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2. ARISTOTELIA COLENSOI (*Hook., F.*) Mr. Colenso's Aristotelia.

SPECIFIC CHARACTER.—Very similar, in most respects, to *A. racemosa*, but differing in the much narrower, perfectly glabrous leaves, which are ovate-lanceolate, narrowed into a long acuminate point, deeply irregularly serrate; and the

small fruit, which is no bigger than a peppercorn. The seeds are as in *A. racemosa*. I have seen no flowers.—*Handbook of the New Zealand Flora*, p. 33.

DESCRIPTION, etc.—This small tree is common to the Northern Island, and is known mostly as growing in the woods of the Wairarapa Valley. It is probably known in other districts, but its presence has not been indicated. It is in appearance similar to *A. racemosa*, but has much smaller leaves and smaller fruit. It is consequently not so handsome as the foregoing. The able compiler of the "*Handbook*" not having seen the plant in flower,—only, evidently, having had a fruiting specimen to diagnose,—we are unable to speak as to the size or colour of its flowers. The species is called after Mr. Colenso, F.L.S., as a further tribute to his extensive researches in New Zealand botany.

3. ARISTOTELIA FRUTICOSA (*Hook., F.*) The Shrubby Aristotelia.

SPECIFIC CHARACTER.—A small, rigid, erect or decumbent shrub, with woody tortuous branches, and erect or spreading downy shoots, with red-brown bark. Leaves very variable, on short, downy or glabrous petioles, coriaceous, $\frac{1}{4}$ –1 in. long, ovate-obovate, or linear-oblong, obtuse, entire, erenate-toothed, serrate or lobed. Flowers minute, usually solitary and axillary,

rarely racemose; peduncles usually short. Petals, 4, very short, or as long as the calyx, entire or lobed, pink, shorter than the female. Stamens, 4–6; filaments short; anthers downy; ovary 2–4-celled. Berry, globose, small, 4–6-seeded. Seed with a bony, rugged testa, covered with a thin pulp.—*Handbook of the New Zealand Flora*, p. 33.

DESCRIPTION, etc.—This species is common in mountainous districts throughout the Islands, at an altitude of from 2,000 to 4,000 feet, and varies greatly in character. It is stated by Sir J. D. Hooker, in the "*Handbook*," "that he made four varieties, but they seem to be only states, determined by age and exposure, rather than hereditary races." Messrs. Hector and Buchanan appear to regard this species as a form of *A. racemosa*. As in *A. racemosa*, the flowers are polygamous, but much smaller and more sparingly produced, and are destitute, like the other species, of fragrance and honey. Its specific name is due to the plant being of a shrubby character.

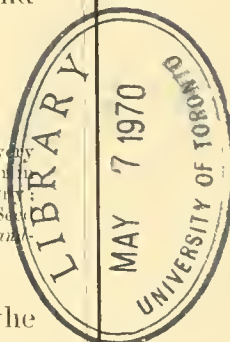
GENUS III.

ELÆOCARPUS (*Linn.*) The Elæocarpus.

GENERIC CHARACTER.—Trees generally hard-wooded, with the branches leafy at the extremity. Leaves generally alternate, exstipulate. Flowers racemose, usually hermaphrodite, pendulous. Sepals, 4 or 5, valvate. Petals, 4 or 5, lacinate, induplicate-valvate. Stamens numerous, seated on a glandular torus; filaments short, anthers long, awned, pubes-

cent, opening by a short terminal slit. Ovary 2–5-celled; style subulate, stigma simple; ovules 2 or more, pendulous. Drupe with one bony, 1- or several-celled nut, which is often tubercled for wrinkled. Seed pendulous.—*Handbook of the New Zealand Flora*, p. 34.

DESCRIPTION, etc.—A very large tropical genus principally of India and Java, a few species occurring in Australia and New Zealand. They either form trees attaining



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sometimes the height of fifty to sixty feet, or are large shrubs. *E. ganitrus*, a tree growing forty or fifty feet high, is a native of India and the Malay Islands, where the hard stones of the fruit are commonly used for stringing into rosaries, or for making necklaces, bracelets, buttons, heads of pins, and similar articles. The genus is represented in New Zealand by the following:—(1.) *ELÆOCARPUS DENTATUS*, a small tree having silky twigs and leaves with recurved margins; (2.) *ELÆOCARPUS HOOKERIANUS*, a small, quite glabrous tree, with smaller flat leaves. The name given to this genus bears reference to the olive-like drupe and stone which characterises it.

1. *ELÆOCARPUS DENTATUS* (*Vahl.*) The Tooth-leaved *Elæocarpus*.

