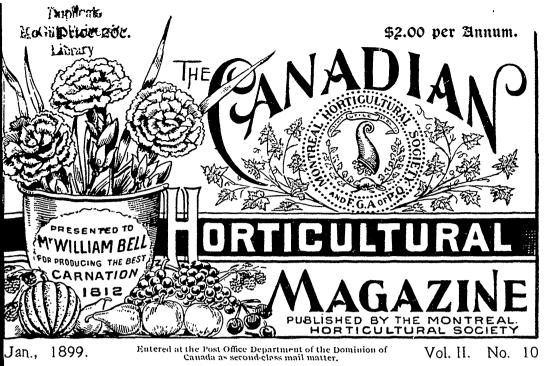
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January, 1899.

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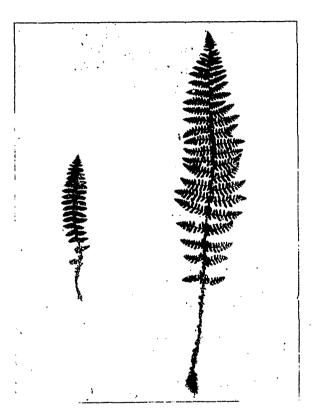
CANADIAN FERNS.

BY REV. ROBERT CAMPBELL, D.D., MONTREAL.

PART VI.—DRYOPTERIS—Continued.

Fern. Although somewhat rare in Canada, this interesting fern is widely distributed, being reported from localities so far apart as Cape Briton, the Saguenay River, where Mr. Watt found it, Hemmingford, the Lake Superior Region, in which it abounds on the Trap Rocks, and the Saskatchawan and Peace Rivers, through to the Artic circle. I came upon it once, on one of the highest peaks of the Laurentians, near Murray Bay. The fine specimen used here for illustration was picked up at Tadousac by Mr. J. B. Goode, of Montreal, who has kindly placed it at my disposal for the purpose. It was Mr. Goode who also reported this fern from Hemmingford.

This *Dryopteris* is a somewhat diminutive fern, varying in height from four inches to a foot, as the two figures in the illustration show, and differs in appearance from every other "Aspidium." It is feather-shaped, and its colour is a bluish-green, the pinnas lying close together. The sori are of a leaden hue, and somewhat bulbous in form, the covering remaining over them even after maturity But while differing in appearance from every other member of the *Dryopteris* family, the feature of this fern that specially attracts the popular notice is its pleasant odour—hence the folk-name "fragrant." Its habitat is the clefts of rocks, and it usually grows in quantities wherever it does occur.



(10) FRAGRANT SHIELD FERN. Dryopteris Fragrans (L.) Schott.



(11) MARGINAL SHIELD FERN. Dryopteris Marginalis (L.) A. Gray.

DRYOPTERIS MARGINALIS (L.) A. GRAY. - Marginal Shield Fern. Every frequenter of the slopes of Mount Royal is familiar with this "Aspidium," and in many forms, too, as well as in many sizes. For, even in the same locality, specimens differing in some small particulars may be found. Its characteristic feature is indicated by its specific name, Marginalis,—the sori are ranged along the margins of the sections of the pinnules, of the fertile fronds. But the margins themselves vary not a little. Sometimes the edges are quite straight, at other times, they are toothed, while occasionally they are deeply lobed. Now and then occur specimens, the sections of whose pinnules are sword-shaped. The latter are usually twice pinnate, all the pinnules besides being pinnatifid. variety which the late Professor Lawson called Traillæ after the venerable authoress of Lakefield, Ontario, whose volume "Studies of Plant Life in Canada," since published, has done so much to popularize the delightful pursuit of field Botany. This variety may be found along the rocky ravines on the steep ascent of the mountain, above the mansion of Ravenscrag. One of the specimens employed in the accompanying illustration has its pinnas curving upwards like those of the species Cristata. The colour is also a light green, while its sori are of a leaden hue. I found this varying form growing in great quantities in the crevices of rocks at Bic.

The typical *Marginalis* is of a shining holly-green, and of a somewhat leathery texture. Besides its characteristic arrangement of sori, its vein markings differ much from those of the other species of "Dryopteris," and constitute a feature of much interest and beauty.

DRYOPTERIS FILIX-MAS (L.) SCHOTT.—Male Fern. English fern lovers recall with delight the "Male Fern" which is so abundant every where throughout Britain, and grows in a circular tust, as the "Lady Fern" and the Onocleas do with us. It is but seldem they have the pleasure of greeting their old favourite in the wilds of Canada. Yet it does occur in a few widespread localities in the Dominion. It is reported from Nova Scotia, New Brunswick, Gaspé, in this Province, Niagara and Owen Sound, in Ontario, and British Columbia.



