder, forms the Sumach of commerce. Many localities in our colony are particulary well adapted for the growth of this bush. It is remarkably rich in Tannic acid, yielding

as much as 30 per cent., and extensively used for the production of a superior Corduan- or Maraquin-leather. The cultivation presents no difficulty. Sumach can also be used for ink and various particularly black dyes. Under favorable circumstances as much as a ton of Sumach is obtained from an acre.

Rhus Cotinus, L.

The Scotino. Countries at the Mediterranean Sea. The wood of this bush furnishes a yellow pigment. The Sotino, so valuable as a material for yellow and black dye, and as a superior tanning substance, consists of the grinded foliage of this plant.

Rhus glabra, L.

North America, extending to 54° N.L. This Sumach shrub will grow on rocky and sterile soil. It produces a kind of gall, and can also be used as a good substitute for the ordinary Sumach. This species can easily be multiplied from suckers. It will live on poor soil. American sumachs contain generally from 15 to 20 per cent. Tannin.

Rhus lucida, L.

South Africa. This shrub proved here of particular adaptability for forming hedges. About half a hundred South African species are known, of which probably some could be utilized like ordinary Sumach, but hitherto we have remained unacquainted with the nature and degree of any of their tanning and coloring principles.

Rhus semialata, Murray.

China and Japan. This shrub produces a kind of nut-galls.

Rhus typhina, L.

The Staghorn Sumach. North America, extending to Canada. This species will grow to a tree of 30 feet high. Its wood is of an orange tinge. Through incisions into the bark a kind of Copal is obtained. The leaves can be used like ordinary Sumach. This bush can be reared on inferior land.

Ribes aureum, Pursh.

Arkansas, Missouri, Oregon. This favorite bush of our shrubberies would likely on our forest-streams produce its pleasant berries, which turn from yellow to brown or black. Allied to this is *R. tenuiflorum*, Lindl., of California and the nearest States, with fruits of the size of red currants, of agreeable flavor, and either dark purple or yellow color.

Ribes divaricatum, Douglas.

California and Oregon. One of the Gooseberries of those countries. Berries smooth, black, about one-third of an inch in diameter, pleasant to the taste. Culture might improve this and many of the other species. R. Nuttalli (*R. villosum*, Nutt., not of Gay, nor of Wallich) is an allied plant also from California.

Ribes Floridum, l'Herit.

The Black Currant of North America. The berries resemble in odor and taste those of R. nigrum. Allied to this is *R. Hudsonianum*, Rich., from the colder parts of North America.

Ribes Griffithi, J. Hook. and T. Thoms.

Himalaia, at a height of 10,000 to 13,000 feet. Allied to R. rubrum, bearing similar but larger berries of somewhat austere taste. The naturalization of this Currant-bush on our highest alps may prove of advantage. *R. laciniatum*, H. and T., is likewise a Himalaian species with red berries, and so *R. glaciale*, Wall. Furthermore *R. villosum*, Wall. (*R. leptostachyum*, Decaisne) comes from the Indian highlands and seems worthy of introduction.

Ribes Grossularia, L.

The ordinary Gooseberry. Europe, North Africa, Western Asia, on the Himalaian Mountains up to a height of 12,000 feet. This bush, familiar to every one, is mentioned here merely to indicate the desirability of naturalizing it in our alpine regions, where no fruits equal to it in value exist.

Ribes hirtellum, Michaux.

The commonest smooth Gooseberry of North America. It likes moist ground.

Ribes nigrum, L.

The Black Currant. Middle and Northern Asia, Europe, North America, ascending the Himalaian and Tibet mountains to a height of 12,000 feet. Commonly cultivated already in the cooler parts of Victoria, but also particularly fit to be dispersed through our forests and over our alps.

Ribes niveum, Lindl.

One of the Oregon Gooseberry-bushes. Berries small, black, of a somewhat acid taste and rich vinous flavor.

Ribes rotundifolium, Michaux.

North America. Yields part of the smooth Gooseberries of the United States. The fruit is small, but of delicious taste.

Ribes rubrum, L.

The ordinary Red Currant. Europe, North America, North and Middle Asia, in the Himalaian Mountains ceasing where R. Griffithi commences to appear. One of the best fruit-plants for jellies and preserves that could be chosen for the colder mountain altitudes of our Colony. The root-bark contains Phlorrhizin. Perhaps other species, than those recorded here, among them some from the Andes, may yet deserve introduction, irrespective of their showiness, for their fruits.

† **Ricinus communis,** L.*

The Castoroil-plant. Indigenous to the tropical and sub-tropical zones of Asia and Africa. A shrubby very decorative plant, attaining the size of a small tree. It was well known to the Egyptians 4000 years ago, and is also mentioned already in the writings of Herodotos, Hippocrates, Dioscorides, Theophrastos, Plinius and other ancient physicians, philosophers and naturalists. The easy and rapid growth, the copious seeding and the early return of produce, render this important plant of high value in a clime like ours, more particularly as it will thrive on almost any soil, and can thus be raised even on arid places, without being scorched by hot winds. It may thus become an important plant also for culture in our desert-tracts, and is evidently destined to be one of our most eligible oil-plants for tech-

nical uses, irrespective of the value of its oil for medicinal purposes. The seeds contain about 50 per cent. oil. To obtain the best medicinal oil, hydraulic pressure should be employed, and the seeds not be subjected to heat; the seed-coat should also be removed prior to the extracting process being proceeded with. A screw-press suffices however for ordinary supply to obtain the oil. By decantation and some process of filtration it is purified. For obtaining oil to be used for lubrication of machinery or other technologic purposes, the seeds may be pressed and prepared by various methods under application of heat and access of water. Castoroil is usually bleached simply by exposure to solar light, but this procedure lessens to some extent the laxative properties of the oil. It dissolves completely in waterless alcohol and in ether, and will become dissolved also in spirit of high strength, to the extent of three-fifths of the weight of the latter. Solutions of this kind may become valuable for various technic purposes, and afford some tests for the pureness of the oil. If pressed under heat it will depose margaritin. Heated in a retort about one-third of the oil will distil over, and a substance resembling india-rubber remains, which saponizes with alkalies. Other educts are at the same time obtained, which will likely become of industrial value. These facts are briefly mentioned here merely to explain, that the value of this easily produced oil is far more varied than is generally supposed, and this remark applies with equal force to many other chemical compounds from vegetable sources, briefly alluded to in this present enumerative treatise. The seeds contain also a peculiar alkaloid: Ricinin. The solid chemic compound of Castor-oil is the crystalline Isocetin-Acid (a Glycerid). The oil contains also a non-crystalline acid peculiar to it (Ricin-acid). For the production of a particular kind of silk the Ricinus-plant is also important, inasmuch as the hardy Bombyx Cynthia requires for food the leaves of this bush. The value of Castoroil imported last year into Victoria was according to the Custom-returns not less than £23,755. Even a few of the seeds if swallowed, will produce poisonous effect.

Rosa centifolia, L.

The Cabbage Rose. Indigenous on the Caucasus and seemingly also in other parts of the Orient. Much grown in South Europe and South Asia for the distillation of Rose-water and Oil or Attar of Roses. From 12,000 to 16,000 roses, or from 250 lbs. to 300 lbs. of rose-petals are required according to some calculations, for producing a single ounce of Attar through ordinary distillation. The flowers require to be cut just before expansion; the calyx is separated and rejected; the remaining portions of the flowers are then subjected to aqueous distillation, and the saturated rose-water, so obtained, is repeatedly used for renewed distillation, when from the overcharged water the oil separates on a cold place and floats on the surface. But some other methods exist for producing the oil, for instance it may be got by distilling the rosebuds without water at the heat of a saltwater bath. The odor may also he withdrawn by alcoholic distillation from the Roses, or be extracted by the "enfluerage" process. The latter is effected by placing the flowers, collected while the weather is warm, into shallow frames covered with a glass-plate, on the inner side of which a pure fatty substance has been thinly spread. The odor of the flowers is absorbed by the adipose or oleous substance, though the blossoms do not come with it in direct contact; fresh flowers are supplied daily for weeks. The scent is finally withdrawn from its matrix by maceration with pure alcohol. Mr. Jos. Bosisto's method for obtaining the most delicate and precious volatile oils will likely be applicable also to the Rose, and prove more advantageous both in labor and gain than any other process. Purified Eucalyptus-oil can be used for diluting Rose-oil, when it is required for the preparation of scented Soap.

Rosa Damascena, Miller.

Orient. Allied to the preceding species, and also largely used for the production of essential Oil of Roses.

Rosa Gallica, L.

The French or Dutch Rose. Middle and South Europe, Orient. The intensely colored buds of this species are par

ticularly chosen for drying. These however may be got also from other kinds of Roses.

Rosa Indica, L.

Noisette Rose. From Upper India to China and Japan. Some Roses of the sweetest scent are derived from this species.

Rosa laevigata, Michaux. (*R. Sinica,* Aiton.)

The Cherokee Rose. China and Japan. Considered one of the best Hedge-roses, and for that purpose much employed in North America. It serves also well for bowers. Allied to the foregoing species.

Rosa moschata, Miller.

North Africa and South Asia as far east as Japan. From the flowers of this extremely tall climbing species also essential oil is obtained. The Attar thus derived from Roses of not only different varieties but even distinct species must necessarily be of various quality.

Rosa sempervirens, L.

From South Europe through Southern Asia to Japan. One of the best Rose-bushes for covering walls, fences and similar structures. Also the flowers of this species can be utilized for Rose-oil.

Rosa setigera, Michaux.

North America, where it is the only climbing Rose-bush. It deserves introduction on account of its extremely rapid growth, 10 feet to 20 feet in a season. Its flowers however are nearly inodorous.

Other original species of Roses deserve our attention, Dr. J. Hooker admitting about 30, all from the Northern Hemisphere. But on the snow-clad unascended mountains of Borneo, Sumatra, New Guinea and Africa south of the Equator yet perhaps new Roses may be discovered, as they have been traced south to Abyssinia already.

Rosmarinus officinalis, L.

The Rosmary. Countries around the Mediterranean Sea. This well-known bush is mentioned here as a medicinal

plant, from which a distilled oil is rather copiously obtainable. One of our best plants for large garden edgings. The oil enters into certain compositions of perfumery.

Rubia cordifolia, L. (*R. Mungista,* Roxb.)

From the Indian Highlands through China and Siberia to Japan; also occurring in various parts of Africa, as far south as Caffraria and Natal. This perennial plant produces also a kind of Madder. Probably other species yield likewise Dye-roots. The genus is represented widely over the globe, but as far as known not in Australia.

Rubia tinctorum, L.

The Madder. Countries around the Mediterranean Sea. A perennial herb of extremely easy culture. The roots merely dried and pounded form the dye. The chemical contents are numerous; in the herb: Rubichloric and Rubitannic acid; in the root: Alizarin, Purpurin, Rubiacin, Rubian, Ruberythrin acid, and three distinct resins; also Chlorogenin, Xanthin and Rubichloric acid. On the five first depend the pigments produced from the root. Madder is one of the requisites for Alizarin Ink.

Rubus Canadensis, L.*

The Dewberry of North America. A shrub of trailing habit. Fruit black, of excellent taste, ripening earlier than that of *R. villosus,* Ait., which constitutes the High Blackberry of the United States, with large fruits.

Rubus Chamæmorus, L.

The Cloud-Berry. North Europe, North Asia, North America, particularly in the frigid zone. A perennial but herbaceous plant; a pigmy amongst its congeners. Nevertheless it is recommended for introduction to our spongy mossy alpine moors, on account of its grateful amber-colored or red fruit. All the species can readily be raised from seeds. *R. Arcticus,* L., also with edible fruit, is in the high north usually its companion. Near to us we have a similar little herb, living for a great part of the year in snow, namely *Rubus Gunnianus,* Hook. It occurs on the alpine heights of Tasmania, from whence it might be easily transferred to

our snowy mountains and those of New Zealand. The fruit of R. Gunnianus is red and juicy, but not always well developed.

Rubus cuneifolius, Pursh.

The Sand Blackberry. North America. A dwarf shrub. The fruit is of agreeable taste.

Rubus deliciosus, Torrey.

On the sources of the Missouri. An erect shrub. Fruit Raspberry-like, large and grateful.

Rubus fruticosus, L.*

The ordinary Blackberry or Bramble. All Europe, North Africa, Middle and Northern Asia. This shrub bears well in our clime. In some countries it is a favorite plant for hedges. It likes above all calcareous soil, though it is content with almost any, and deserves to be naturalized on the rivulets of our ranges. *R. corylifolius*, Sm., *R. suberectus*, Andr. and *R. leucostachys*, Sm., are varieties like many other named kinds of European Blackberries, or perhaps belong to the closely allied *R. caesius*, L., the English Dewberry; or in some instances hybrid forms may have arisen from the two, although the generality of these various Blackberry-bushes bear their fruits freely enough.

Rubus Idaeus, L.*

The ordinary Raspberry. Europe, Northern and West Asia. It is mentioned here, to point out the desirability of naturalizing the plant in our mountains and on river-banks. It would live also on our highest alps, where the native Raspberry (*R. parvifolius*, L.) produces much finer fruits than in our lowlands. The fruits contain Stereopten.