SPECIFIC CHARACTER.—A small tree with brown bark, which yields a permanent dye; branches fastigate at the top of the naked trunk, silky when young. Leaves erect, petioled, 2-3 in. long, very coriaceous and variable, linear-oblong, obovate or lanceolate, obtuse or acuminate, margins recurved, sinuate-serrate, below often white with silky down, and with

hollows where the veins meet the midrib. Racemes glabrous or silky, of many white pendulous flowers $\frac{1}{2}$ in. diam. Petals lobed or lacerate. Anthers with a flat recurved tip. Drupe $\frac{1}{2}$ – $\frac{3}{4}$ in. long, ovoid; pulp astringent but eatable; stone deeply furrowed.—*Handbook of the New Zealand Flora*, p. 34.

DESCRIPTION, etc.—Fig. 1, Plate No. 15.—The “HINAU,” or “WHINAU.”—This tree is common to both Islands, and is especially plentiful in some parts of the Wellington District. It ascends from almost sea level to an altitude of 2,000 feet on the mountains. On account of the permanent dye that it yields, the Hinau is considered to be valuable. In favourable localities it often attains a height of from fifty to sixty feet, and has a stem from two to three feet in diameter. The wood is a reddish brown, very tough, strong, and durable; it splits freely, and the heart has given satisfactory proof of great durability when employed for economical purposes. It has been used in mines for props and sleepers with marked advantage; and, after a test of many years, has been found to be quite sound and in good condition. It is even asserted that the wood hardens with age. In some localities it is much prized by the settlers for fencing purposes, and serves as fuel. The appearance of the tree when in blossom, in October and November, is charming. The dense green foliage, interspersed with its conspicuous and abundant pendulous, creamy-white flowers, affords a pleasurable spectacle, well worthy the attention of all lovers of nature, and admirably suited for the brush of the artist. The flowers are not fragrant, but they produce large quantities of honey, which is probably secreted by the circle of glands surrounding the base of the stamens. In olden times, the Native chief who was proprietor of a goodly grove of Hinau trees was considered a man of great wealth and importance, since from these his tribe derived a large portion of their sustenance, the berries of the trees affording a rich harvest of food. To rob a Hinau grove was considered by the ancient Maori, a capital offence. The fruit, which grows plentifully in small loose bunches, (*racemes*), is a small drupe, about the size of a large sloe, having a



Prunella vulgaris L. *Prunella vulgaris* L. *Prunella vulgaris* L.

peculiarly-shaped, furrowed nut within; its skin is hard, dry, and shining, and of a greyish colour; the outside, or fleshy part, is also dryish, small in quantity, austere, and altogether uncatable in its raw state. These fruits were collected when ripe, in large quantities, and placed in water in the hull of a canoe, or some such large receptacle, where, after steeping, they were well rubbed in the hands, the nuts, stalks, and bits of broken skin strained out, the water carefully drained off, and the grey, coarse meal left as a residuum, made into a huge cake, cooked, and eaten. To bake a big cake through, it often took two days. In colour the cake was a blackish grey, darker than barley or rye bread; the rough, unpalatable taste of the fruit in its raw state being wholly lost in the cooking. This food was greatly esteemed, and, when in season, always made a first-rate dish for visitors. The rats in the forest are exceedingly fond of its kernel, and prove themselves very expert in boring through the hard shell to extract it. The bark of the Hinau yields a permanent blue-black dye, which is used largely for tanning purposes; and, by adding the rust of iron to it, produces an excellent non-corrosive ink. The dye was formerly much in request by the Maoris for colouring their flax mats and baskets, using a mordant composed of aluminous clay. The tan-producing properties of the bark of the Hinau is estimated to be second only, amongst New Zealand trees, to the Tanekaha (*Phyllocladus trichomanoides*), and has for years past been an article of export, besides being much sought after by local tanners.

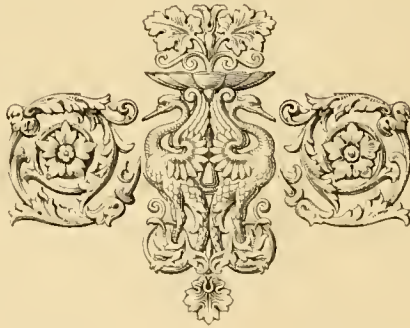
2. ELÆOCARPUS HOOKERIANUS (*Raoul.*) Dr. Hooker's Elæocarpus.