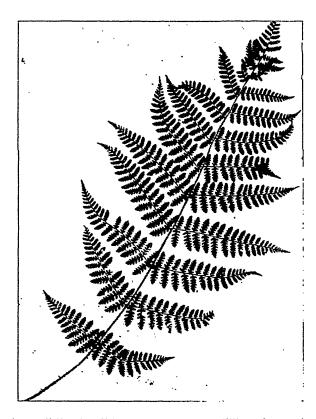
(12) MALE FERN. Filix-mas (L.) Schott.



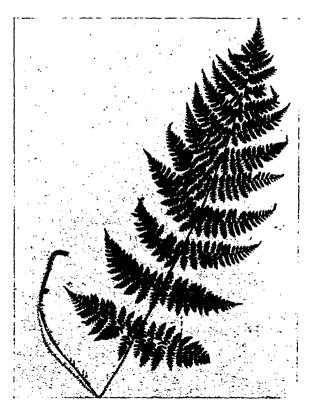
(13) SPINULOSE SHIELD FERN. Di vopteris Spinulosa (Retz.) Kuntze.

In shape, this fern is broadly lanceolate, the lower pinnas decreasing, as in most of the shield ferns. Regularly pinnate, the pinnas are again pinnate, or at least cut down near to the midrib. The segments are regularly oblong, slightly curved very obtuse slightly toothed and connected at the base. The sori are rather large, near the base of the segments, and have the usual kidney shaped covering, which procures for the whole family the designation, "Shield Fern."

- 13 DRYOPTERIS SPINULOSA (RETZ) KUNTZE.—Spiny Shield-Fern. The typical Dryopteris Spinulosa, which so abounds in Great Britain, is somewhat rare in Canada, but is occasionally met with in thick damp woods over the country. The specimen employed for illustration I found in a ravine at Ferncliff, Gananoque, Ontario; but I have seen it growing also in Bagg's woods, Montreal. All the varieties of this species have in common spiny teeth on the margins of the sections of their pinnules,—hence their designation, Spinulosa. The typical form of the species is differentiated from the other two varieties here presented, in that it is only twice pinnate, while the others are tri-pinnate. The pinnules on the midrib are connected by a very narrow wing; in the others, the sections are cut clean through to the midrib. It will be noticed, too, that the pinnæ of the typical Spinulosa are more oblique to the rachis or stem, than those of the others. Then, the covering of the sori is smooth in this variety, while it is surrounded with stalked glands in the variety to be next described.
- Evergreen Wood Fern. There is no fern better known or more prized throughout central and eastern Ontario than this variety of the species Spinulosa. As its popular name implies, it never fails, the old fronds surviving until they are replaced by the new season's growth. When the ground gets bare in spring, this fern is as fresh and green as it was when the mantle of the early winter's snow covered it, and this fact, along with its ample proportions, and the graceful outlines of its pinnules, makes it a prime favourite among Canadian ferns. It grows plentifully in the part of the Park around



(14) INTERMEDIATE SPINULOSE SHIELD FERN. In sopteris Spinulosa Intermedia (Muhl.) Under te.



(15) BROAD SPINULOSE SHIELD FERN. Dryopteris Spinulosa Dilatata (Hoffm.) Underw.

the Park-ranger's residence towards Cote des Neiges Cemetery and beyond the riding course. It specially affects the soil in which Pines and Hemlocks grow. It differs from the typical *Spinulosa*, in its general outline, in being thrice pinnate for the most part, and as to the quality of the covering over its sori. Its pinnules are also more crowded on the midribs.

DRYOPTERIS SPINULOSA DILATATA (HOFFMN.) UNDERW.— The Broad Shield Fern. Not because its general outline is always broader than that of Spinulosa intermedia, just described, is this fern called "The Broad Shield Fern;" but because the individual pinnæ are wider spreading, as well as the sections of the pinnules. glance at the illustrations enables one easily to differentiate the two varieties. The pinnules are not crowded on the pinnæ, but are wide apart; while it is observed that the lowest pair of the Spinulosa dilatata are nearly triangular in form, so much longer are the pinnules near the rachis than those in the middle. In intermedia the pinnæ are lance-shaped, the pinnules along to the middle being of a uniform length. The covering of the sori is also smooth in this variety, as we saw it was in the type first described. To Montrealers, it is this spreading Spinulosa which is most familiar. be said to be the prevailing fern in all the woods for miles around Montreal, both on the islands and on the main land, and we all rejoice in its luxuriance and enduring verdure.