Rubus macropetalus, Douglas.*

California and Oregon. An unisexual shrub. Fruit black, oval-cylindric, particularly sweet.

Rubus occidentalis, L.*

The Black Raspberry or Thimbleberry. North America. A species with woody stems and nice fruits, with a glaucous bloom, well flavored and large. It ripens early.

Rubus odoratus, L.*

North America. A kind of Raspberry. A handsome species on account of its large purple flowers. Berry edible. Culture would doubtless enhance the value of the fruits of many of these Rubi. Hybridising might be tried.

Rubus strigosus, Michaux.

North America. Closely allied to the European Raspberry. Its fruits large, also of excellent taste. It would lead too far to enumerate other kinds of Rubus, although about a hundred genuine species occur, which render the genus one of very wide dispersion over the globe.

Rubus trivialis, Michaux.*

Southern States of North America. Another shrubby species with good edible fruits, which are large and black. The plant will thrive in dry sandy soil.

Rumex Acetosa, L.

The Kitchen Sorrel. Europe, Middle and North Asia to Japan, also in the frigid zone of North America. A perennial herb. The tender varieties, particularly the Spanish one, serve as pleasant aciduous vegetables, but must be used in moderation, as their acidity like that of the species of Oxalis (Wood-sorrel) depends on Binoxylate of potash.

Rumex scutatus, L.

The French Sorrel. Middle and South Europe, North Africa, Orient. Also perennial, and superior to the foregoing as a culinary plant. Both and the following are of use against scurvy and most easily reared.

Rumex vesicarius, L.

South Europe, Middle Asia, North Africa. An annual berb of similar utility as the two former ones.

Ruta graveolens, L.

The Rue. Mediterranean countries and the Orient. The foliage of this acrid and odorous shrub, simply dried, constitutes the Rue-herb of medicine. The allied *R. silvestris*, Mill., is still more powerful in its effect. These plants and others of the genus contain a peculiar volatile oil and a Glycosid (Rutin).

Sabal Adansoni, Guernsent.

Dwarf Palmetto. South Carolina, Georgia and Florida. A stemless Fan-Palm, with the two following and Chamaerops Hystrix attaining the most northerly positions of any American palms.

Sabal Palmetto, Roem. and Schult.*

Extends from Florida to North Carolina. The stem attains a height of 40 feet. This noble Palm ought to grow on our sandy coast-tracts, as in such it delights to live.

Sabal serrulata, R. and S.

South Carolina, Georgia and Florida. The stem grows to 8 feet high. The leaves can be used for cabbage-tree hats and other purposes, for which palm-leaves are sought.

Saccharum officinarum, L.

The Sugar-Cane. India, China, South Sea Islands, not indigenons in any part of America or Australia. Sugar-cane having been cultivated in Spain and other countries on the Mediterranean Sea, it will be worthy of further trial, whether in the warmest parts of our Colony under similar climatic conditions sugar from cane can be produced to advantage. Though the plant will live unprotected in the vicinity of Melbourne, it thrives there not sufficiently for remunerative culture. But it may be otherwise in East Gipps Land or along the Murray River and its lower tributaries. In the United States the profitable culture of cane ceases at 32° N.L., in China it extends only to the 30° N.L. In the last-mentioned country the culture of Sugar-cane dates from the remotest antiquity; moreover we have from thence a particular kind (*S. Sinense*, Roxb.), which is hardier and bears drought better than the ordinary cane; this kind needs renewal only every second or third year, and ripens in seven months if planted early in spring, but if planted in autumn and left standing for fully a year the return of sugar is larger. Moderate vicinity to the sea is favorable for the growth of canes.

The multiplication of all sorts of Sugar-cane is usually effected from top cuttings, but this cannot be carried on from the

same original stock for an indefinite period without deterioration; and as seeds hardly ever ripen on the canes, new plants must from time to time be brought from the distance. Thus New Caledonia has latterly supplied its wild-growing splendid varieties for replanting many sugar-fields in Mauritius. The Bourbon variety is praised as one of the richest for sugar: the Batavian variety (*S. violaceum*, Tussac) is content with less fertile soil. Many other varieties are known. Excessive rains produce a rank luxuriance of the canes on expense of the saccharine principle. Rich manuring is necessary to attain good crops, unless in the best of virgin soil. The lower leaves of the stem must successively be removed, also superabundant suckers, to promote the growth upwards, and to provide ventilation and light. Out of the remnants of Sugar-cane Molasses, Rum and Taffia can be prepared. The average yield of Sugar varies from 1 ton 6 cwt. to 3 tons for the acre. For fuller information the valuable local work of Mr. A. McKay, "The Sugar-cane in Australia," should be consulted. The stately *S. spontaneum*, L., which extends from India to Egypt, is available for scenic culture. It attains a height of 15 feet. Other tall kinds of Saccharum occur in South Asia.

Sagittaria lancifolia, L.

From Virginia to the Antilles. This very handsome aquatic plant can doubless be utilized like the following species. It attains a height of 5 feet.

Sagittaria obtusa, Muehlenberg. (*S. latifolia*, Willd.)

North America, where it replaces the closely allied S. sagittifolia. A few other conspicuous species are worthy of introduction.

Sagittaria sagittifolia, L.

Europe, North and Middle Asia, east to Japan. One of the most showy of all hardy water-plants; still not alone on that account deserving naturalization, but also because its root is edible. If once established this plant maintains its ground well, and might occupy spots neither arable nor otherwise utilized.

Salix nigra, Marshall. (*S. Purshiana*, Sprengel.)

The Black Willow of North America. It attains a height of 25 feet. This species was not included in the list of trees, published by the Acclimatisation Society in its last year's report. The Black Willow is one used for basket-work, although it is surpassed in excellence by some other species, and is more important as a timber-willow. Mr. W. Scaling, of Basford, includes it among the sorts, which he recommends in his valuable publication "The Willow" (London, 1871). From his treatise, resting on unrivalled experience, it will be observed, that he anew urges the adoption of the Bitter Willow (also called the Rose-Willow or the Whipcord-Willow), *S. purpurea*, L., for game-proof hedges, this species scarcely ever being touched by cattle, rabbits and other herbivorous animals. Not only for this reason, but also for its very rapid growth and remunerative yield of the very best of Basket material he recommends it for field hedges. Cuttings are planted only half-a-foot apart, and must be entirely pushed into the ground. The annual produce from such a hedge is worth 4s. to 5s. for the chain. For additional strength the shoots can be interwoven. In rich bottoms they will grow from 7 feet to 13 feet in a year. The supply of basket material from this species has fallen very far short of the demand in England. The plant grows vigorously on light soil or warp land, but not on clay. *S. rubra*, Huds., is also admirably adapted for hedges. The real Osier, *S. viminalis*, L., is distinguished by basketmakers as the soft-wooded Willow, and is the best for rods requiring two years' age, and also the most eligible for hoops, but inferior to several other species for basket manufacture. *S. triandra*, L., is a prominent representative of the hard-wooded Basket Willows, and comprises some of the finest varieties in use of the manufacturers. A crop in the third year after planting from an acre weighs about 12 tons, worth £3 for the ton. *S. fragilis*, L., and *S. alba*, L., are more important as timber-willows, and for growing hoop-shoots. Their rapidity of growth recommends them also for shelter plantations, to which advantage may be added their inflammability and their easy propagation; the latter

quality they share with most Willows. Mr. Scaling's renewed advocacy for the formation of Willow-plantations comes with so much force, that his advice is here given though condensed in a few words. Osier-plantations come into full bearing already in the third year; they bear for ten years and then slowly decline. The raw-produce from an acre in a year averages 6 tons to 7½ tons, ranging in price from £2 10s. to £3 10s. for the ton (unpeeled). Although 7000 acres are devoted in Britain to the culture of Basket Willows (exclusive of spinneys and plantations for the farmers' own use), yet in 1866 there had to be imported from the Continent 4400 tons of Willow-branches, at a value of £44,000, while besides the value of the made baskets imported in that year was equal to the above sum. Land comparatively valueless for root or grain crop can be used very remuneratively for Osier-plantations. The soft-wooded Willows like to grow in damper ground, than the hard-wooded species. The best peeled Willow-branches fetch as much as £25 for the ton. Peeling is best effected by steam, by which means the material is also increased in durability. No Basket Willow will thrive in stagnant water. Osier-plantations in humid places should therefore be drained. The cuttings are best taken from branches one or two years old, and are to be planted as close as 1 foot by 1½ foot. No part of the cutting must remain uncovered, in order that only straight shoots may be obtained; manuring and ploughing between the rows is thus also facilitated, after the crop has been gathered, and this, according to the approved Belgian method, must be done by cutting the shoots close to the ground after the fall of the leaves.

Salvia officinalis, L.

The Garden Sage. Countries at the Mediterranean Sea. A somewhat shrubby plant of medicinal value, pervaded by essential oil. Among nearly half a thousand species of this genus some are gorgeously ornamental.

Sambucus nigra, L.

The ordinary Elder. Europe, North Africa, Middle Asia. The flowers are of medicinal value, and an essential oil can

be obtained from them. The wood can be utilized for shoe-pegs and other purposes of artisans. The berries are used for coloring of port wine and for other purposes of dye.

Santalum cygnorum, Miquel.

South-western Australia, where this tree yields scented Sandal-wood.

Santalum Preissianum, Miq. (*S. acuminatum,* A. de Cand.)

The Quandang. Desert-country of extra-tropical Australia. The fruits of this small tree are called Native Peaches. As both the succulent outer part and kernel are edible, it is advisable to raise the plant in desert-tracts, where the species does not occur, since moreover it becomes gradually sacrificed on many native places by pasture operations.

Santalum Yasi, Seemann.

The Sandal-tree of the Feegee Islands, where it grows on dry and rocky hills. It is likely to prove hardy here, and deserves with a few other species from the South Sea Islands, yielding scented wood, test-culture in the warmest parts of our Colony.

Saponaria officinalis, L.

The Soapwort or Fuller's Herb. Europe, North and Middle Asia. A perennial herb of some technologic interest, as the root can be employed with advantage in some final processes of washing silk and wool, to which it imparts a peculiar gloss and dazzling whiteness, without injuring in the least the most sensitive colors. Experiments, instituted in the laboratory of the Botanic Garden of Melbourne, render it highly probable, that Saponin, which produces the froth from the soapwort, is also present in the bark of *Acacia* (*Albizzia*) *lophantha,* W. At all events a substance, closely resembling Saponin, was unexpectedly detected (in the course of other investigations entrusted to Mr. Rummel) in the bark of this Acacia, and this substance occurred in so large a proportion as to constitute 10 per cent. of the dry bark.

Satureja hortensis, L.

The Summer Savory. Countries around the Mediterranean Sea. An annual scent herb, from which an essential aromatic

oil can be distilled. The culture of this and allied plants is easy in the extreme.

Satureja montana, L.

The Winter Savory. On arid hilly places at and near the Mediterranean Sea. A perennial somewhat shrubby herb, frequently used as a culinary condiment along with or in place of the foregoing species, although it is scarcely equal to it in fragrance.

Satureja Thymbra, L.

Countries at or near the Mediterranean Sea. A small evergreen bush, with the flavor almost of Thyme. The likewise odorous *S. Graeca*, L., and *S. Juliana*, L., have been transferred by Bentham to the closely cognate genus Micromeria; they are in use since Dioscorides' time, though not representing, as long supposed, the Hyssop of that ancient physician.

Saussurea Lappa, Bentham. (*Haplotaxis Lappa*, De Caisne.)

Cashmere. The aromatic root of this perennial species is of medicinal value, and by some considered to be the Costus of the ancients.

Schizostachyum Blumei, Nees.