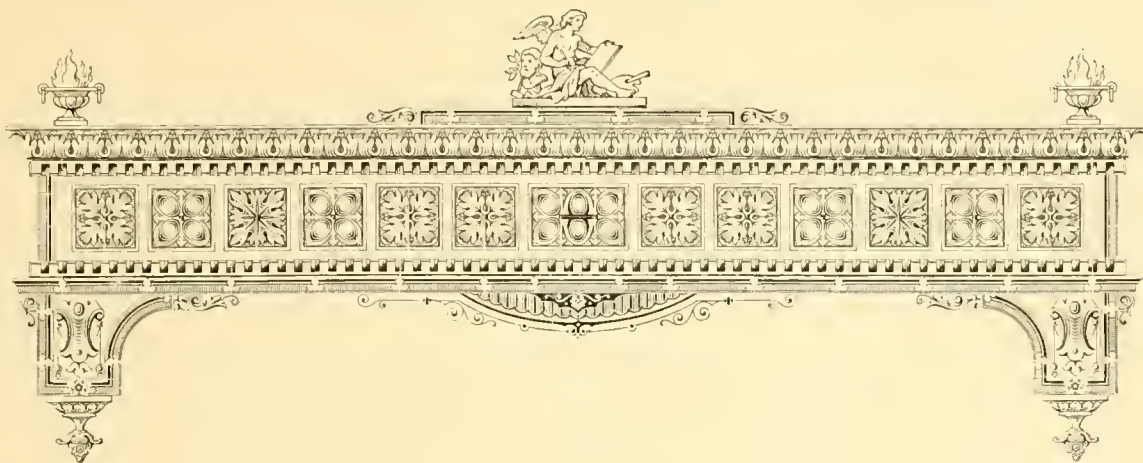
SPECIFIC CHARACTER.—A small quite, glabrous tree, 30–40 ft. high, like *E. dentatus* in habit, but smaller in all its parts. Leaves coriaceous, elliptical or linear-oblong, obtuse, 1½–2 in. long, margins flat, crenate or sinuate-serrate, those of young plants linear and pinnatifid; petioles ¼–½ in. long.

Racemes erect, shorter than the leaves, with small, drooping, whitish flowers; Sepals, lanceolate; Petals rather longer, unequally cleft into obtuse lobes. Anthers obtuser than in *E. dentatus*. Drupe small, blue, ⅓ in., with a furrowed, rugose nut.—*Handbook of the New Zealand Flora*, p. 34.

DESCRIPTION, etc.—The “POKAKO.”—This species is indigenous to the hilly portions of the Northern, and common on the Middle Island. It is smaller in all its parts to *E. dentatus*, but differs widely from it in its more compact habit, smaller close-set leaves, and small flowers, which are greenish white, and drooping, but very conspicuous by their abundance. Though destitute of fragrance, equally, with those of the “Hinaiu,” they produce a good deal of honey. This tree, in favourable localities, sometimes attains a height of fifty feet, with a trunk two feet in diameter, but is usually smaller. It is noticeable that in young plants the leaves are small, crowded, and variously-shaped, whilst the branches are flexuous and interlacing, in no way resembling the mature trees. The timber is whitish, compact, and difficult to split, but apparently

not durable. In some parts of the Middle Island it is often sold as white pine, and has been utilized in the construction of earth-wagons and trucks. It may be used with advantage for a variety of inside work. In the Nelson District this species ascends the mountains to an elevation of 3,500 feet. Its native name is "Pokako," or "Mahi-mahi," but it is very commonly called "Hinau" by the settlers. In the same manner the "Hinau" in the Northern Island is sometimes called "Pokako."





CHAPTER XII.

ORDER XII.—LINEÆ. (The Flax Family.)

CHARACTER OF THE ORDER.—Herbs or under shrubs, usually with entire, alternate leaves and sub-racemose, handsome, hermaphrodite, regular flowers. Sepals, 5, free, imbricate. Petals, 5, free, fugacious, contorted. Stamens, 5, hypogynous; filaments united below into a cup, which has usually 5 minute

glands at its base; anthers, versatile. Ovary, 3-5-celled; styles, 3-5, stigmas terminal; cells, 1-2-ovuled. Capsule splitting septoidally into indehiscent or dehiscent 1-2-seeded cocci. Seeds with scanty albumen or none.—*Handbook of the New Zealand Flora*, p. 34.

DESCRIPTION OF THE ORDER.—



ATHER a large order, abundant in Europe and North Africa. The plants yield mucilage and fibre. The flax (*Linum usitatissimum*) from which the linen of commerce is made, belongs to the New Zealand genus, which is likewise a large European one. The name of the order is taken from the Latin, meaning "a thread of flax."

1. LINUM (*Linn.*) The Flax.

GENERIC CHARACTER.—Glabrous herbs, with narrow, quite entire leaves, fibrous bark, and usually large flowers. Sepals, 5, entire. Stamens alternating with 5 setiform processes of the staminal tube. Ovary, 5-celled; cells imperfectly

divided by a longitudinal septum. Cocci, 5, septate, 2-seeded or 10, by each splitting along the septum.—*Handbook of the New Zealand Flora*, p. 35.