With one more fern we conclude the list of the very large and important family DRYOPTERIS.

ROBERT CAMPBELL.



MORPHOLOGY.

PART II.

STEM; LEAVES; STIPULES.

By Mrs. G. W. SIMPSON, MONTREAL,

The word tissue, applied generally, signifies any woven material;—applied botanically, it means any kind of membrane or filament.

In the stem of plants more than one kind of tissue is found. The sissue forming nodes or knots, bearing, as they do, new young growing points, differs from the tissue forming the internodes, or space between the knots.

The stem, though generally round, is not always so. In some families it is triangular, and in others square. It can also assume irregular and even grotesque forms, as amongst the Cacti and Orchids, the tubers, rhizomes, etc. You will remember that these clumsy-looking vegetables, full of starch, are stems and not roots—they are stems because they hear leaves, which roots do not.

For the most part stems are strong, and can stand upright, but there are stems which spend their strength in trailing on the ground. or climbing by means of some support. It often happens that different habits are found in members of the same family. Climate has a great deal to do with variety of habit; and circumstances have, perhaps, even more. In cold countries, trees are apt to grow low, and extend their branches horizontally, so that the snow may pack them round about, keep them warm in severe weather, and preserve them from the disorganizing mid-winter thaws, until the spring comes to stay. In the thick darkness, and oppressive heat of tropical forests, the flowering orchids leave the ground in which, no doubt, their ancestors made their primal growth, and climb the trees until, in the course of time, they reach the top branches, spread themselves to the light and air, and live among the birds and butterflies. We find their stems twisted and twirled as though they had clung to the tree-tops, in such wise that the wind and heavy rain

could not dislodge them, while their roots hung free in the air, or found a place in the modicum of earth deposited in the forked branches of their strong and tall abodes.

The leaf grows from the stem at a node, which forms the base of the lateral shoot. The tip of the leaf is the apex; the edges between the apex and the base, are the margins, and a leaf has generally an upper and lower surface. Some leaves can easily be detached from the stem, in which case they usually form a kind of cushion at the base, and leave a scar when they fall. In others they form a sheath at the base, as in the grasses and monocotyledones generally. In others again the base is prolonged like wings below the leaf as in some kinds of thistle.

When these basal wings take a branch-like form they are called stipules. The stipules of the Pea Family are large and handsome, but in general they are small and unimportant in size and form. In exceptional cases they become thorns or tendrils, to protect the plant from its enemies, or help it to climb. The power of metamorphosis, or change of shape in a leaf is quite marvellous. There seems no change or use that it cannot assume if the plant to which it belongs needs special service. The stipule itself is only an inferior, accessory kind of leaf, which stays in its place or falls off, just as the leaf proper seems to want it or not. The monocotyledones seldom have stipules, but exhibit every form of basal sheath. Every shoot of grass by the wayside will show you this sheath clothing the leaf-stem. Where the sheath meets the leaf in the grasses, a membranous appendage is found called a ligule.

Leaves are stalked or sessile. If sessile they sit direct upon the stem; if stalked the petiole or stalk may be round, or grooved; it may be short, or long; it may lie on the same plane as the leaf, or it may be placed at right angles to it. In this last case the leaves are easily moved by the wind, as in many poplars. Sometimes, as in the orange, the petiole is winged. These winged petioles are common in the Australian Acacias and are called phyllodes.

The leaf-blade varies greatly in form. It is seen from a thread to a branch, for it may be said to be branched when it is divided

and sub-divided, as in the Legumes, Roses, Meadow-rue and others. The sections, or divided portions, are termed leaflets.

The venation or veining of leaves is principally of two kinds—parallel veined, and netted veined. The words fairly explain themselves. No sharp dividing line can be drawn between the two forms of veins. They pass imperceptibly the one into the other; monocotyledones, however, favour the parallel veins, and di-cotyledones the netted veins.

The leaf has a special function, or office, in plant-nourishment. and will suffer almost any inconvenience to accommodate itself to circumstances, rather than fail in this duty. Thus we find the same plant living under many dissimilar conditions. We have waterbuttercups and land-buttercups; we have creeping buttercups and erect buttercups; and many families of plants show the same power of variation. Some leaves are specialized, or set apart for protective service, as in the case of thorns. Here a leaflet, a stipule, and in extreme cases even a whole leaf is set apart and altered. In Mid-Africa there are thorn-growths so strong and impassable as to make serviceable fortifications, keeping out wild animals and still wilder men. With these natural strong walls we have become familiar of late under the name of Zereba. A leaf sometimes assumes the form of a tendril, and helps the plant to climb. We have a very common example of this everywhere, in the vetch, where the plant has the habit of giving up the terminal leaflet to the office of the tendril.