Java. A lofty Bamboo. A few other species, less elevated, occur in China, the South Sea and Philippine Islands and Madagascar. The genus might well be united with Melocanna. The Bamboos being brought once more thus before us, it may be deemed advisable, to place together into one brief list all those kinds, which are recorded either as very tall or as particularly hardy. Accordingly, from Major-General Munro's admirable monography ("Linnean Transact.," 1858,) the succeeding enumeration is compiled, and from that masterly essay, resting on very many years' close study of the richest collections, a few prefatory remarks are likewise offered, to vindicate the wish of the writer of seeing these noble and graceful forms of vegetation largely transferred to every part of Australia, where they would impress a grand tropical feature on the landscapes. Even in our far southern latitudes Bamboos from the Indian

lowlands have proved to resist our occasional night frosts of the low country. But in colder places the many sub-alpine species could be reared. Be it remembered that Chusque aristata advances to an elevation of 15,000 feet on the Andes of Quito, indeed to near the zone of perpetual ice. Arundinaria falcata, A. racemosa and A. spathiflora live on the Indian highlands, at a zone between 10,000 feet and 11,000 feet, where they are annually beaten down by snow. We may further recognize the great importance of these plants, when we reflect on their manifest industrial uses, or when we consider their grandeur for picturesque scenery, or when we observe their resistance to storms of heat, or when we watch the marvellous rapidity, in which many develope themselves. Their seeds, though generally only in long intervals produced, are valued in many instances higher than rice. The ordinary great Bamboo of India is known to grow 40 feet in 40 days, when bathed in the moist heat of the jungles. The Bourbon Bamboo forms an impenetrable sub-alpine belt of extraordinary magnificence in yonder island. One of the Tesserim Bambusas rises to 150 feet, with a diameter of the mast-like cane sometimes measuring fully 1 foot. The great West Indian Arthrostylidium is sometimes nearly as high and quite as columnar in its form, while the Dendrocalamus at Pulo Geum is equally colossal. The Platonia Bamboo of the highest wooded mountains of Parama sends forth leaves 15 feet in length and 1 foot in width. Arundinaria macrosperma as far north as Philadelphia rises still in favorable spots to a height of nearly 40 feet. Through perforating with artistic care the huge canes of various Bamboos musical sounds can be melodiously produced, when the air wafts through the groves, and this singular fact may possibly be turned to practice for checking the devastations from birds on many a cultured spot. Altogether 20 genera with 170 well-marked species are circumscribed by General Munro's consummate care; but how may these treasures yet be enriched, when once the snowy mountains of New Guinea through Bamboo jungles become ascended, or when the alps on the sources of the Nile, which Ptolemæus and Julius Cæsar already longed to

ascend, have become the territory also of phytologic researches, not to speak of many other tropical regions as yet left unexplored. Europe possesses no Bamboo; Australia as far as hitherto ascertained only one (in the interior of Arnhem's Land). Almost all Bamboos are local, and there seems really no exception to the fact, that none are indigenous to both hemispheres, all true Bambusas being Oriental.

The introduction of these exquisite plants is one of the easiest imaginable, either from seeds or the living roots. The Consuls at distant ports, the missionaries, the mercantile and navigating gentlemen abroad and so particularly also any travellers could all easily aid in transferring the various Bamboos from one country to the other—from hemisphere to hemisphere. Most plants of this kind here with us, once well established in strength under glass, can be trusted out to permanent locations with perfect and lasting safety, at the commencement of the warm season. Indeed Bamboos are hardier than most intra-tropical plants, and the majority of them are not the denizens of the hottest tropical lowlands, but delight in the cooler air of mountain regions. In selecting the following array from General Munro's monography it must be noted, that it comprises only a limited number, and that among those, which are already to some extent known, but as yet cannot be defined with precision in their generic and specific relation, evidently some occur, which in elegance, grace and utility surpass even many of of those now specially mentioned:—

Arundinaria Japonica, S. and Z. Japan. Height to 12 feet.
Arundinaria macrosperma, Mich. North America. Height to 35 feet.
Arundinaria verticillata, Nees. Brazil. Height to 15 feet.
Arundinaria debilis, Thwaites. Ceylon; ascends to 8000 feet. A tall species.
Arundinaria acuminata, Munro. Mexico. Height to 20 feet.
Arundinaria falcata, Nees. Himalaia; ascends to 10000 feet. Height to 20 feet.

Arundinaria tesselata, Munro. South Africa; ascends to 6500 feet. Height to 20 feet.

Arundinaria callosa, Munro. Himalaia; ascends to 6000 feet. Height to 12 feet.

Arundinaria Khasiana, Munro. Himalaia; ascends to 6000 feet. Height to 12 feet.

Arundinaria Hookeriana, Munro. Sikkim; ascends to 7000 feet. Height to 15 feet.

Arundinaria suberecta, Munro. Himalaia; ascends to 4500 feet. Height to 15 feet.

Thamnocalamus Falconeri, J. Hook. Himalaia; ascends to 8000 feet. Tall.

Thamnocalamus spathiflorus, Munro. Himalaia; ascends to 10000 feet. Tall.

Phyllostachys bambusoides, S. and Z. Himalaia, China, Japan. Height to 12 feet.

Phyllostachys nigra, Munro. China, Japan. Height to 25 feet.

Arthrostylidium longiflorum, Munro. Venezuela; ascends to 6000 feet.

Arthrostylidium Schomburgkii, Munro. Guiana; ascends to 6000 feet. Height to 60 feet.

Arthrostylidium excelsum, Griseb. West India. Height to 80 feet; diameter 1 foot.

Arthrostylidium racemiflorum, Steudel. Mexico; ascends to 7500 feet. Height to 30 feet.

Aulonemia Quexo, Goudot. New Granada, Venezuela, in cool regions. Tall, climbing.

Merostachys ternata, Nees. South Brazil. Height to 20 feet.

Merostachys Clausseni, Munro. South Brazil. Height to 80 feet.

Merostachys Kunthii, Ruprecht. South Brazil. Height to 30 feet.

Chusquea simpliciflora, Munro. Panama. Height to 80 feet. Scandent.

Chusquea abietifolia, Grisebach. West India. Tall, scandent.

Chusquea Culcou, E. Desv. Chili. Height to 20 feet. Straight.

Chusquea uniflora, Steudel. Central America. Height to 20 feet.

Chusquea Galleottiana, Ruprecht. Mexico; ascends to 8000 feet.

Chusquea montana, Philippi. Chili Andes. Height to 10 feet.

Chusquea Dombeyana, Kunth. Peru; ascends to 6000 feet. Height to 10 feet.

Chusquea Fendleri, Munro. Central America; ascends to 12000 feet.

Chusquea scandens, Kunth. Colder Central America. Climbing, tall.

Chusquea Quila, Kunth. Chili. Tall.

Chusquea tenuiflora, Philippi. Chili. Height to 12 feet.

Chusquea Gaudichaudiana, Kunth. South Brazil. Very tall.

Chusquea capituliflora, Trinius. South Brazil. Very tall.

Platonia nobilis, Munro. New Granada, colder region.

Nastus Borbonicus, Gmel. Bourbon, Sumatra; ascends to 4000 feet. Height to 50 feet.

Guadua Tagoara, Kunth. South Brazil; ascends to 2000 feet. Height to 30 feet.

Guadua latifolia, Kunth. Central America. Height to 24 feet.

Guadua macrostachya, Rupr. Guiana to Brazil. Height to 30 feet.

Guadua capitata, Munro. South Brazil. Height to 20 feet.

Guadua angustifolia, Kunth. Andes of South America. Height to 40 feet.

Guadua virgata, Rupr. South Brazil. Height to 25 feet.

Guadua refracta, Munro. Brazil. Height to 30 feet.

Guadua paniculata, Munro. Brazil. Height to 30 feet.

Bambusa Tulda, Roxb. Bengal to Burmah. Height to 70 feet.

Bambusa nutans, Wall. Himalaia; ascends to 7000 feet.

Bambusa tuldoides, Munro. China, Hong Kong, Formosa.

Bambusa pallida, Munro. Bengal to Khasia; ascends to 3500 feet. Height to 50 feet.

Bambusa polymorpha, Munro. Burmah, in the Teak region. Height to 80 feet.

Bambusa Balcooa, Roxb. Bengal to Assam. Height to 70 feet.

Bambusa flexuosa, Munro. China. Height to 12 feet.

Bambusa Blumeana, Schultes. Java. Tall.

Bambusa arundinacea, Roxb. Southern India. Height to 50 feet.

Bambusa spinosa, Roxb. Bengal to Burmah. Height to 100 feet.

Bambusa vulgaris, Wendl. (*B. Thouarsi*, K.) Ceylon and other parts of India. Height to 50 feet.

Bambusa Beecheyana, Munro. China. Height to 20 feet.

Bambusa marginata, Munro. Tenasserim; ascends to 5000 feet. Tall, scandent.

Bambusa regia, Th. Thomson. Tenasserim. Height to 40 feet.

Bambusa Brandisii, Munro. Tenasserim; ascends to 4000 feet. Height to 120 feet, circumference 2 feet.

Gigantochloa maxima, Kurz. (*Bambusa verticillata*, Willd.) Java. Height to 100 feet

Gigantochloa atter, Kurz. Java. Height to 40 feet.

Gigantochloa heterostachya, Munro. Malacca. Height to 30 feet.

Oxytenanthera Abyssinica, Munro. Abyssinia to Angola; ascends to 4000 feet. Height to 50 feet.

Oxytenanthera nigro-ciliata, Munro. Continental and insular India. Height to 40 feet.

Oxytenanthera albo-ciliata, Munro. Pegu, Moulmein. Tall, scandent.

Oxytenanthera Thwaitesii, Munro. (*Dendrocalamus monadelphus*, Thwait.) Ceylon; ascends to 5000 feet. Height to 12 feet.

Melocanna bambusoides, Trin. Chittagong, Sylhet. Height to 70 feet.

Schizostachyum Blumei, Nees. Java. Very tall.

Cephalostachyum capitatum, Munro. Himalaia; ascends to 6000 feet. Height to 30 feet.

Cephalostachyum pallidum, Munro. Himalaia; ascends to 5000 feet. Tall.

Cephalostachyum pergracile, Munro. Burmah. Height to 40 feet.

Pseudostachyum polymorphum, Munro. Himalaia; ascends to 6000 feet. Very tall.

Teinostachyum attenuatum, Munro. (*Bambusa attenuata*, Thw.) Ceylon; ascends to 6000 feet. Height to 25 feet.

Teinostachyum Griffithi, Munro. Burmah. Tall and slender.

Beesha Travancorica, Beddome. Madras. Tall.

Beesha Rheedei, Kunth. Southern India, Cochin-China. Height to 20 feet.

Beesha stridula, Munro. Ceylon.

Beesha capitata, Munro. Madagascar. Height to 50 feet.

Dendrocalamus strictus, Nees. India to Japan. Height to 100 feet.

Dendrocalamus sericeus, Munro. Behar; ascends to 4000 feet. Tall.

Dendrocalamus flagellifer, Munro. Malacca. Very tall.

Dendrocalamus giganteus, Munro. Burmah, Penang. Exceedingly tall. Circumference 2 feet.

Dendrocalamus Hookeri, Munro. Himalaia; ascends to 6000 feet. Height to 50 feet.

Dendrocalamus Hamiltoni, Nees. Himalaia; ascends to 6000 feet. Height to 60 feet.

Dinochloa Tjankorreh, Buehse. Java, Philippines; ascends to 4000 feet. Climbing.

Scilla esculenta, Ker. · (*Camassia esculenta*, Lindl.)

The Quamash. In the Western extra-tropic parts of North America, on moist prairies. The onion-like bulbs in a roasted state form a considerable portion of the vegetable food, on which the aboriginal tribes of that part of the globe are living. It is a pretty plant, and might be naturalized here on our moist meadows.

Schoenocaulon officinale, A. Gray.

(*Asa-Graya officinalis*, Lindl.)

(*Sabadilla officinalis*, Brandt and Dierbach.)

Mountains of Mexico. A bulbous-rooted herb with leafless stem, thus far specially distinct from any Veratrum. It furnishes the Sabadilla-seeds and yields two alkaloids: Veratrin and Sabadillin; a resinous substance: Helonin; also Sabadillic and Veratric acid. The generic names adopted for this plant by Lindley and by Dierbach are coetaneous.

Scorzonera deliciosa, Gusson.*

Sicily. One of the purple-flowered species, equal if not superior in its culinary use to the allied Salsify.

Scorzonera Hispanica, L.*

Middle and South Europe, Orient. The perennial root of this yellow-flowered herb furnishes not only a wholesome and palatable food, but also serves as a therapeutic remedy much like Dandelion. Long boiling destroys its medicinal value. Some other kinds of Scorzonera may perhaps be drawn into similar use, there being many Asiatic species.

Scorzonera tuberosa, Pallas.

At the Wolga and in Syria. Also this species yields an edible root, and so perhaps the Chinese *S. albicaulis*, Bunge, the Persian *Sc. Scowitzii*, Cand., the North African *Sc. undulata*, Vahl., the Greek *Sc. ramosa*, Sibth., the Russian *Sc. Astrachanica*, Cand., the Turkish *Sc. semicana*, Cand., the Iberian *Sc. lanata*, Bieberst. At all events careful culture may render them valuable esculents.

Sebæa ovata, R. Brown.

Extra-tropic Australia and New Zealand. This neat little annual herb can be utilized for its bitter tonic principle (Gentian-bitter). *S. albidiflora*, F. v. M., is an allied species from somewhat saline ground. These plants disseminate themselves most readily.

Secale cereale, L.*

The Rye. Orient, but perhaps wild only in the country between the Caspian and Black Seas. Mentioned here as the hardiest of all grain-plants for our highest alpine regions. There are annual and biennial varieties, while a few allied species, hitherto not generally used for fodder or cereal culture, are perennial. The Rye, though not so nutritious as wheat, furnishes a most wholesome well-flavored bread, which keeps for many days, and is most extensively used in Middle and North Europe and Asia. This grain moreover can be reared in poor soil and cold climates, where Wheat will no longer thrive. In produce of grain Rye is not inferior to Wheat in colder countries, while the yield of straw is larger, and the culture less exhaustive. It is a hardy cereal, not readily subject to disease, and can be grown on some kinds of peaty or sandy or moory ground. The sowing

must not be effected at a period of much wetness. Wide sand tracts would be uninhabitable, if it was not for the facility to provide human sustenance from this grateful corn. It dislikes moist ground. Sandy soil gives the best grain. It is a very remarkable fact, that since ages in some tracts of Europe Rye has been prolifically cultivated from year to year without interruption. In this respect Rye stands favorably alone among alimentary plants. It furnishes in cold countries also the earliest green-fodder, and the return is large. When the Rye-grain becomes attacked by *Cordyceps purpurea*, Fr., or very similar species of fungi, then it becomes dangerously unwholesome, but then also a very important medicinal substance, namely Ergot, is obtained. The biennial Wallachian variety of Rye can be mown or depastured prior to the season of its forming grain. In alpine regions Wallachian Rye is sown with Pine-seeds, for shelter of the Pine seedlings in the first year.