DESCRIPTION, etc.—This genus, which gives its name to the order Lineæ, consists only of herbs as far as relates to New Zealand. In Europe the species are numerous, and comprise some small shrubs. Very few of them are of any importance except *L. usitatissimum*, the common annual Flax, which has been an object of cultivation from the very earliest times. We read of Flax being grown at the time when the Israelites were in Egypt. The seeds yield an oil by expression, which is known as linseed.

1. LINUM MONOGYNUM (*Forst.*) The One-styled Flax.

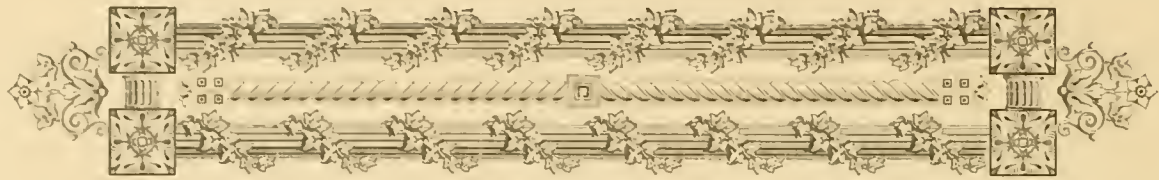
SPECIFIC CHARACTER.—A perennial, variable herb, sometimes woody at the base, simple or branched, 6-12 in. high, erect or decumbent. Leaves, $\frac{1}{2}$ 1 in. long, oblong-linear or linear-subulate, 1-3-nerved. Flowers numerous, white or pale

blue, very variable in size. Sepals, ovate-lanceolate, acute. Styles united, their free tips recurved. Capsule, globose, of 10 cocci. *Handbook of the New Zealand Flora*, p. 35.

DESCRIPTION, etc.—Fig. 2, Plate No. 15.—The “RAUHUIA” or “KAHO.”—This interesting little plant is common, especially on rocky coasts, throughout both Islands, and ascends 2,000 feet in the mountains of Canterbury. It is likewise indigenous to the Chatham Islands. Two varieties are named, the one (*grandiflorum*) being erect and branched, with numerous flowers one-half to one inch across; whilst the other (*diffusum*) is decumbent, with few flowers, one-quarter to half an inch in diameter. Our plate represents a figure of the erect variety, a very chaste and beautiful plant. The Linum family has been largely introduced into British gardens, and all possess handsome flowers of various hues and colours—white, yellow, blue, rose and parti-colour. *L. narbonense*, a native of Spain, is said to be the most beautiful of the species, and *L. usitatissimum* the most useful. The latter is only known at the present day as a cultivated plant, or as occurring in a semi-wild state in places where it has escaped from cultivation. In some parts of New Zealand it is frequently to be seen by the road-sides and in the ditches asserting its right to domicile. Being a hardy plant, when once located it spreads quickly. History tells us that this species has from time immemorial been cultivated for its tenacious fibre, it being one of those plants which the wants of man early taught him to use. The Bible affords us ample proof of the antiquity of the use of flax as a material for weaving cloth, and the long period during which it has been an object of culture has, doubtless, as in other known instances, so altered the appearance of the plant that it is not recognizable in its original form, if such exists at the present day. Microscopists have proved that the cloth used by the ancient Egyptians for wrapping round mummies, the antiquity of which is undeniable, was made of flax. Flax and linen formed an article of commerce between the ancient Egyptians and Greeks. The plant was also cultivated by the early Romans; but, as their clothing was chiefly made of wool, it did not find much favour. In modern times the culture of flax is widely spread in the Northern Hemisphere, extending from the tropics of India and Egypt to the northern parts of Europe. Besides the fibre of the flax plant, its oily seeds, known as linseed, are a commercial article. The finest kind of oil is the product of simple pressure, and is called “cold drawn;” but the ordinary kind is obtained by breaking up, beating, and re-pressing the cake left after the last process. It is a non-drying oil; but, by boiling with sugar of lead, red lead, or white vitriol, it is converted into a drying oil fit for the use of painters. The cake is greatly valued by agriculturalists

for feeding purposes, but it has a tendency to make the fat of beasts fed upon it of a deep yellow colour. The sole English species is known as *Linum anglica*. It is a perennial, has pale blue flowers, and is found generally on chalky or sandy soils. The subject of our plate, *L. monogynum*, was introduced into Britain from New Zealand in 1835, and, under cultivation, has much improved. Instead of the simple display of the New Zealand species, it forms a showy head of white flowers in corymbose clusters, exceedingly pretty. As our native *Linum* is hardy, and can be propagated by division of its roots, cuttings, or seeds, we would say, seek to introduce so graceful and interesting a plant into the garden, where, under slender care, it would improve, and add to the floral treasures around the homestead. The name *monogynum* bears reference to the species having its styles united, or forming, as it were, only one.