I have said enough, I think, to show how useful, for general purposes, the foliage leaf is to the plant, but I have yet to show that it is altogether necessary. Without leaves, or organs of similar nature, there would be no plants, and without plants, no animals.

Plants and animals are solid bodies. A solid body has definite form, with power to retain it, and even, within certain limits, to change it. A liquid cannot retain its own form, which is given and retained, for the most part, by some containing vessel. A gas cannot be held in an open vessel, but if required to be confined, must be enclosed on every side.

Although plants are solid bodies, they cannot feed on solids as most animals can. All plant food must either be in liquid or gaseous state. In order to build up their solid bodies, plants must have carbon. Without carbon they would cease to exist. Experiment has taught the botanist that this necessary element is furnished to plants by the agency of leaves.

Carbon exists in the atmosphere in chemical combination with oxygen in the following proportion, namely, one part carbon to two of oxygen, which is the same as saying that a molecule of carbon di-oxide contains three atoms, of which one is carbon and two are oxygen. Carbon di-oxide is commonly called Carbonic Acid Gas.

I must here digress for a moment to tell that free carbon is found in nature in three solid forms, namely, charcoal, graphite or plumbago (of which lead pencils are made), and diamond. The plant structure can easily be seen in charcoal, and often in graphite, but before the diamond discloses its nature, it must be burned.

The leaf cannot feed on any form of solid carbon. It cannot feed on solids under any circumstances. The carbon, therefore, must be presented to the leaf in form of gas. The leaf seizes the carbon di-oxide from the air, acts chemically upon it, and produces certain materials, bearing the general name of carbon-compounds, upon which it can feed.

Great efforts have been made, and are still being made, to locate the chemical power within the leaf. Three agents seem necessary to the work,—three at least,—heat, light, and chlorophyll. That is to say,—a right temperature; a certain intensity of light; and a peculiar green colouring matter, called chlorophyll. What the nature of chlorophyll is, no one seems quite to know. The function of the green leaf is said to be that of seizing the carbonic acid gas from the air, and rendering back to the air an equivalent in the form of oxygen.

We have now seen that green leaves take from the air carbon and oxygen—that they retain the carbon and return the oxygen—but it must be stated that they do not do this unassisted. It is not a simple taking of carbon and rejecting of oxygen, for the plant

does not feed directly on the carbon. It accepts the help of the roots and other organs to prepare and store various kinds of food which it is able to assimilate, of which carbon is the basis.

Before we are prepared to enquire what that food is called which the plant requires for its nourishment and growth, we must spend a little time upon the morphology of the root.

But this we must reserve for another paper.



CALIFORNIA POPPY.—The California Poppy, or Eschscholtzia Californica, enjoys a special reputation along the Pacific Coast of North America as a soporific and analgesic. Some varieties appear to be more active than others. It is supposed to contain a small amount of morphine, but Professor Shoemaker states (Month. Mag. Pharm.) that other principles not yet completely isolated contribute towards producing its effects, and among them the active principle called sanguinarine. It has been found to be an efficient and harmless soporific agent, especially for children. It relieves pain and induces sleep, relieves tremor and agrees well with the digestive organs. The California Poppy is used in the form of a fluid extract or as a syrup, half a fluidram to five fluidrams at a dose. It is said to be a good addition to cough mixtures where the use of opium is not considered advisable. The cumulative effects in human subjects resemble those produced by codein. Though it: narcotic effects are not very decided, they continue for a considerable period after the medicine is discontinued.—Western Druggisi

AMATEUR DEPARTMENT.

ONDUCTED BY MRS. ANNIE L. JACK, CHATEAUGUAY BASIN, CHATEAUGUAY, QUE.

To our Readers:

In order to be in touch with those who are interested in our work we must know their needs, and position, and this department is established by the Editors of the magazine to enable the amateur gardeners to consult with me as to the best methods of cultivating fruits, flowers and vegetables. It is for those who are named under the heading of "amateurs," but any professional who is willing to contribute of their larger experience and wisdom will be welcomed among us. If "two heads are better than one," then the heads and hands of many must produce only the best, and that will be our aim. Every one with a few window plants, or a small garden, should give their own experience towards the good of the gardening public, and we welcome the two letters given below, and will try to answer the questions that have puzzled them. So, reader mine, let us help each other and the editors promise to have the magazine more up to date in future, so that the doing of the month will be in advance of its coming. This is a much needed improvement that we all shall welcome, for there i, "a time for everything" and it is as well to take it "by the forelock."