Sechium edule, Swartz.

West India. The Chocho or Chayota. The large root of this climber can be consumed as a culinary vegetable, while the good-sized fruits are also edible. The plant comes in climates like ours to perfection.

Selinum anesorrhizum, F. v. M.

(*Anesorrhiza Capensis*, Ch. and Schl.)

South Africa. The root of this biennial herb is edible. *A. montana*, Eckl. and Zeyh., a closely allied plant, yields likewise an edible root, and so it is with a few other species of the section Anesorrhiza.

Sesamum Indicum, L.

The Gingili. Southern Asia, extending eastwards to Japan. This annual herb is cultivated as far as 42° N.L. The oil, fresh expressed from the seeds, is available for table use. One of the advantages of the culture of this plant consists in its quick return of produce. The soot of the oil is used for China-ink.

Sesbania aculeata, Persoon.

The Danchi. Intra-tropical and sub-tropical Asia, Africa and Australia. This tall annual plant has proved adapted for our desert-regions. It yields a tough fibre for ropes, nets and cordage, valued at from £30 to £40 for the ton Several congeneric plants can be equally well utilized.

Shepherdia argentea, Nuttall.

The Buffalo Berry. From the Missouri to Hudson's Bay. This bush bears red acidulous edible berries.

Sison Amomum, L.

Middle and South Europe. A herb of one or two years' duration. It grows best on soil rich in lime. The seeds can be used for condiment.

Smilax officinalis, Humboldt.

New Granada and other parts of Central America. This climbing shrub produces at least a portion of the Columbian Sarsaparilla.

Smilax medica, Cham. and Schl.

Mexico. This plant produces mainly the Sarsaparilla root of that country.

Smilax papyracea, Duhamel.

Guyana to Brazil. The origin of the principal supply of Brazilian Sarsaparilla is ascribed to this species, although several others of this genus, largely represented in Brazil, may yield the medicinal root also. In our fern-tree gullies these plants would likely succeed in establishing themselves. *Smilax australis*, R. Br., extends from the tropical coast-parts of Australia to East Gipps Land. Neither this, nor the East Australian *S. glycyphylla*, Smith, nor the New Zealand *Ripogonum scandens*, Forst., have ever been subjected to accurate therapeutic tests, and the same may be said of numerous other Smilaces, scattered through the warmer countries of the globe. The Italian Sarsaparilla, which is derived from the Mediterranean *S. aspera*, L., has been introduced into medicine.

Smyrnium Olusatrum, L.

The Alisander. Middle and South Europe, North Africa, Western Asia. A biennial herb, which raw or boiled can be utilized in the manner of Celery. The roots and the fruitlets serve medicinal purposes.

Solanum Aethiopicum, L.

Tropical Africa. Cultivated there and elsewhere on account of its edible berries, which are large, red, globular and uneven. The plant is annual.

Solanum Dulcamara, L.

Middle and South Europe, North Africa, Middle Asia. A trailing half-shrub, with deciduous leaves. The stems are used in medicine, and contain two alkaloids: Dulcamarin and Solanin.

Solanum edule, Schum. and Thonn.

Guinea. The berry is of the size of an apple, yellow and edible.

Solanum indigoferum, St. Hilaire.

Southern Brazil. A dye-shrub, deserving here trial-culture.

Solanum Gilo, Raddi.

Tropical America; much cultivated there for the sake of its large spherical orange-colored berries, which are eatable.

Solanum Lycopersicum, L (*Lycopersicum esculentum,* Mill.)

The Tomato. South America. Annual. Several varieties exist, differing in shape and color of the berries. It is one of the most eligible plants with esculent fruits for naturalization in our desert-country. As well known the Tomato is adapted for various culinary purposes.

Solanum Melongena, L.

(*S. ovigerum,* Dunal. *S. esculentum,* Dunal.)

The Egg-plant. India and some other parts of tropical Asia. A perennial plant, usually renewed in cultivation like an annual. The egg-shaped large berries are known under the name of Aubergines or Bringals or Begoons as culinary esculents. Allied plants are; *S. insanum,* L., *S.*

S. longum, Roxb., *S. serpentinum*, Desf., *S. undatum*, Lam., *S. ferox*, L., *S. pseudo-saponaceum*, Blume, *S. album*, Lour., which bear all large berries, considered harmless, but may not all represent well-marked species. Absolute ripeness of all such kinds of fruits is an unavoidable requisite, as otherwise even wholesome sorts may prove acrid or even poisonous. Probably many other of the exceedingly numerous species of the genus Solanum may be available for good-sized edible berries.

Solanum macrocarpum, L.

Mauritius and Madagascar. A perennial herb. The berries are of the size of an apple, globular and yellow. *S. Thonningi*, F. Jacq., from Guinea, is a nearly related plant. *S. calycinum*, Moc. et Sess., from Mexico, is also allied.

Solanum muricatum, l'Herit.

The Pepino of Peru. A shrubby species with egg-shaped edible berries, which are white with purple spots, and attain a length of 6 inches.

Solanum Quitoense, La Marck.

Ecuador, Peru. A shrubby plant. The berries resemble in size, color and taste small oranges, and are of a peculiar fragrance. To this the *S. Plumierii*, Dun., from the West Indian Islands is also cognate and the *S. Topiro*, Kunth, from the Orinoco.

Solanum tuberosum, L.*

The Potato. Andes of South America, particularly of Chili, but not absolutely trans-equatorial, as it extends into Columbia. It is also wild in the Argentine territory. As a starch-plant, the Potato interests us on this occasion particularly. Considering its prolific yield in our richer soil, we possess as yet too few factories for Potato-starch. The latter by being heated with mineral acids or malt can be converted into Dextrin and Dextro-Glucose for many purposes of the arts. Dextrin, as a substitute for gum, is also obtainable by subjecting Potato-starch in a dry state to a heat of 400° F. Alcohol may be largely produced from the tubers. The berries and shoots contain Solanin.

Solanum torvum, Swartz.

From West India to Peru. A shrubby species with yellow spherical berries of good size, which seem also wholesome. Other species from tropical America have shown themselves sufficiently hardy for inducing us to recommend the test-culture of such kinds of plants. Many of them are highly curious and ornamental.

Solanum Uporo, Dunal.

In many of the islands of the Pacific Ocean. The large red spherical berries of this shrub can be used like Tomato.

Solanum vescum, F. v. Mueller.

The Gunyang. South-east Australia. A shrub yielding edible berries, which need however to be fully ripe for securing absence of deleterious properties.

Solanum xanthocarpum, Schrad. and Wendl.

North Africa and South Asia. A perennial herb. The berries are of the size of a cherry, and either yellow or scarlet.

Sophora Japonica, L.

China and Japan. A deciduous tree. The flowers produce a yellow or with admixtures a green dye, used for silk.

Spartina juncea, Willd.

Salt marshes of North America. A grass with creeping roots; it can be utilized to bind moist sand on the coast. A tough fibre can readily be obtained from the leaves. *S. polystachya,* W. and *S. cynosuroides,* W. are stately grasses, the former also adapted for saline soil, the latter for fresh-water swamps.

Spartium junceum, L.

Countries around the Mediterranean Sea. The flowers of this bush provide a yellow dye. A textile fibre can be separated from the branches.

Spigelia Marylandica, L.

North America, north to Pennsylvania and Wisconsin. A perennial handsome herb, requiring as a vermifuge cautious

administration *S. anthelmia*, L. is an annual plant of tropical America and possesses similar medicinal properties, in which probably other species likewise share.

Spilanthes oleracea, N. Jacq.

The Para Cress. South America. An annual herb of considerable pungency, used as a medicinal salad.

Spinacia oleracea, L.

Sibiria. The ordinary Spinage. An agreeable culinary annual of rapid growth. It is of a mild aperient property.

Spinacia tetrandra, Stev.

Caucasus. Also annual and unisexual like the preceding plant, with which it has equal value, though it is less known.

Stenotaphrum glabrum, Trin.*

South Asia, Africa, warmer countries of America, not known from any part of Europe or Australia. Here called the Buffalo-Grass. It is perennial, creeping and admirably adapted for binding sea-sand and river-banks, also for forming garden edges, and for establishing a grass-sward on lawns much subjected to traffic; it is besides of some pastoral value.

Stilbocarpa polaris, De Caisne and Planchon.

Auckland's and Campbell's Islands, and seemingly also in the southern extremity of New Zealand. A herbaceous plant with long roots, which are saccharine and served some wrecked people for a lengthened period as sustenance. The plant is recommended here for further attention, as it may prove through culture a valuable addition to the stock of culinary vegetables of cold countries.

Stipa tenacissima, L.* (*Macrochloa tenacisima*, Kunth.)

The Esparto or Atocha. Spain, Portugal, Greece, North Africa, ascending the Sierra Nevada to 4000 feet. This grass has become celebrated since some years, having afforded already a vast quantity of material for British paper-mills. It is tall and perennial, amd may prove here a valuable acquisition, inasmuch as it lives on any kind of poor soil, occurring naturally on sand and gravel as well as on

clayey or calcareous or gypseous soil, and even on the very brink of the coast. But possibly the value of grasses of our own, allied to the Atocha, may in a like manner become commercially established, and mainly with this view paper samples of several grass-kinds were prepared by the writer (*vide* "Report, Industrial Exhibition, Melbourne, 1867"). Even in the scorching heat and the arid sands of the Sahara the Atocha maintains itself, and it may thus yet be destined to play an important part in the introduced vegetation of any arid places of our desert-tracts, particularly where lime and gypsum exist. The very tenacious fibre resists decay, and is much employed for the manufacture of ropes. During 1870 the import of Esparto ropes into England was 18,500 tons, while the raw material to the extent of about 130,000 tons was imported. Extensive culture of this grass has commenced in the south of France. It is pulled once a year, in the earlier part of the summer. The propagation can be effected from seeds, but is done usually by division of the root. Ten tons of dry Esparto, worth from £4 to £5 each, can under favorable circumstances be obtained from an acre. The supply has fallen short of the demand. Good writing paper is made from Esparto without admixture; the process is similar to that for rags, but cleaner. The price of Esparto-paper ranges from £40 to £50 for the ton. *Stipa arenaria*, Brot., is a closely allied and still taller species, confined to Spain and Portugal. Consul W. P. Mark deserves great praise for having brought the Atocha into commercial and manufactural recognition.

Styrax officinale, L.

Countries on the Mediterranean Sea. A tall bush or small tree. The fragrant solid Storax-resin exudes from this plant, or is particularly obtained by pressure of the bark.

Symphytum officinale, L.

The Comfrey. Europe, Western Asia. A perennial herb. The root is utilized in veterinary practice. *S. asperrimum*, Sims, from the Caucasus, is recommended by some as a prolific plant for green-fodder.

Tacca pinnatifida, G. Forster.

Sand-shores of the South Sea Islands. From the tubers of this herb the main supply of the Feegee Arrowroot is prepared. It is not unlikely, that this plant will endure our coast clime. The Tacca-starch is much valued in medicine, and particularly used in cases of dysentery and diarrhœa. Its characteristics are readily recognized under the microscope. Several other kinds of Tacca are distinguished, but their specific limits are not yet well ascertained. Dr. Seemann admits two (*T. maculata* and *T Brownii*) for tropical Australia, one of these extending as a hill-plant to Feegee. From the leaves and flower-stalks light kinds of bonnets are plaited. A Tacca, occurring in the Sandwich Islands, yields a large quantity of the so-called Arrowroot exported from thence. Other species (including those of Ataccia) occur in India, Madagascar, Guinea and Guiana, all deserving tests in reference to their value as starch-plants.

Tamarindus Indica, L.

Tropical Asia and Africa. This magnificent large expansive tree extends northwards to Egypt, and was found by the writer of this list in North-western Australia. It is indicated here not without hesitation, to suggest new trials of its acclimation on the lower Murray River and in East Gipps Land. The acid pulp of the pods forms the medicinal Tamarind, rich in formic and butyric acid, irrespective of its other contents.

Tanacetum vulgare, L.

The Tansy. North and Middle Europe, North Asia, North-western America. A perennial herb of well-known medicinal value, which mainly depends on its volatile oil.

Telfairia pedata, Hooker.

Mozambique. A cucurbitaceous climber with perennial stems, attaining a length of 100 feet, with fringed lilac flowers of extraordinary beauty and with fruits attaining a weight of 60 lbs., and containing at times as many as 500 large seeds. The latter in a boiled state are eatable, or a large quantity of oil can be pressed from them. The root is fleshy. Our summers in the Murray-country are likely

to bring this plant regularly into bearing. A second huge species of similar use, *T. occidentalis*, J. Hook., occurs in Guinea.