CHAPTER XIII.

ORDER XIII.—GERANIACEÆ. (The Crane's-bill Family, including Oxalideæ.)

CHARACTER OF THE ORDER.—Herbs, with leaves opposite or alternate, and regular or irregular hermaphrodite flowers. Sepals, 5, free, imbricate, one sometimes spurred. Petals, 5, rarely fewer, imbricated. Disk, inconspicuous or glandular. Stamens, 10, hypogynous, the alternate ones often smaller or imperfect, or without anthers; filaments often connate below;

anthers, versatile. Ovary, 3-5-lobed, or 3-5 carpels combined in the axis, produced into as many free or connate styles, with capitate or longitudinal stigmas; cells, 1-or more ovuled. Fruit capsular, 3-5-lobed, 3-5-valved, variously dehiscent. Seeds with little or no albumen.—*Handbook of the New Zealand Flora*, p. 35, and *Additions and Corrections*, etc., p. 726.

DESCRIPTION OF THE ORDER.—



VERY large order, containing many genera absent in New Zealand, differing a good deal in structure to some of which the above character does not altogether apply. The plants of this order are distributed over various parts of the world. They have astringent and aromatic qualities, many of them are fragrant, and some have an odour of musk. They are sometimes tuberous, and the tubers are eaten. There are numerous hybrids among the plants, and it is not easy to determine the exact number of species, but about 540 are recorded, which include the genera *ERODIUM*, *GERANIUM*, *PELARGONIUM*, and *MONSONIA*, as examples. The genera confined to New Zealand consist of:—(1). *GERANIUM*, flowers regular, styles combined; (2). *PELARGONIUM*, flowers irregular, calyx with a spur adnate to the pedicel; and (3). *OXALIS*, flowers regular, styles free, leaves 3-foliolate. The name "Crane's-bill," given to this family, is derived from the long central beak of the fruit having a resemblance to the head of that bird, and which is peculiar to the genera *GERANIUM* and *PELARGONIUM*. Botanists apply the term "Pelargonium" to that section of the great family of Crane's-bills which has irregular or unsymmetrical corollas; those that have regular corollas being, by them, called Geraniums.