LETTERS FROM READERS.

Will the Editor of the Amateur Department tell me why a salvia that did not bloom all summer, and was only in flower two weeks after being lifted in the fall should become only a skeleton of stalks and branches by this time.

Yours truly,

BERTHA.

In answer to this I would say that the salvia, if very carefully managed, sometimes blossoms in winter. It must not be kept too wet or dry, or be too full of new growth when lifted. But the stalks

and branches will make excellent cuttings for planting out if started in sand next month, and it is a gay bloomer for a bed in summer. Early starting is what is required to have good blooming plants, and they will need to be transplanted into pots when well started.

The next letter is from Michigan, it reads: I am wondering already what I shall do with a precious Calla Lily, that is now full of buds and flowers. It was given to me so, and I have never had the summer care of this plant. Our garden is very shady, is that good?

The reply is that a shady nook is the very best place to keep a Calla, particularly if it is damp there. When the plant has finished blooming and warm weather comes, gradually give less water, and when the foliage fades, turn the pot on its side, if you prefer this method. Our best winter bloomers are planted out; and allowed to grow, then lifted in September, when new leaves will soon appear, if the pot has been on its side, but the earliest flowers for Christmas will be from the plants that have made some growth, and then are lifted without disturbing the roots. Liberal watering and good drainage is necessary for the Calla, for they will not thrive if the soil is sour, or the water stagnant. No window garden is complete without a Calla, and they grow to immense plants if given plenty of tub-room, and two months' rest in summer.

THE NEEDS OF THE MONTH.

If the ground is bear of snow it is well to get something light to cover the bulbs and tender plants,—a little strawy manure or mulch of any sort, for it is not to keep the frost out, but to keep it in, and to avoid the freezing and thawing that does so much mischief. Tender shrubs can be protected by long straw tied about them. Barrels put over plants are very unsightly, sticking above the snow all winter, for it is a long season, and does not need to be made unsightly by these obstructions on the lawn.

In the greenhouse and windows where plants live behind the glass, the sun is beginning to exercise its power over the plant world. Let time be taken to clean up Palms, Rubber plants and Dracænas, by sponging the leaves with whale oil soap and afterwards with clean water.

Give good ventilation on pleasant days, but avoid draughts. Let it be about 70 degrees in the daytime and 55 degrees at night. Never give fertilizer unless the plants are in a growing state. Spray the foliage of plants to give them the dew they would have in their natural state.

If Geraniums fag quickly and do not seem satisfied with a moderate amount of water be sure that they are pot bound and need shifting. If the Azaleas look fagged when in the window be sure to shade them from the hot sun, or leaves and flowers will suffer. Give plenty of water and keep cool. New growth that may start on the flower branch must be rubbed off, or the blossoms will suffer. worst trouble as the sun gets more power is that the insects get more numerous, and require greater attention. Sprinkle with tobacco water for green fly, and wash with whale oil soap if very badly infested. Red spider can be kept in check if the leaves of the plants are kept moist. The mealy bug is a soft winter bug that looks as if it could only be a bit of cotton wadding stuck on to the stem, or in the crotch of a branch. It is, however, troublesome to disloge, and causes the leaves of most plants to turn yellow and drop off. succumbs to a bath of strong soap suds and a rinsing of clean water, and yet grows again so fast that it must be watched for and destroyed. We have found it very destructive to Bouvardias, if not noticed in time it will rob the plant of all its flowers.

Chrysanthemums that have done blooming and are put away in the cellar must be taken care of, and not allowed to get too dry, if cuttings are wanted for the next season. Tulips that have blossomed may be stored away in a paper bag and set out in some corner of the garden in spring. They will perhaps recover and bloom a year later. Last season our pots of choicest Tulips were put in the cellar and destroyed by mice, who seem to find something they approve of in the centre of a Tulip bulb. Freezias, that fall over and look limp, have a better chance for flowers if tied up and set where they will get the morning sun. When in flower they need to be shaded and watered, or the blossoms will wilt very quickly. They are worthy of a little attention, being so very fragrant. The best work that can

be done while the "frost is on the window pane" is to read and study the best methods for laying out and planting the garden, remembering where mistakes were made last season, and being ready to correct them when the time comes. A little knowledge of good effect is useful, and a person of good taste will study for this result, instead of leaving the plants in a jumble of confused colors and uneven height, that do not show to advantage. So we will plan while the plants are sleeping, and be ready to care for and to enjoy them when they awake in the springtime.

Annie L. Jack.

WILD FLOWERS OF NEW ZEALAND.