Terfezia Leonis, Tulasne.

South Europe, North America. This edible truffle, together with other species of this and other genera, is deserving of naturalization in Australia.

Tetragonia implexicoma, J. Hook.

Extra-tropic Australia, New Zealand, Chatham's Island. A frutescent widely expanding plant, forming often large natural festoons, or trailing and climbing over rocks and sand, never away from the coast. As a Spinage-plant it is as valuable as the succeeding species. It is well adapted for the formation of bowers in arid places. *T. trigyna*, Banks and Soland., seems identical.

Tetragonia expansa, Murray.

The New Zealand Spinage, occurring also on many places of the coast and in the desert-interior of Australia. Known also from New Caledonia, China, Japan and Valdivia. An annual herb, useful as a culinary vegetable, also for binding drift-sand.

Teucrium Marum, L.

Countries at the Mediterranean Sea. A small somewhat shrubby plant, in use for the sake of its scent, containing a peculiar Stearopten. *T. Scordium*, L. from Europe and Middle Asia, *T. Chamaedrys*, L., *T. Polium*, L. and *T. Creticum*, L. from South Europe, are occasionally drawn into medical use. All these together with many other species from various countries are pleasantly odorous.

Thea Chinensis, Sims.*

The Tea-shrub of South-eastern Asia. This evergreen and ornamental bush has proved quite hardy in our lowland clime, where in exposed positions it endures without any attention as well our night frosts as also the free access of scorching summer winds. But it is in our humid valleys with rich alluvial soil and access to springs for irrigation, where only the most productive tea-fields can be formed.

The plant comes into plentiful bearing of its product as early as the Vine and earlier than the Olive. Its culture is surrounded with no difficulties, and it is singularly exempt from diseases if planted in proper localities. Pruning is effected in the cool season, in order to obtain a large quantity of small tender leaves from young branches. Both the Chinese and Assam tea are produced by varieties of one single species, the Tea-shrub being indigenous in the forest-country of Assam. Declivities are best adapted and usually chosen for tea-culture, particularly for Congo, Pekoe and Souchong, while Bohea is often grown in flat countries. For many full details Fortune's work, "The Tea-Districts of China," might be consulted.

The tea of commerce consists of the young leaves, heated, curled and sweated. The process of preparing the leaves can be effected by steam machinery; one of particular construction has been suggested recently by Mr. Joachimi according to requirements explained by the writer. In 1866 three machines for dressing tea have been patented in England, one by Messrs. Campbell and Burgess, one by Mr. Thomson and one by Mr. Tayser. To give an idea of the quantity of Tea, which is consumed at the present time, it may be stated, that from June to September, 1871, 11,000,000 lbs. of tea were shipped from China alone to Australia, and that the produce of tea in India from January to June of this year has been 18,500,000 lbs. Seeds of the Tea-bush are now in many parts of this colony locally to be gathered from plants distributed by the writer, and for years to come the cultivation of the Tea-bush, merely to secure local supplies of fresh seeds, ready to germinate, will in all likelihood prove highly lucrative. Tea contains an alkaloid: Coffein, a peculiar essential oil and Bohea-acid along with other substances.

Thrinax parviflora, Swartz.

West India, and also on the continent of Central America. The stem of this Fan-palm attains a height of 25 feet. It belongs to the sand-tracts of the coast and may endure our clime. The fibre of this Palm forms material for ropes.

T. argentea, Lodd., is a closely allied palm. The few other species of the genus deserve also trial-culture here.

Thymelæa tinctoria, Endl. (*Passerina tinctoria*, Pourr.)
Portugal, Spain, South France. A small shrub. It yields a yellow dye. Cursorily it may be noted here, that some of our Pimeleæ contain a blue pigment, which has not yet been fully tested. Their bark produces more or less of Daphnin and of the volatile acrid principle, for which the Bark of *Daphne Mezereum*, L. is used. These are remarkably developed in the Victorian *Pimelea stricta*, Meissn. The bark of many is also pervaded by a tough fibre, that of the tall *Pimelea clavata*, Labill., a West Australian bush, being particularly tenacious.

Thymus capitatus, Hoffm. and Link. (*Satureja capitata*, L.)
Around the whole Mediterranean Sea. Since the times of Hippocrates, Theophrastos and Galenus this small scented shrub has been employed in medicine.

Thymus Mastichina, L.
Spain, Portugal, Morocco. A half-shrub of agreeable scent, used also occasionally in medicine.

Thymus Serpillum, L.
Europe, Western Asia. A perennial herb of some medicinal value. It would live on our highest alps. An essential oil can be obtained from it. One particular variety is lemon-scented.

Thymus vulgaris, L.
The Garden-Thyme. South Europe. This small shrubby plant is available for scent and for condiments. It is also well adapted for forming garden-edges. The essential oil of this plant can be separated into the crystalline Thymol and the liquid Thymen and Cymol. *T. aestivus*, Reut., and *T. hiemalis*, Lange, are closely cognate plants. Several other species with aromatic scent occur at the Mediterranean Sea.

Tragopogon porrifolius, L.
The Salsify. Middle and Southern Europe, Middle Asia. The root of this herb is well known as a useful culinary vegetable.

Trapa bicornis, L. fil.*

The Leng or Ling or Links of China. The nuts of this water-plant are extensively brought to market in that country. The horns of the fruit are blunt. The kernel, like that of the two following species, is of excellent taste. The plant is regularly cultivated in lakes and ponds of China.

Trapa bispinosa, Roxb.*

Middle and South Asia, extending to Ceylon and Japan; found also in Africa as far south as the Zambesi. Here in our culture it lasts through several years. In some countries, for instance in Cashmere, the nuts form an important staple of food to the population. To this species probably belong *T. Cochin-chinensis,* Lour. and *T. incisa,* Sieb. and Zucc.

Trapa natans, L.*

The ordinary Waternut. Middle and South Europe, Middle Asia, North and Central Africa. Recorded as an annual. *T. quadrispinosa,* Roxb., from Sylhet, is an allied plant.

Trifolium agrarium, L.

The perennial Yellow Clover or Hop-Clover. All Europe, Western Asia. Of considerable value in sandy soil as a fodder-herb. It is easily naturalized.

Trifolium Alexandrinum, L.*

The Bersin-Clover. North-eastern Africa, South-western Asia, South Europe. Much grown for forage in Egypt. Recorded as annual.

Trifolium fragiferum, L.

The Strawberry-Clover. Europe, North Africa, Middle and North Asia. A perennial species, well adapted for clay soils.

Trifolium hybridum, L.*

The Alsike-Clover. Europe, North Africa, Western Asia. A valuable perennial pasture-herb, particularly for swampy localities.

Trifolium incarnatum, L.

The Carnation-Clover. Middle and South Europe. Though annual only, it is valued in some of the systems of rotation of crops. It forms particularly a good fodder for sheep. A white flowering variety exists.

Trifolium medium, L.*

The Red Zigzag Clover. Europe, North and Middle Asia. A deep-rooting perennial herb, much better adapted for dry sandy places than *T. pratense.* It would also endure the inclemency of the clime of our higher alpine regions if disseminated there. *T. Quartinianum,* A. Rich., is an allied plant from Abyssinia, where several endemic species exist.

Trifolium pratense, L.*

The ordinary Red Clover. All Europe, North Africa, North and Middle Asia, extending to Japan. A biennial or under special circumstances also perennial herb, of great importance for stable-fodder. It prefers rich soil and particularly such, which is not devoid of lime. Also this species would live in our alps, where it would much enrich the pastures.

Trifolium repens, L.*

The ordinary White Clover. Europe, North Africa, North and Midele Asia, sub-Arctic America. Perennial. Most valuable as a fodder-plant on pastoral land. It has a predilection for moist soil, but springs again from dry spots after rain. It has naturally spread over many of our humid valleys, and its growth should be encouraged in such localities.

Trifolium subrotundum, Hochstett.

The Mayad-Clover. North and Middle Africa, ascending to 9000 feet. A perennial species, in its native countries with advantage utilized for Clover-culture. This by no means closes the list of the Clovers, desirable for introduction, inasmuch as about 150 well-marked species are recognized, many doubtless of pastoral value. But the notes of rural observers on any of these kinds are so sparingly extant, that much uncertainty about the yield and nutritive value of the various kinds continues to prevail. Most Clovers

come from the temperate zone of Europe and Asia; only two are indigenous to the eastern of the United States of North America, none occurs in Australia, few are found in South Africa, several in California and the adjoining countries, several also in Chili; no species is peculiar to Japan.

Trigonella Foenum Graecum, L.

Countries on the Mediterranean Sea. The seeds of this annual herb find their use in veterinary medicine.

Trigonella suavissima, Lindley.

Interior of Australia, from the Murray River and its tributaries to the vicinity of Shark's Bay. This perennial, fragrant, clover-like plant proved a good pasture-herb. A lithogram, illustrating this plant, occurs in the work on the "Plants Indigenous to Victoria." Some of the many European, Asian and African plants of this genus deserve our local tests.

Tripsacum dactyloides, L.

Central and North America. A reedy perennial grass, more ornamental than utilitarian. It is the original Buffalo-Grass, and attains a height of 7 feet, assuming the aspect of Maize. It is of inferior value for fodder.

Triticum vulgare, Villars.*

The Wheat. Apparently arisen through culture from *Aegilops ovata*, L., and then a South European, North African and Oriental plant. This is not the place, to enter into details about a plant universally known. It may therefore suffice merely to mention, that three primary varieties must be distinguished between the very numerous sorts of cultivated Wheat: 1. Var. muticum (*T. hybernum*, L.), the Winter Wheat or Unbearded Wheat; 2. Var. aristatum (*T. aestivum*, L.), the Summer Wheat or Bearded Wheat; 3. Var. adhaerens (*T. Spelta*, L.), Wheat with fragile axis and adherent grain. Metzger enumerates as distinct kinds of cultivated Wheat:—

T. vulgare, Vill., which includes among other varieties the ordinary Spring Wheat, the Fox Wheat and the Kentish

Wheat. It comprises also the best Italian sorts for plaiting straw-bonnets and straw-hats, for which only the upper part of the stem is used, collected before the ripening of the grain and bleached through exposure to the sun while kept moistened.

T. turgidum, L., comprising some varieties of White and Red Wheat, also the Clock Wheat and the Revet Wheat.

T. durum, Desfont., which contains some sorts of the Bearded Wheat.

T. Polonicum, L., the Polish Wheat, some kind of which is well adapted for Peeled Wheat.

T. Spelta, L., the Spelt Corn or Dinkel Wheat, a kind not readily subject to disease, succeeding on soil of very limited fertility, not easily attacked by birds, furnishing a flour of excellence for cakes, also yielding a superior grain for Peeled Wheat. For preparing the latter it is necessary to collect the spikes while yet somewhat green and to dry them in baking-houses.

T. diccocum, Schrank. (*T. amyleum*, Ser.) The Emmer Wheat. Its varieties are content and prolific on poor soil, produce excellent starch, are mostly hardy in frost and not subject to diseases. To this belongs the Arras Wheat of Abyssinia, where a few other peculiar sorts of Wheat are to be found.

T. monococcum, L. St. Peter's Corn, which is hardier than most other Wheats; exists in the poorest soils, but produces grains less adapted for flour than Peeled Wheat.

Tropaeolum majus, L.

Peru. This showy perennial climber passes with impropriety under the name of Nasturtium. The herbage and flowers serve as Cress and also are considered antiscorbutic. A smaller species, *T. minus*, L., also from Peru, can likewise be chosen for a Cress-salad; both besides furnish in their flower-buds and young fruits a substitute for Capers. A volatile oil of burning taste can be distilled from the foliage of both; and this is more acrid even than the distilled oil

of Mustard-seeds. In colder countries these plants are only of one year's duration. Numerous other species, all highly ornamental, occur in South America and a few also in Mexico.

Trophis Americana, L.

West Indian Archipelagus. The foliage of this milky tree has been recommended as food for the silk-insect. In Cuba and Jamaica it is used as provender for cattle and sheep.

Tuber aestivum, Vittad.

The Truffle mostly in the markets of England. The white British Truffle, *Chairomyces meandriformis*, Vitt., though large is valued less. In the Department Vaucluse (France) alone about 60,000 lbs. of Truffles are collected annually at a value of about £4000. Many other kinds of Truffles are in use. Our own native Truffle, *Mylitta australis*, Berk., attains sometimes the size of a Cocos nut, and is also a fair esculent. It seems also quite feasible to naturalize the best of edible fungi of other genera, although such may not be amenable to regular culture.

Tuber cibarium, Sibthorp.

Middle and South Europe. The Black Truffle. Like all others growing under ground, and generally found in forest-soil of limestone formations. It attains a weight over 1 lb. Experiments for naturalization may be effected with every prospect of success by conveying the Truffle in its native soil to us, and locating it in calcareous places of our forest-regions. As condiment or merely in a roasted state it affords an aromatic food. *T. melanosporum*, Vitt., from France, Germany and Italy, is of a still more exquisite taste than *T. cibarium*, indeed of Strawberry flavor. Again *T. magnatum*, Pico, from Italy, is of delicious fragrance.