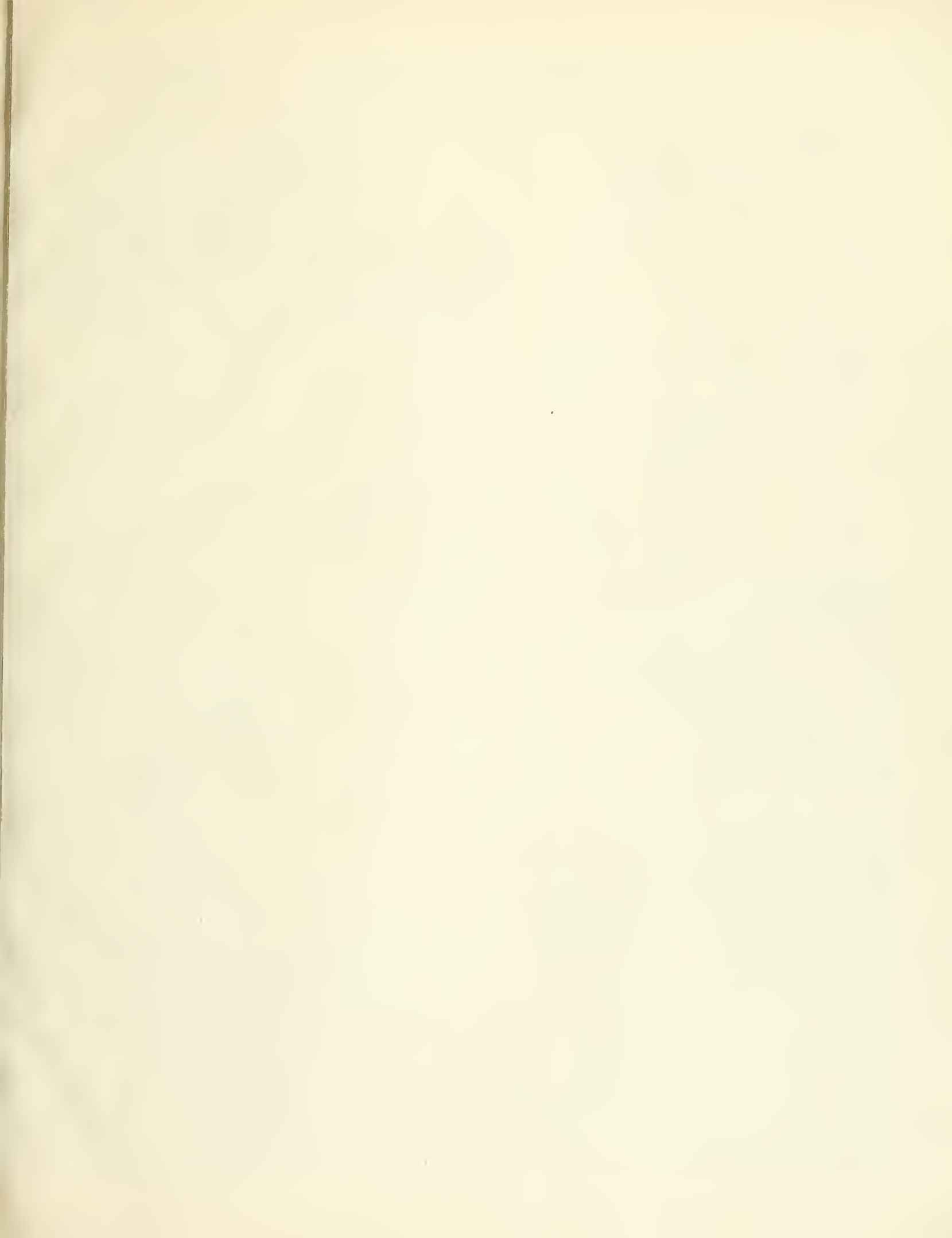




Fig. 2.

Fig. 4

Fig. 5

Fig. 3.

Fig. 1.

1.—GERANIUM DISSECTUM. 2—GERANIUM TRAVERSII. 3.—PELARGONIUM AUSTRALE.
 4.—OXALIS CORNICULATA. 5.—OXALIS MAGELLANICA.

S. Featon
 1882
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GENUS I.

GERANIUM (*Lin.*) The Crane's-bill.

GENERIC CHARACTER.—Stemless or branching herbs, with stipulate leaves and axillary, 1-2-flowered, 2-bracteolate peduncles. Flowers, regular. Torus with 5 glands alternating with the petals. Stamens, 10, all perfect (rarely 5, imperfect), free or united at the base. Ovary, 5-celled, beaked; beak

terminated by 5 short styles, which are longitudinally stigmatose; cells, 2-ovuled. Capsule of 5, tailed, 1-seeded cocci, elastically curling up, and separating from the axis, to which their tails remain attached. Cotyledons, plicate or convolute.—*Handbook of the New Zealand Flora*, p. 35.

DESCRIPTION, etc.—A large genus, the type of the order, indigenous to Britain and all temperate regions of the globe. Some of the handsomest are British species, which are well worth cultivating, and are often seen in gardens. The greenhouse plants usually called geraniums are now removed to the genus *Pelargonium*, from a very trifling difference in the calyx. The other differences are scarcely worth naming, except that in the geraniums the petals, which are large and roundish, are all equal; and in pelargoniums they are unequal, the upper two being larger than the rest. The species of true geranium are mostly hardy or greenhouse perennials. All of the New Zealand species are biennial or perennial-rooted, and the roots possess astringent qualities. They are:—(1.) *Geranium dissectum*: Peduncles, 2-flowered, pink; sepals, awned; carpels, hairy; seeds, pitted. (2.) *G. microphyllum*: Peduncles, 1-flowered, white or pale pink; sepals, hardly awned; carpels, hairy; seeds, scarcely dotted. (3.) *G. sessiliflorum*: Peduncles, 2-flowered, pink; sepals, awned; carpels, hairy; seeds, quite even; stemless. (4.) *G. molle*: Peduncles, 2-flowered, pink; sepals, not awned; carpels, glabrous; seeds, smooth. (5.) *G. Traversii*: Peduncles, 1-flowered; sepals, broadly ovate, cuspidate and silky. The name "Geranium" is said to be derived from the Greek word "geranos," a crane, in allusion to the long beak of the fruit bearing a resemblance to the head of that bird.

1. GERANIUM DISSECTUM (*Lin.*) The Cut-leaved Geranium (var. *Carolinianum*.)

SPECIFIC CHARACTER.—Stem, 1-2 ft. high, stout, erect or decumbent, branched more or less, covered with spreading, usually retrorse, hairs. Leaves, 1-2 in. diam., on long petioles, orbicular, deeply cut into few or many broad, or narrow, obtuse or acute lobes; stipules broad, scarious. Peduncles

slender, 2-flowered, with ovate, subulate bracts. Flowers very variable in size, $\frac{1}{4}$ – $\frac{3}{4}$ in. diam. Sepals hairy, awned. Petals notched or retuse, pink. Carpels and their beaks hairy, even. Seeds deeply and coarsely pitted.—*Handbook of the New Zealand Flora*, p. 36.