BY MARY REYNOLDS, N. Z.

The Herpolirion, (Order, Liliaceæ) is a small, creeping plant found in swampy places on the mountains of Canterbury and Nelson. It has stiff stems, narrow leaves, and waxy-white flowers, with seed-bearing filaments.

Belonging to the order Saxifrageæ is Weinmannia silvicola, (called Tawhero by the natives,) a handsome, but small, evergreen tree, bearing in the greatest profusion erect racemes of pretty white, or pale red flowers; the leaves are exceedingly variable in form. This species is said to be identical with a New Caledonian one. The trunk of the tree is from one to three feet in diameter; the timber is of a brownish-red, close in the grain, strong, and tough; the bark contains a large percentage of tannin, and has been used in tanneries.

Weinmannia racemosa, or Lowai, attains larger dimensions than the above, which, however, it closely resembles, except that the leaves are more leathery. The flowers are in bloom from December to January, and, owing to their profusion, the tree looks very beautiful during that time. The timber is darker than that of W. silvicola; its durability has hardly been tested, but while under the influence of sun and air the wood quickly decays, it seems to be extremely lasting buried underground in wet places, where other timbers would be of little use.

Leucopogon fasciculatus, (Order, Ericeæ,) is a large shrub with slender spreading branches, the flowers are greenish white, minutely small, on drooping spikes; the berry hard and fleshy. Most frequently found in hilly places.

Leucopogon Frazeri is a very small, erect plant, with curving branches, close-set leaves, hard, lanceolate, and bright green; and large solitary flowers white and bearded, very hardy, and useful for cutting, as they last so long in water, and also for hand bouquets. Abundant throughout New Zealand on dry soils. The berry, which is orange-colored, with a sweet taste, is edible. Some of the genus grow in Australia, and are called "Native Currants" by the settlers.

The Celmisias, (Order, Compositeæ,) of which I wrote before as growing about the mountains of Canterbury, are very variable in species, of which there are about thirty C. Monroi has stiff, pointed, wrinkled leaves, and large white flowers tinged with pink or purple outside the petals, which grow on stalks covered with a white wooly substance, giving the plant a most remarkable appearance. It flowers in January and February, and is found at altitudes of from three thousand to four thousand feet.

Celmisia troloserica has broad, leathery leaves; those of C. verbascifolia are lance-shaped, with wooly edges, shining above, and thickly clothed below with a pale yellow down; C. vermicosa is densely tufted, very leafy, and everywhere glossy and shining; the flower rays numerous, with purple disk—a beautiful plant.

In telling you of the Senecios I inadvertently left out some very pretty ones. S. pendicioides flowers in December, a compact, close-growing shrub from six to twelve feet high; found more than a hundred y' ago by Banks and Solander, two celebrated naturlists who were with Captain Cook on his first voyage to these shores; it is easily recognized by its small, oblong, crimped leaves, and heads of deep yellow flowers. S. Huntii also has yellow flowers, but larger, and more Daisy-like; and the leaves are smooth and glossy. S. eleagnifolius, also a small shrub, has very thick leathery leaves, bright green, with white markings on the upper surface and yellowish-brown beneath; the flowers are white and yellow, small and tubular.

I think only one Dendrobium has been found here—D. Cunninghamii—an epiphyte growing on the trunks of trees (as its name, which is of Greek origin, signifies,) in several places, notably in Great Barrier Island, where the ill-fated steamer "Wairarapa" was wrecked during a fog last November. The roots are white, long, and cylindrical; leaves narrow, stems reddish-brown; and flowers pale rose-color, and very beautiful. As a rule Dendrobiums are not difficult to cultivate; they will generally thrive on a block of wood, and enjoy copious supplies of water during the growing season.

Linum Monogyrium, (Order, Lineæ,) is a pretty, delicate-looking plant, growing plentifully about the hills and steep broken riverbanks. It is very beautiful, with its milk-white flowers, (the children here call them Milk-maids,) and pale green, narrow leaves. It flowers here in February, but in English greenhouses in June and July. Unlike its English sister, the little annual blue Flax-plant, this pearl among our wild flowers is a perennial. So light are its slender and delicate stems that they nod and bend with every passing breeze, even when there is hardly motion enough in the air to sway the long summer grasses, reminding one of Mary Howitt's lines to the English Flax-flower:

"Ah! the little Flaxflower, it groweth on the hill, And be the breeze awake or sleep it never standeth still. It groweth, and it groweth fast, one day it is a seed, And then a little blade, like grass, no better than a weed; And then comes out the Flaxflower, uplifted to the sky—And 'Tis a dainty little thing,' we say as we go by!"