Ullucus tuberosus, Lozano. (*Melloca tuberosa*, Lindl.)

Andes of New Granada and Peru, up to an elevation of 9000 feet. A perennial herb, the tubers of which are edible.

Urginia Scilla, Steinheil. (*Scilla maritima*, L.)

South Europe, North Africa. The medicinal Squill. The plant needs not regular cultivation, but settlers living near

the coast might encourage its dissemination, and thus obtain the bulbs as drug from natural localities. Its peculiar bitter principle is called Scillitin.

Uvularia sessilifolia, L.

North America, in forests. This pretty herb is mentioned as yielding a good substitute for Asparagus.

Vaccinium alatum, Dombey. (*Thibaudia alata,* Dunal.)

Frigid regions of the Andes of Peru. A tall evergreen shrub, with pink berries of the size of a cherry. This highly ornamental plant could be grown in our sub-alpine regions.

Vaccinium bicolor, F. v. M. (*Thibaudia bicolor,* R. and P.)

Cold zone of the Peruvian Andes. A high evergreen bush, with red berries of the size of a Hazel nut. All Thibaudias seem best to form a section in the genus Vaccinium, some species of the latter, for instance *Vaccinium Imrayi,* Hook., from Dominica, mediating the transit. The species of the section Thibaudia are, as a rule, producing red berries of acidulous grateful taste. Many others may deserve therefore culture in our forest ravines or on our alpine heights. They occur from Peru to Mexico, also in West India. One species, Vaccinium melliflorum (*Thibaudia melliflora,* R. and P.), has its flowers rich in honey-nectar.

Vaccinium caespitosum, Mich.

Canada and Northern States of North America. A deciduous-leaved small bush, with blueish edible berries. *V. ovalifolium,* Sm., is an allied species.

Vaccinium corymbosum, L.*

The Swamp-Blueberry or blue Huckle-berry. Canada and United States of North America. A good-sized shrub with deciduous foliage. Berries blueish-black of sweetish taste, ripening late in the season.

Vaccinium erythrocarpum, Michaux.

(*Oxycoccus erectus* Pursh.)

Carolina and Virginia, on high mountains. An upright bush of a few feet in height, with deciduous leaves. The

transparent scarlet berries, according to Pursh, are of excellent taste.

Vaccinium grandiflorum, Dombey.

(*Ceratostemma grandiflorum*, R. and P.)

Andes of Peru. A tall evergreen shrub. The berries of a pleasant acidulous taste.

Vaccinium humifusum, Graham.

North-western America, on the Rocky Mountains. Berries of this bush well flavored.

Vaccinium Leschenaultii, Wight. (*Agapetes arborea*, Dunal.)

India, Neilgherries and Ceylon. This evergreen species attains the size of a tree, flowering and fruiting throughout the year. The fruits resemble cranberries.

Vaccinium leucanthum, Cham.

Mountains of Mexico. An arborescent species. The blackish berries are edible.

Vaccinium macrocarpon, Aiton.*

(*Oxycoccus macrocarpus*, Pers.)

The large Cranberry. From Canada to Virginia and Carolina, particularly in sandy and peaty bogs, and in cold mossy swamps. A trailing evergreen bush, with stems attaining a length of 3 feet. It is this species, which has become so extensively cultivated in the eastern parts of the United States, where on moory land, often not otherwise to be utilized, enormous quantities of this fruit have been produced by regular culture at a highly profitable scale. The berries are of the acid taste, pleasant aroma and scarlet brightness of the British Cranberry, but considerably larger.

Vaccinium meridionale, Swartz.

Jamaica, from the summits of the highest ranges down to the Coffee-regions. It attains a height of 30 feet and is evergreen. The small berries are of the taste and color of those of V. Vitis Indæa.

Vaccinium Mortinia, Bentham.

Mountains of Columbia. A shrub several feet high. The fruits resemble those of V. Myrtillus, but are more acid. They come under the name Mortina to the Quito market.

Vaccinium Myrtillus, L.*

The British Whortleberry or Bilberry. Throughout Europe, North and Middle Asia, remotest North America, in heathy and turfy forest-land. A shrub, few feet high or less, deciduous, erect, of great value for its copious supply of berries. They are, as well known, black with a blueish-grey hue and of exceedingly grateful taste. The naturalization of this plant on our alpine ranges and in our cooler woodlands, particularly in our forests of Fagus Cunninghami, would prove a boon. The berries can be utilized for their dye. The whole bush contains Quina acid.

Vaccinium myrtilloides, Michaux.

Michigan, Canada, Newfoundland, Labrador. The large edible berries are called Bluets. This little bush is adapted for our higher alpine country.

Vaccinium Oxycoccus, L.* *(Oxycoccus palustris,* Pers.)

The British Cranberry. Through Europe, North and Middle Asia, North America, on turf-moss in moory heaths. A creeping evergreen shrub of particular neatness. The berries give a most agreeable preserve and are of anti-scorbutic value. This species is particularly eligible for the spongy mossy bogs of our snowy mountains.

Vaccinium parvifolium, Smith.

North-western America. A tall shrub. The berries are excellent for preserves.

Vaccinium Pennsylvanicum, Lamarck.*

(*V. angustifolium,* Aiton.)

The early Blue-berry or Blue Huckleberry. North America, on dry woody hills. A dwarf-bush with deciduous foliage, producing fruit in abundance. The berries are large, blueish-black and of sweet taste. *V. Canadense,* Kalm, according to Dr. Asa Gray, is closely allied.

Vaccinium uliginosum, L.

British Bog Bilberry. Europe, North and Middle Asia, North America. A deciduous bush, with blackish berries, similar to those of V. Myrtillus, but hardly of equal excellence.

Vaccinium vacillans, Solander.

North America, in sandy forest-lands. A deciduous small bush, coming with its blue berries later into season than V. Pennsylvanicum.

Vaccinium Vitis Idaæ, L.

Europe, North and Middle Asia, North America. A dwarf-shrub with evergreen leaves. The purplish-red berries are sought for jellies and other preserves.

It is as yet impossible to say, how many other species of Vaccinium are producing good-sized and well-flavored fruits. But the genus ranges in many species from Continental Asia to the Indian Archipelagus, and has a wide extension also in South America, occupying in hot countries higher mountain regions. But few reliable notes on the tropical species are extant, as far as the fruits are concerned.

Valeriana Celtica, L.

Alps of Europe. The root of this perennial herb is particularly aromatic.

Valeriana edulis, Nuttall.

North-western America, from Oregon to the Rocky Mountains. The thick spindle-shaped root of this herb affords food to the natives of that part of the globe. When baked the root proves agreeable and wholesome. When we consider the wild states of the plants, from which many of our important root-crops arose, then this Valeriana and several other plants, suggestively mentioned in these pages, may well be admitted for trial-culture.

Valeriana officinalis, L.

Europe, North and Middle Asia, in swampy grass-land, with a predilection for forests and river-banks. This perennial herb would do particularly well on our alps. It is the only

one among numerous congeners of Europe, Asia and America, which is drawn to a considerable extent into medicinal use. The root and herb contain Valerianic acid and a peculiar tannic acid; the root furnishes an esential oil, which again resolves itself into Valerol (70 per cent.), Valereen, Barneol and Valerianic acid. The order of Valerianeæ is not represented by any native plant in Australia.

Valerianella olitoria, Moench.

Lamb's Lettuce. Europe, North Africa, North and Middle Asia. A fair and early Salad-plant. It is an annual plant, and has several congeners in Europe and Asia.

Veratrum album, L.

Europe, North and Middle Asia, extending eastwards to Japan. It delights particularly in sub-alpine localities. The root furnishes Veratrin, Jervin and Sabadillic acid.

Veratrum viride, Aiton.

Canada and United States of North America. A near relative of the former plant. Its root has come recently into medicinal use.

Vicia Ervilia, Willdenow. (*Ervum Ervilia,* L.)

South Europe, North Africa, South-western Asia. An annual herb, praised as a valuable fodder-plant on dry calcareous soil.

Vicia Faba, L.*

The Straight Bean. Orient, particularly on the Caspian Sea. This productive annual herb affords not only its seeds for table use, but provides also a particularly fattening stable food. The seeds contain about 33 per cent. starch.

Vicia sativa, L.* (*V. angustifolia,* Roth.)

The ordinary Vetch or Tare. Europe, North Africa, North and Middle Asia. One of the best of fodder-plants, but only of one or two years' duration. Many of the other European and Asiatic species of Vicia are deserving our attention.

Vigna Sinensis, Endl.* (*Dolichos Sinensis,* L.)

Tropical Asia and Africa. The cultivation of this twining annual pulse-herb extends to Southern Europe and many other countries with a clime like ours. The pods are remarkable for their great length, and used like French Beans. *Vigna Catjang,* A. Rich. and *Vigna sesquipedalis* are varieties of this species. In fair soil the produce is fortyfold.

Viola odorata, L.

The Violet. Middle and South Europe, North Africa, Middle Asia. Passingly alluded to here, as this modest though lovely plant should be extensively naturalized in our forest-glens, to furnish its delicate scent for various compositions of perfumery.

Vitis acetosa, F. v. Mueller.

Carpentaria and Arnhem's Land. Stems rather herbaceous than shrubby, erect. The whole plant is pervaded with acidity, and proved valuable in cases of scurvy. The berries are edible. This species, if planted here, would likely spring annually afresh from the root.

Vitis aestivalis, Michaux.*

The Summer Grape of the United States of North America. Flowers fragrant. The berries are deep blue, of pleasant taste, and ripen late in the season.

Vitis Baudiniana, F. v. Mueller. (*Cissus Antarctica,* Vent.)

East Australia. With V. hypoglauca the most southern of all Grapes, none extending to New Zealand. It is evergreen, and here a vigorous plant for bowers, but suffers even from slight frosts. The berries are freely produced and edible, though not large.

Vitis cordifolia, Michaux.* (*Vitis riparia,* Mich.)

The Winter Grape or Frost Grape. From Canada to Florida. A deciduous vine. The scent of the flowers reminds of Reseda. The berries are small, either blackish or amber-colored, and very acid. They can be used for preserves, and are only fully matured when touched by frosts. A succession of seedlings may give us a superior and simultaneously a very hardy vine.

Vitis hypoglauca, F. v. Mueller.

East Australia, as far south as Gipps Land. An evergreen climber of enormous length, forming a very stout stem in age. The black berries attain the size of small cherries. Also this species may perhaps be vastly changed in its fruit by continued culture.

Vitis Indica, L.

On the mountains of various parts of India, ascending an altitude of 3000 feet in Ceylon. The small berries are edible. The plant should be subjected to horticultural experiments. This is an apt opportunity to draw attention to the various Indian species of Vitis with large edible berries; for instance: *V. laegivata*, Bl., *V. thyrssiflora*, Miq., *V. mutabilis*, Bl., *V. Blumeana*, Steud., all from the mountains of Java, and all producing berries as large as cherries, those of V. Blumeana being particularly sweet. Further may here be inserted *V. imperialis*, Miquel, from Borneo, *V. auriculata*, Wall. and *V. elongata*, Wallich, both the last from the mountainous mainland of Coromandel, and all producing very large juicy berries even in the jungle wilderness. *V. quadrangularis*, L., stretches from Arabia to India and Central Africa, and has also edible fruits. Many such plants may be far more eligible for Grape-culture in hot wet climes than the ordinary vine. About 250 species of Vitis are already known, mostly from intra-tropical latitudes, and mostly evergreen; but in regard to their elevation above the ocean, and to the nature of their fruits, we are almost utterly without data.

Vitis Labrusca, L.*

The Isabella Grape. North America, from Canada to Texas and Florida, also in Japan. The Schuylkill Grape is derived from this species. A pale-fruited variety furnishes the Bland's Grape. Another yields the American Alexander-Grape. The berries are large among American kinds and are of pleasant taste. Flowers fragrant. This and the other hardy North American vines seem never to be attacked by the Oidium disease.

Vitis Schimperiana, Hochstetter.

From Abyssinia to Guinea. This vine may become valuable with many other Central African kinds for tropical culture, and may show itself hardy here. Barter compares the edible berries to clusters of Frontignac Grape.

Vitis vinifera, L.*

The Grape Vine. Turkey, Persia, Tartary. This is not the place to discuss at length the great industrial questions, concerning this highly important plant, even had these not engaged already since many years the attention of a large number of our colonists. The whole territory of Victoria stretches essentially through the vine-zone, and thus most kinds of vine can be produced here, either on the lowlands or the less elevated mountains in various climatic regions and in different geologic formations.

The Corinthian variety, producing the "Currants" of commerce, thrives also well in some districts, where with Raisons it promises to become a staple article of our exports beyond home consumption. Dr. W. Hamm, of Vienna, has recently issued a Vine-map of Europe, indicating the distribution of the different varieties and the principal sources of the various sorts of Wine. The writer would now merely add, that the preservation of the Grapes in a fresh state, according to M. Charmeux's method, and the sundry modes of effecting the transit of ripe Grapes to long distances, ought to be turned to industrial advantage. The pigment of the dark wine-berries is known as Oenolic acid. The juice contains along with Tartaric acid also Grape acid. All these chemically defined substances have uses of their own in art and science.