DESCRIPTION.—Fig. 1, Plate No. 16.—The "MATUAKUMARA."—This plant is abundant throughout both Islands, and is also indigenous to the Continent of America, from Canada to Cape Horn. It is described in the North American Floras as annual or biennial. The talented compiler of the "*Handbook*" remarks that the roots seem annual in Canadian and United States specimens, but perennial in Western North America, Rocky Mountains, and Chilian ones. The petals, also, which are as short as the sepals in the United States form, become larger in the Western American. The New Zealand form differs from the European *G. dissectum*, chiefly in the petals being often

larger, always less notched, and the root always more than annual; but these distinctions are said not to be constant. The amount and depth of pitting of the seed varies much in different specimens. The species ranges through temperate Australia and North and South America, in which latter country it has several names. Of the four species peculiar to New Zealand *G. dissectum* is the largest and handsomest, the pink flowers of which often measure three-quarters of an inch across, and are produced very abundantly. It commences to bloom early in Summer, and often continues until late in Autumn. In country districts it is found growing luxuriantly on the road-sides and bordering the ditches; in fact, wherever the land has been cleared, or burnt off, it springs up spontaneously and grows with vigour. The native name of the plant, "Matua-kumara," means, literally, "the father or parent of the Kumara;" and, as it grows prolifically in their plantations, the Maoris may in some manner believe that its presence augurs well for, and ensures the increased growth of, their much-esteemed product the Kumara. In times of scarcity, the root of this species was eaten as food. Unimportant as this little plant is from a floral point of view, it reminds us of the very beautiful members of its family which ornament, with luxuriant growth, our colonial gardens—offshoots of the handsome European and African species, adorning the greenhouses and gardens of the fair land of Britain. Some of our readers may feel surprised to hear that many of our so-called handsome Geraniums displayed at exhibitions, with their brilliant and varied colours of leaf and flower, are classified by botanists under the genus PELARGONIUM. Most of the species are astringent, particularly the North American *G. maculatum* or "Alum-root," the rhizome of which is used in its native country instead of Kino. The Tasmanian *G. parviflorum* is there called the "Native carrot," and its tubers are used as food. There are about a dozen British species. The specific name of *dissectum*, given to the subject of our plate, is in allusion to the much cut form of its leaves, which make the plant at all times very distinguishable. The varieties are:—*pilosum*, covered with spreading hairs, petals often large; *patulum*, leaves covered with spreading and retrorse hairs, petals usually small; and *glabratum*, more glabrous, with leaves 3 to 5-lobed, and with the lobes broader.

2. GERANIUM MICROPHYLLUM (*Hook., F.*) The Small-leaved Geranium.

SPECIFIC CHARACTER.—Leaves orbicular, $\frac{3}{4}$ -1 in. broad, usually cut to or below the middle into 5-7 broad, obtuse, toothed, lobes; petioles slender; stipules small. Peduncles rarely 2-flowered. Flowers smaller than in *G. dissectum*

(var. *patulum*), excepting in fine specimens; the sepals with very short awns; and the petals larger in proportion, white or pale-pink, retuse. Carpels even, with short hairs. Seeds minutely dotted.—*Handbook of the New Zealand Flora*, p. 36.

DESCRIPTION, etc.—A very slender, prostrate, straggling, branched plant, 12 to 15 inches long, more or less covered with silky white, appressed spreading hairs, often retrorse

on the peduncles and pedicels. It is common to both the Islands in mountainous or hilly situations. It has small, pale-pink flowers, and smaller leaves than *G. dissectum*. Altogether it is of a much more slender habit, with very obscurely-pitted seeds.

3. GERANIUM SESSILIFLORUM (Cav.) The Stemless-Flowered Geranium.

SPECIFIC CHARACTER.—Stemless or nearly so; root, stout; branches, if present, very short, and leaves more or less covered with silky hairs, which are spreading or retrorse on the petioles, pedicels, and sepals. Leaves, mostly radical, very numerous, on long slender petioles, 3-6 in. long, orbicular, cut to or below the middle into cuneate 5-7-fid lobes; stipules broad, membranous. Peduncles short, from the root, or

from branches which are rarely longer than the leaves. Flowers, between those of *G. dissectum* (var. *patulum*) and *microphyllum*. Sepals awned, very hairy. Petals retuse, longer than the sepals. Carpels even, pilose. Seeds quite even or minutely punctulate, not pitted.—*Handbook of the New Zealand Flora*, p. 37.