The Mountains of Asia Minor have furnished to cultivation some of our choicest spring gems. The Chionodoxas and the Giant Snowdrops are among them. Of the former there are four varieties, and we are now wondering how we ever got along without them. They are very early and very beautiful and also very easily flowered in pots during winter. Half a dozen bulbs may be planted in a six-inch pot with a delightful result.

RUBBER TREES.

The Central American Rubber-tree (Castilloa elastica) is native in all the coast valleys. This is one of the most important of all the rubber-producing trees, and is, perhaps, the most valuable of all. The Para Rubber (Hevea braziliensis) grows only in swamps, the true Rubber (Ficus clastica) does not seem to be successful as a rubber-producing tree away from its home in the East Indies, and the Ceara Rubber (Manihot Glaziovi) is of difficult cultivation while the Castilloa is of the easiest. It forms a tree forty or fifty feet high with a clean, smooth stem sometimes two feet in diameter. The leaves are large, oblong in shape and covered with scattering hairs. The foliage is light green in colour, rather scanty and generally produced on the extremities of the branches, The flowers are small, of a greenish-yellow colour and the tree blooms in February and perfects its seeds in three or four months thereafter. Mr. Morris gives such a good account of the gathering of the rubber that I reproduce it in part, as it is better than I can give:

"The Castilloa Rubher-tree is fit to be tapped for caouchouc, produced by its milk, when about seven years old. The milk is obtained at present from trees growing wild, by men who are well acquainted with the different localities inhabited by the tree.

The flow of milk is most copious during the months of October, November, December and January. The rubber gatherer commences operations on an untapped tree by reaching with a ladder, or by means of lianos, the upper portions of the trunk, and scoring the trunk the whole length with deep cuts which extend all around. The cuts are sometimes made so as to form a series of spirals all around the tree. At other times they are simply shaped like the letter V, with a small piece of sheet iron, the blade of a cutlass or the leaf of a Palm stuck at the lower angle to form a spout to lead the milk into a receptacle below. A number of trees are treated in

this manner and left to bleed for several hours. At the close of the day the rubber gatherer collects all the milk, washes it by means of water and leaves it standing till the next morning. He now procures a quantity of stems of Moon-plant Calonyetion speciosum), pounds it into a mass, and throws it into a bucket of water. After this decoction has been strained it is added to the rubber milk in the proportion of one pint to a galion, or until, after brisk stirring, the whole of the milk is coagulated. The masses of rubber now floating on the surface are now strained from the liquid, kneaded into cakes, and placed under heavy weights to get rid of all watery particles."

A full average sized tree is said to yield about eight gallons of sap which makes about sixteen pounds of rubber. The source of supply is liable to become exhausted unless private plantations are made, and the government offers a bounty to any one who plants them. I would think they would be a good tree to grow with Cocoa as they would furnish the required shade and be of profit also.

A few words about another useful plant—the Sarsaparilla, familiar to all as the basis of blood-purifying medicines. to the Smilax family and is an enormous vine, very troublesome in newly cleared plantations. It grows to a great height climbing over the trees. The part used is the long roots; this the Zarza—the vine is known as Zarza here-gatherer digs from the soil, places the stem back in the hole and covers the end with earth; it takes root again and in time produces another crop. The roots are washed, tied into bunches and sold to the dealers who have the roots made up into tight rolls, bressed into bales and sewed up in hides and shipped in that form. It is worth about ten cents per pound and many thousand pounds are annually exported. The vine is easily propagated, both by seeds and cuttings, and requires no cultivation The yield is said to average twenty pounds of dried root to each vine, and at the price of ten cents per pound ought to be a profitable crop to grow.

BUYING FRUIT TREES.

The average amateur horticulturist knows little about buying nursery stock. An owner of a garden is fortunate if he can class among his acquaintances a reliable nurseryman, to advise him in his purchases.

It is safe to say that half of our horticultural amateurs do not know the name and address of a reliable grower of nursery stock. They do not seem to think it necessary to find out if the man from whom they buy their trees can be relied upon to supply varieties true to name. As a rule they only think of buying when the tree agent comes around. This person, who is generally equipped with a book of beautiful plates, painted from life, and a case of handsome real fruit samples, done up in spirits, is perhaps an entire stranger, but he knows how to talk and has learned his piece by heart. usually succeeds in getting an order and a contract from the purchaser, agreeing to pay a good deal more than the stock is really The goods arrive in due time, are usually in good condition, worth. well packed, and for the most part grow. But when they come to fruiting they very often turn out to be other varieties entirely from those ordered, sorts altogether unsuited to our locality and the chances are that in the course of a few years the trees all die out. They are unable to survive through a severe winter. There are very few people interested in gardening who have not had experiences of this kind at some time or other. But it is only fair to say that there are exceptions among tree peddlers, and an honorable one who knows his business is met with at times