Vitis vulpina, L.* (*Vitis rotundifolia,* Mich.)

The Muscadine or Fox-Grape. South-eastern States of North America. This species includes as varieties also the Bullace, the Mustang, the Bullet-Grape, both kinds of the Scuppernangs and the Cotowba Grape. The

berries are of a pleasant taste, but in some instances of a strong flavor; they are the largest among American Grapes.

Voandzeia subterranea, Thouars.

Madagascar and various parts of Africa, as far south as Natal. This Earth-Pea is annual, and pushes its pods under ground in the manner of Arachis hypogæa for maturation. The pods are edible, and much consumed in tropical countries.

Wallichia oblongifolia, Griffith.

Himalaia, as far as 27° North. There one of the hardiest of all Palms. It is not a tall one, yet a graceful and useful object for cultural industries. Several species exist.

Wettinia augusta, Poeppig.

Peru, on mountains several thousand feet high. This Palm is therefore likely to endure our clime.

Wettinia Maynensis, Spruce.

Cordilleras of Peru. Like the foregoing it attains a height of 40 feet, and advances to elevations of 3000 feet or 4000 feet. Before finally parting from the American Palms, it may be appropriate to allude briefly to some of the hardier kinds, which were left unnoticed in the course of this compilation. From Dr. Spruce's important essay on the Palms of the Amazon River may be learnt, that besides other species, as yet imperfectly known from the sources of this great river, the following kinds are comparatively hardy; thus they might find places for cultivation or even naturalization within the limits of our Colony:—*Geonema undata,* Klotzsch; *Iriartea deltoïdea,* R. and P.; *Iriartea ventricosa,* Mart., which latter rises in its magnificence to fully 100 feet; *Iriartea exorrhiza,* Mart.; this with the two other Iriarteas ascends the Andes to 5000 feet.—*Oenocarpus multicaulis,* Spruce; ascends to 4000 feet; from 6 to 10 stems are developed from the same root, each from 15 feet to 30 feet

high.—*Euterpe;* of this two species occur in a zone between 3000 feet and 6000 feet.—*Phytelephas microcarpa*, R. and P.; eastern slope of the Peru Andes, ascending to 3000 feet.—*Phytelephas macrocarpa*, R. and P.; also on the eastern side of the Andes, up to 4000 feet; it is this superb species which yields by its seeds part of the vegetable ivory.—*Phytelephas aequatorialis*, Spruce; on the west slope of the Peruvian Andes, up to 5000 feet; this Palm is one of the grandest objects in the whole vegetable creation, its leaves attaining a length of 30 feet! The stem rises to 20 feet. Palm-ivory is also largely secured from this plant. Though aequinoctial it lives only in the milder regions of the mountains; therefore in the equable temperature of East Gipps Land it would likely prosper without protective cover.—*Carludovica palmata*, R. and P., on the east side of the Andes of Peru and Ecuador, up to 4000 feet; the fan-shaped leaves from cultivated specimens furnish the main material for the best Panama-hats. The illustrious Count de Castelnau saw many Palms on the borders of Paraguay during his great Brazilian Expedition. Most of these together with the Palms of Uruguay and the wide Argentine territory would likely prove adapted for acclimation in our latitudes; but hitherto the limited access to those countries has left us largely unacquainted with its vegetable treasures also in this direction. Von Martius demonstrated, already in 1850, the occurrence of the following Palms in extra-tropic South America:—*Ceroxylon australe*, Mart., on high mountains in Juan Fernandez at 30° S.L.; *Jubœa spectabilis*, Humb., in Chili at 40° S.L.; *Trithrinax Brasiliana*, Mart., at 31° S.L.; *Copernicia cerifera*, Mart., at 29° S.L.; *Acrocomia Totai*, Mart., at 28° S.L.; *Cocos australis*, Mart., at 34° S.L.; *Cocos Yatai*, Mart., at 32° S.L.; *Cocos Romanzoffiana*, Cham., at 28° S.L.; *Diplothemium littorale*, Mart., at 30° S.L. Al[the last mentioned Palms occur in Brazil, the Acrocomia and Trithrinax extending to Paraguay, and Cocos australis to Uruguay and the La Plata State.

While some Palms, as indicated, descend to cooler latitudes, others ascend to temperate and even cold mountain regions. Among the American species are prominent in this respect: *Euterpe andicola*, Brogn., *E. Haenkeana*, Brogn., *E. longivaginata*, Mart., *Diplothemium Porallyi*, Mart. and *Ceroxylon pithyrophyllum*, Mart., all occurring on the Bolivian Andes at an elevation of about 8000 feet.—*Ceroxylon andicola*, Humb., *Kunthia montana*, Humb., *Oreodoxa frigida*, Humb., and *Geonoma densa*, Linden, reach also on the Andes of New Granada a height of at least 8000 feet.—*Ceroxylon Klopstockia*, Mart., advances on the Andes of Venezeula to a zone 7500 feet altitude, where Karsten saw stems 200 feet high with leaves 24 feet long! There also occur *Syagrus Sancona*, Karst. and *Platenia Chiragua*, Karst. at elevations of 5000 feet, both very lofty Palms. From the temperate mountain regions of sub-tropical Mexico are known among others: *Chamaedora concolor*, Mart., *Copernicia Pumos*, Humb., *C. nana*, Kunth, and *Brahea dulcis*, Mart., at elevations from 7000 feet to 8000 feet.

Xanthorrhiza apiifolia, l'Herit.

North America. A perennial almost shrubby plant of medicinal value. The root produces a yellow pigment, similar to that of *Hydrastis Canadensis*, L. Both contain also Berberin.

Ximenia Americana, L.

Tropical Asia, Africa and America, passing however the tropics in Queensland, and gaining also an indigenous position in Florida. This bush may therefore accommodate itself to our clime in localities free of frost. The fruits are edible, resembling yellow plums in appearance; their taste is agreeable. The wood is scented.

Yucca filamentosa, L.

The Adam's Needle. From Carolina and Florida to Texas and Mexico. An almost stemless species. It would hardly be right, to omit here the plants of this genus altogether, as

they furnish a fibre of great strength, similar to that of the Agaves. Moreover all these plants are decorative, and live in the poorest soil, even in drifting coast-sand. They are also not hurt, as is the case with the Fourcroyas, by the frosts of our lowlands. Among the species with stems of several feet in height may be recorded *Y. gloriosa*, L. and *Y. aloifolia*, L., both from the sandy south coast of North America.

Zalacca secunda, Griffith.

Assam, as far north as 28°. A stemless Palm with large feathery leaves, exquisitely adapted for decorative purposes. Before we finally quit the Asiatic Palms we may yet learn from Von Martius's great work, how many extra-tropic members of this princely order were known in 1850 already, when that masterly work was concluded. Martius enumerates as belonging to the boreal extra-tropic zone in Asia: From Silhet at 24° N.L.: *Calamus erectus*, Roxb.; *C. extensus*, Roxb.; *C. quinquenervius*, Roxb.;—from Garo at 26° N.L.: *Wallichia caryotoides*, Roxb.; *Ptychosperma gracilis*, Miq.; *Caryota urens*, L.; *Calamus leptospadix*, Griff.;—from Khasya in 26° N.L.: *Calamus acanthospathus*, Griff.; *C. macrospathus*, Griff.; *Plectocomia Khasyana*, Griff.;—from Assam about 27° N.L.: *Areca Nagensis*, Griff.; *A. triandra*, Roxb.; *Livistona Jenkinsii*, Griff.; *Daemonorops nutantiflorus*, Griff.; *D. Jenkinsii*, Griff.; *D. Guruba*, Mart.; *Plectocomia Assamica*, Griff.; *Calamus tenuis*, Roxb.; *C. Flagellum*, Griff.; *C. Heliotropium*, Hamilt.; *C. floribundus*, Griff.; *Phœnix Ouseloyana*, Griff.;—from Upper Assam between 28° and 29° N.L.: *Caryota obtusa*, Griff.; *Zalacca secunda*, Griff.; *Calamus Mishmelensis*, Griff.;—from Darjiling at 27° N.L.: *Wallichia obtusifolia*, Griff.; *Licuala peltata*, Roxb.; *Plectocomia Himalaiana*, Griff.; *Calamus schizospathus*, Griff.;—from Nepaul between 28° and 29° N.L.: *Chamaerops Martiana*, Wall.;—from Guhrval in 30° N.L.: *Calamus Royleanus*, Griff.;—from Saharampoor in 30° N.L.: *Borassus flabelliformis*, L.;—from Duab in 31° N.L.: *Phœnix silvestris*, Roxb.;—from

Kheree in 30° N.L.: *Phœnix humilis*, Royle; — from Dekan: *Bentinckia Coddapanna*, Berry, at an elevation of 4000 feet.

Miquel mentions as Palms of Japan (entirely extra-tropical): *Rhapis flabelliformis*, Aiton; *R. humilis*, Blume; *Chamaerops excelsa*, Thunb.; *Livistona Chinensis*, Br. and *Arenga saccharifera*, La Bill. or a species closely allied to that Palm.

Zea Mays, L.*

The Maize or Indian-Corn. Indigenous to the warmer parts of South America. St. Hilaire mentions as its native country Paraguay. Found in Central America already by Columbus. This conspicuous though annual cereal grass interests us on this occasion as being applicable here to far more uses than those, for which it has hitherto been employed. In North America, for instance, Maize is converted into a variety of dishes for the daily table, being thus boiled in an immature state as "green corn." Mixed with other flour it furnishes good bread. For some kind of cakes it is solely used, also for Maizena, Maccaroni and Polenta. Several varieties exist; the Inca-maize of Peru being remarkable for its gigantic size and large grains. Maize is not readily subject to the ordinary corn diseases; but to prosper it requires fair access to potash and lime. Good writing and printing papers can be prepared from Maize-straw. Meyen calculated, that the return from Maize under most favorable circumstances in tropical countries would be 800-fold, and under almost any circumstance it is the largest yielder among cereals in warm countries. As a fattening saccharine green-fodder Maize is justly appreciated. Any Ergot from it is used, like that of Rye, for medicinal purposes. Maize-Corn contains about 75 per cent. of starch. Dierbach recommends Mellago or Treacle from Maize, instead of that prepared from the roots os *Triticum repens*, L., and the molasses, so obtained, serve also culinary uses.

Zingiber officinale, Roscoe.

The Ginger. India and China. Possiby this plant may be productive in the hottest parts of our colony, and give satisfactory results. The multiplication is effected by division of the root. For candied ginger only the young succulent roots are used, which are peeled and scalded prior to the immersion into the saccharine liquid.

Zizania aquatica, L.* (*Hydropyrum esculentum*, Link.)

The Canada Rice. In shallow streams and around ponds and lakes from Canada to Florida. This tall grass might be readily naturalized. Although its grain can be utilized for bread-corn, we would wish to possess the plant chiefly to obtain additional food of a superior kind for water-birds.

Zizania latifolia, Hance.*

(*Hydropyrum latifolium*, Grisebach.)

The Kau-sun of China. In lakes of Amur, Manschuria, China and Japan. Nearly related to the preceding species. From Dr. Hance we know, that the solid base of the stem forms a very choice vegetable, largely used in China, where this tall water-grass undergoes regular cultivation like the Trapa.

Zizania miliacea, Michaux.

Southern part of North America, West India. Likewise tall and perennial, but more restricted to the tide-water meadows and ditches, according to Pursh; but according to Chapman's note generally distributed like Z. aquatina, with which it has similar use. In South Brazil occurs a similar grass, namely *Z. microstachya*, Nees.

Zizyphus Jujuba, La Marck.

From India to China. This shrub or tree can only be expected to bear its pleasant fruits in the warmest parts of our colony. The fruit is red or yellow, and of the size of a large cherry.

Zizyphus rugosa, La Marck.

Nepaul and other mountainous parts of India. A small tree, hardier than the last. The drupe of this is also edible, and the same may be said of a few other Indian species.

Zizyphus vulgaris, La Marck.

Orient, particularly Syria. A small tree, well-adapted for our clime. Fruits scarlet, about an inch long, with edible pulp; they are known as South European Jujubs.

CONCLUDING REMARKS.