There are resident agents in some localities, who, after many years of upright dealing, can be relied on to supply good stock, true to name, at reasonable prices. This he procures from reliable nurserymen. Such an agent, as a rule, is well posted on fruit culture, varieties, and the soil in which they succeed. He interests amateurs in his district in fruit growing for home use, and by this means, and the example of those who buy from him, induces many to plant,

who never would have attempted such a thing but for his efforts. Amateurs who have such an agent in their locality are often better treated by him than they would be by a grower at a distance. The agent cannot afford to supply stock not true to name or poor in quality, or his reputation and business would be ruined. But as a general thing it is best for the amateur to order direct from a responsible grower.

Very often stock is offered at very low prices by dishonest persons, who represent to be growers, and who are really agents. They buy large quantities of almost useless stuff, where they can get it cheapest, and sell it to their customers at prices lower than honest growers can afford to sell at. The agent of this kind often publishes a very gaudy catalogue and great bargains, but supplies trees of little worth, poorly packed and likely not true to name. Another way in which to gain experience is to buy high-priced novelties. Very few of these, when tested for a few years, prove to be better than older kinds, and the great majority of them turn out to be inferior to standard sorts, which might have been purchased for one-tenth the price. Until a novelty has been thoroughly tested it is safe for the owner of a small garden to get along without it.

The agent who offers for sale "great acquisitions" in the shape of raspberries that will bear fruit in abundance from early June till October, the tree blackberry growing twelve feet high, and the grape without seeds as large as a pigeon's egg, can be looked upon as a downright fraud—an unsafe person to have any dealings with.



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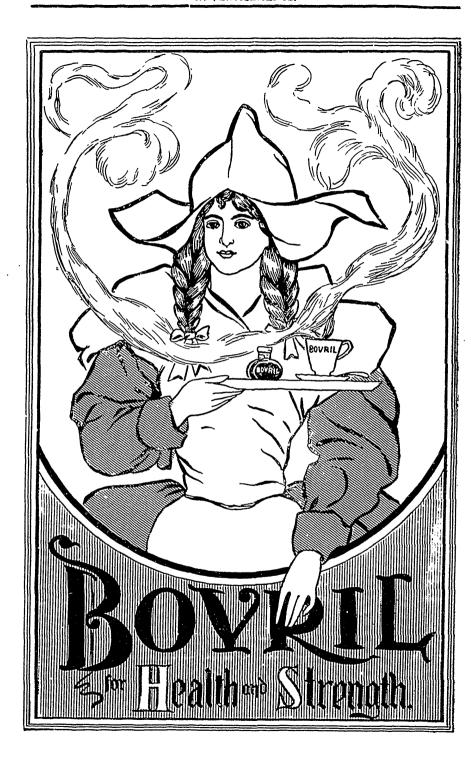
In order to inoculate these fine qualities on other sorts it has been used as a parent plant by cross fertilizing with other meritorious sorts, and it has thus given birth to a large number of our most valuable hybrid remontant and hybrid tea roses, which retain to a remarkable degree either one or the other of the leading characteristics of this beautiful variety.

The culture of any variety belonging to this class is very simple. Good rich loam, enriched every year by a good top dressing of well rotted manure, will produce an abundant supply of strong shoots, on which the flowering shoots are produced. Trim in spring, when still in a dormant condition, by cutting away at lease one-third of last year's growth, thus removing the weak outside eyes and forcing all the strength of the plant into the best developed eyes of the branches, thus securing large perfect flowers instead of a great number of inferior ones. After the first crop of flowers is passed, cut back the flower shoots again, one-half or more, to force the breaking of new shoots at once.

Before the advent of hybrid tea roses, in which we find united the free blooming habit of the tea rose with the exquisite colors and fragrance of the hybrid remontant roses, the growing of the General Jacqueminot for winter bloom was very popular, and the wholesale price for Christmas was for several decades one dollar per flower; but such sorts as Meteor, W. T. Bennett, Souvenir de Wotton, and especially American Beauty, have crowded it out of the proud position it once held for forcing purposes.

But as long as roses will be grown and cherished as the queen of flowers the famous General Jacqueminot rose will hold its place in any collection.

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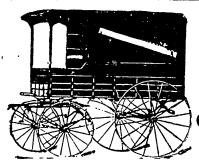
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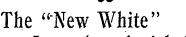
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