The writer in concluding this small contribution towards the literature of industrial plants could not but feel, that he overstepped already the limits originally assigned to this communication. Yet thus far extended as it is, it excludes many important genera and species altogether, not merely such as Atalantia, Cynodon, Debregeasia, Villeburnia, Zamia and others, which were inadvertently passed, but also numerous others of perhaps secondary note, yet sufficiently significant to be reserved for a supplemental treatise. Nevertheless to about seven hundred prominent utilitarian plants now primary local attention has been directed in a connected form, which with the three hundred timber-trees, enumerated in last year's Report of the Acclimatisation Society, gives us a list of about one thousand plants for our cultural choice. But besides indirectly or passingly the writer has alluded to very many more; and these indications ought to aid many of our colonists to trace out still further novel resources for their requirements in husbandry or technology or any other purpose. It is the intention at an early opportunity to add to these lists, and to group also the products of the various timber-trees together in an augmented index, as many of these furnish also medicinal substances, dyes, oils, gums, resins, esculent fruits and other articles of our wants. Thus notes for instance on Camphor, vegetable tallow, real manna, maple-sugar, hickory-nuts, sandarac, turpentine, kauri, &c., must be sought among the timber-trees. Simultaneously then a geographic grouping of all these indicated plants will be effected, in order that at a glance may be indicated, what from each particular country in various parts of the globe may be secured. The range of each recorded species is now already given with a view of affording a clearer insight into the adaptability of different climatic tracts and altitudes of this colony or countries within the same isothermal lines for special plants. Furthermore to give to

benefactors abroad, who may wish to let us participate in their treasures of plants a more exact indication of our varied climatic zones, it was found expedient to append to this Record a very succinct Meteorologic Schedule. Space did not admit of an enumeration of the many works of different nations, which may be consulted with advantage for following up the indications now given, but a list of the principal publications will be prepared for the supplement promised. It should however be stated, and this with regret, that the new work on vegetable industrial productions, published very recently by Mr. J. Smith of Kew, and resting largely on the notes of the late Alexander Smith, derived from the collections of Hooker's Museum, did not yet reach this country. Notes may hereafter also be added, distinguishing those plants, which give an immediate return in one season, and those, which produce their yield only in variously extended periods. Likewise might be discriminated between those plants, from which commercial raw products are obtained, and those which require costly machinery or toilsome application, to perfect the mercantile article. The brief chemical notes are largely derived from Professor Wittstein's "Chemische Analyse von Pflanzentheilen," of which important work with the author's friendly concession a translation by the writer is early to appear. By these means industrial enquiry may here also be advanced, modern therapeutic for instance depending often with far more exactness on alkaloids or other chemically defined substances, than on the administration of a plant as a whole. In conclusion the writer trusts, that by the issue of these pages our transoceanic interchanges may become extended, and the vegetable treasures of distant countries may be rendered more extensively our own, while some slight advantage may also arise from these unpretensive data to countries endowed with climatic regions not dissimilar to those of Victoria.

TEMPERATURE OF AIR IN SHADE FOR THE LAST FOURTEEN YEARS.

From the Observatory Records of Melbourne.

	HIGHEST.	LOWEST.	MEAN.
At Melbourne	111·2	27·0	57·6
At Sandhurst	117·4	27·5	59·0
At Ballarat	109·0	22·0	53·2
At Portland	108·0	30·0	61·5
At Port Albert	...	...	56·5

RAINFALL AT MELBOURNE.

	INCH.		INCH.		INCH.
In 1857	28·90	In 1862	22·08	In 1867	25·79
1858	26·02	1863	36·43	1868	18·27
1859	21·80	1864	27·40	1869	24·59
1860	25·40	1865	15·94	1870	33.75
1861	29·15	1866	22·41	1871	30·17

TEMP. OF AIR IN SHADE AT TWOFOLD BAY, 1871.

(Corresponding to the lowlands of East Gipps Land.)
From the Observatory Records of Sydney.

	MEAN.	M. MAX.	M. MIN.	E. MAX.	E. MIN.	R'FALL
January	68·1	75·0	61·2	...	...	4.570
February	67.6	72·9	62·3	...	...	12·350
March	64·0	70·4	57·7	...	...	1·500
April	61·5	68·4	54·5	...	...	2·540
May	59·4	64·6	54·2	...	..	12·000
June	53·5	59·9	47·1	...	...	5·640
July	52·7	60·3	45·0	72·0	39·1	0·790
August	52·8	60·8	44·7	68·0	41·1	0·690
September	56·7	63·8	49·5	73·0	44·1	1·530
October	58·1	65·9	50·2	76·0	42·1	8·270
November	63·4	71·6	55·2	81·0	47·1	2·390
December	70·4	79·7	61·1	106·0	54·1	1·470

60·7° mean annual temperature. 53·740 inches rainfall for the year.

TEMP. OF AIR IN SHADE AT TWOFOLD BAY, 1872.

From the Magistrate's Office at Eden.

	MAX. Deg.	MINIM. Deg.	R'FALL Inches.
January	88.0	61·0	3·15
February	83·0	63·0	1·15
March	81·0	58·0	1·92
April	62·0	55·0	1·03
May	62·0	47·0	1·08

INDICATED GENERA,

CONTAINING

Alimentary Plants :

1. YIELDING HERBAGE :

   Atriplex, Beta, Brassica, Chenopodium, Corchorus, Crambe, Hibiscus, Musa, Pringlea, Rheum, Rumex, Spinacia, Tetragonia.

2. YIELDING ROOTS :

   Apios, Arracacha, Asparagus, Beta, Butomus, Carum, Chaerophyllum, Cichorium, Colocasia, Conopodium, Cyperus, Daucus, Dioscorea, Flemingia, Geitonoplesium, Gladiolus, Helianthus, Hypochoeris, Ipomæa, Manihot, Microseris, Oxalis, Pachyrrhizus, Peucedanum, Rha. ponticum, Scilla, Scorzonera, Sechium, Selinum, Stilbocarpa, Tragopogon, Ullucus, Uvularia, Valeriana.

3. YIELDING GRAIN :

   Andropogon, Avena, Eleusine, Hordeum, Oryza, Panicum, Pennisetum, Secale, Zea, Zizania.

4.—YIELDING TABLE PULSE :

   Cajanus, Cicer, Dolichos, Ervum, Lupinus, Phaseolus, Pisum, Vigna.

5.—YIELDING VARIOUS ESCULENT FRUITS :

   Arachis, Corynosicyos, Cucumis, Cucurbita, Cynara, Fagopyrum, Sechium, Telfairia, Trapa, Voandzoa.

S. TRUFFLES :

   Terfezia, Tuber.

Bamboo Plants:

Arundinaria, (*Arundo*), Bambusa, Guadua, Melocanna, Schizostachyum; (many other genera mentioned under Schizostachyum).

Coffee Plants:

Coffea (doubtful).

Condiment Plants:

Acorus, Allium, Apium, Archangelica, Artemisia, Borrago, Brassica, Capparis, Capsicum, Carum, Chærophyllum, Citrus, Cochlearia, Coriandrum, Crithmum, Cuminum, Foeniculum, Glycine, Illicium, Lepidium, Mentha, Ocimum, Olea, Origanum, Peucedanum, Pimpinella, Prunus (*Amygdalus*), Satureja, Sison, Smyrnium, Spilanthes, Tropæolum, Thymus, Valerianella, Zingiber.

Dye Plants:

Alkanna, Anthemis, Carthamus, Crocus, Crozophora, Helianthus, Indigofera, Isatis, Lawsonia, Lithospermum, Maharanga, Mallotus, Opuntia, Peireskia, Perilla, Reseda, Rhamnus, Rhus, Rubia, Sambucus, Saponaria, Solanum, Sophora, Spartium, Thymelæa, Xanthorrhiza.

Fibre Plants:

Agave, Apocynum, Boehmeria, Broussonetia, Camelina, Cannabis, Corchorus, Cordyline, Crotalaria, Cyperus, Fourcroya, Gossypium, Helianthus, Hibiscus, Humulus, Lavatera, Linum, Maoutia, Musa, Pachyrrhizus, Phormium, Pipturus, Poa, Sesbania, Spartium, Yucca.

Fuller's Plant:

Dipsacus.

Fodder Plants:

1. Grasses:

   Agrostis, Alopecurus, Andropogon, Anthistiria, Anthoxanthum, Avena, Bromus, Cynosurus, Dactylis, Ehrharta, Eleusine, Festuca, Hierochloa, Hordeum, Leersia, Lolium, Panicum, Paspalum, Pennisetum, Phalaris, Phleum, Poa, Secale, Stenotaphrum, Tripsacum, Triticum.

2. Other Herbage:

   Cichorium, Pentzia, Prangos, Symphytum.

3. Stable Pulse (Pods and Herb):

   Cicer, Dolichos, Hedysarum, Lathyrus, Lupinus, Medi-

cago, Melilotus, Onobrychis, Ornithopus, Pisum, Trifolium, Trigonella, Vicia.

4. Other Fruits:

Argania, Helianthus, Prosopis.

Gum Plants:

Acacia, Astragalus, Olea, Prosopis.

Hedge Plants:

Acacia, Agave, Crataegus, Justicia, Ligustrum, Maclura, Opuntia, Paliurus, Parkinsonia, Peireskia, Prosopis, Prunus, Rhus, Rosa, Rubus, Salix.

Hop Plant:

Humulus.

Medicinal Plants:

1. Yielding Herbage or Flowers:

Achillea, Aconitum, Aletris, Aloe, Althaea, Anemone, Anthemis, Arctostaphylos, Arnica, Artemisia, Atropa, Barosma, Cannabis, Cassia, Catha, Chelidonium, Chenopodium, Cochlearia, Conium, Cytisus, Digitalis, Erythroxylon, Eupatorium, Hyoscyamus, Ilex, Justicia, Lactuca, Marrubium, Matricaria, Mentha, Menyanthes, Ophelia, Polygala, Prunus, Rafnia, Ricinus, Rosmarinus, Ruta, Salvia, Sambucus, Sebæa, Solanum, Spigelia, Tanacetum.

2. Yielding Bark:

Alstonia, Cinchona.

4. Yielding Roots:

Acorus, Actaea, Anacyclus, Archangelica, Aristolochia, Cephaelis, Cimicifuga, Colchicum, Convolvulus, Gentiana, Glycyrrhiza, Helleborus, Hydrastis, Inula, Ipomaea, Nardostachys, Peucedanum, Pimpinella, Podophyllum, Saponaria, Saussurea, Schoenocaulon, Smilax, Symphytum, Urginia, Xanthorrhiza, Valeriana, Veratrum.

4. Yielding Fruits (or only Seeds):

Cucumis, Ecballion, Foeniculum, Illicium, Mallotus, Rhamnus, Rheum, Ricinus, Smyrnium, Trigonella.

Oil Plants:

Prunus (*Amygdalus*), Arachis, Argania, Brassica, Camelina, Cannabis, Cucurbita, Cyperus, Gossypium, Guizotia, Helianthus, Linum, Olea, Papaver, Ricinus, Sesamum, Telfairia.

Orchard Plants:

Amelanchier, Anona, Brabejum, Cervantesia, Citrus, Diospyros, Euclea, Ficus, Fragaria, Gaultheria, Gaylussacia, Hovenia, Morus, Musa, Myrica, Myrtus, Nephelium, Niemeyera, Opuntia, Parinarium, Passiflora, Peireskia, Persea, Physalis, Prunus, Psidium, Pyrularia, Pyrus, Ribes, Rubus, Santalum, Sechium, Shepherdia, Solanum, Tamarindus, Vaccinium, Vitis, Ximenia, Zizyphus.

Palm Plants:

Bactris, Calamus, Caryota, Ceroxylon, Chamaerops, Hyphaene, Jubæa, Kentia, Livistona, Phœnix, Plectocomia, Ptychosperma, Rhapis, Sabal, Thrinax, Wallichia, Wettinia, Zalacca. (Many other American genera under Wettinia; many other Asian genera under Zalacca.)

Paper Plants:

Arundo, Broussonetia, Cyperus, Lepidosperma, Stipa, Zea. (See also Fibre Plants.)

Resin Plants:

Pistacia, Rhus, Styrax.

Sand-coast Plants:

Agrostis, Asparagus, Crambe, Crithmum, Dactylis, Elymus, Ehrharta, Genista, Lepidosperma, Leptospermum, Panicum, Paspalum, Phormium, Poa, Prunus, Psamma, Sabal, Spartina, Stenotaphrum, Stipa, Tacca, Tetragonia, Thrinax, Urginia, Yucca.

Scent Plants:

Acacia, Adesmia, Andropogon, Anthoxyanthum, Boronia, Cedronella, Citrus, Convolvulus, Dracocephalum, Hedeoma, Heliotropium, Jasminum, Lavandula, Lippia, Melissa, Mentha, Ocimum, Origanum, Pogostemum, Prunus (*Amygdalus*), Pycnanthemum, Reseda, Rosa, Rosmarinus, Satureja, Styrax, Teucrium, Thymus, Viola.

Silk Plants:

Morus, Quercus, Ricinus, Trophis.

Starch Plants:

Alstroemeria, Canna, Cycas, Fagopyrum, Hordeum, Maranta, Oryza, Secale, Solanum, Tacca, Triticum, Zea.

Sugar Plants:

Andropogon, Beta, Cucumis, Saccharum, Zea.

Tannic Plants:

Cytisus, Prosopis, Rhus.

Tea Plants:

Andropogon, Thea.

Tobacco Plants:

Nicotiana.

Water Plants:

Acorus, Aeschynomene, Butomus, Cyperus, Menyanthes, Nelumbo, Oryza, Poa, Sagittaria, Trapa, Zizania.

Wicker Plants:

Salix. (Also genera mentioned under Bamboo Plants).