DESCRIPTION, etc.—This plant is indigenous to the mountain regions of the Middle Island, Otago, Chalky Bay, and the terraces of the Kowai River. It is also found in Tasmania, on the Australian Alps, and in South America. It scarcely differs from *G. dissectum* (var. *pilosum*), except in habit and the smooth seeds. The specific name that it bears is in allusion to the almost stemless growth of the flowers, the peduncles springing up from the root or from very short branches, rarely longer than the leaves.

4. GERANIUM MOLLE (Linn.) The Soft or Tender-leaved Geranium.

SPECIFIC CHARACTER.—A procumbent, much-branched, slender plant, covered with soft spreading hairs. Leaves, 1 in. broad, orbicular or reniform, more or less 5-9-lobed, the segments 3-5-fid; petioles long; stipules very broad and membranous. Peduncles, 2-flowered, with broad membranous

bracts. Flowers, $\frac{1}{4}$ - $\frac{1}{3}$ in. broad. Sepals broadly ovate, not awned. Petals bifid, longer than the sepals, pink. Carpels wrinkled, quite glabrous. Seeds even, not dotted.—*Handbook of the New Zealand Flora*, p. 37.

DESCRIPTION, etc.—This little plant is indigenous to both Islands. It is common in Europe, and extends eastward to the Himalaya Mountains; but, strange to relate, it is not native of any part of Australia or America. This species is entirely distinct in character from *G. dissectum*, having leaves reniform (kidney shaped), and being more in accordance with the accepted form of geranium leaf. Its flowers are small and pink, only two of which are displayed on the same stem. The specific name bears reference to the soft, tender, and mollient habit of the plant. A geranium with pure azure-blue flowers has been found at New River Heads, Invercargill, similar in other respects to *G. molle*, but with much heavier foliage.

5. GERANIUM TRAVERSII (*Hook., F.*) Mr. Travers' Geranium.

SPECIFIC CHARACTER.—Hoary all over, and almost silvery with fine white pubescence. Stems, 1-2 (?) ft. long, rather stout. Leaves long, petioled, orbicular, $1\frac{1}{2}$ in. diam., 7-lobed to the middle; lobes cuneate, 3-fid, both surfaces equally hoary; stipules broad, almost orbicular, cuspidate.

Peduncle 4 in. long, 1-flowered, slender, with 2 ovate-lanceolate acuminate bracts in the middle. Flower large, 1 in. diam. Sepals broadly ovate, cuspidate, silky. Petals orbicular-ovate, quite entire, much larger than the sepals, white.—*Handbook of the New Zealand Flora (Additions and Corrections, etc.)* p. 726.

DESCRIPTION, etc.—Fig. 2, Plate No. 16.—“MR. TRAVERS' GERANIUM.”—This very handsome plant is found only at Chatham Island, where it is common on waste ground. It is not known to occur on the mainland of New Zealand. To Mr. Travers, of Wellington, is due the honour of having introduced this beautiful plant to the botanical world, he having collected it upon one of his visits to the Island in or about the year 1871. The specific name accorded to it is in compliment to that gentleman. Our figure on Plate No. 16 indicates clearly the grace and beauty of this charming addition to our native geraniums.

GENUS II.

PELARGONIUM (*L'Heritier.*) The Native Pelargonium.

GENERIC CHARACTER.—Herbs (rarely shrubs), with opposite, simple-lobed or dissected, stipulate leaves, and 1-or many-flowered axillary peduncles. Flowers slightly irregular. Sepals, 5, the upper produced into a spur, which is adnate

with the pedicel. Petals, 5 or fewer, the upper often dissimilar. Torus with 5 glands. Stamens, 10, of which only 7, or fewer, are antheriferous. Ovary and fruit as in *Geranium*.—*Handbook of the New Zealand Flora*, p. 37.

DESCRIPTION, etc.—A very extensive genus almost confined to the Cape of Good Hope, though a few species occur in Australia, one in the Canary Islands, one in Asia Minor, and one in New Zealand. They are known very generally in gardens as geraniums, though very different from the genus of that name in their spurred calyx, usually irregular corolla, and the number of perfect stamens, which varies from seven down to four. The greater number of forms cultivated in gardens are hybrids, which are produced with great facility in this genus. The species possess more or less of the astringent properties of the order, but one species at least (*P. triste*) has tubers, which are eaten at the Cape of Good Hope. Some have fragrant foliage, from which an essential oil is extracted, as *P. roseum* and *capitatum*. The leaves of *P. acetosum* and *pellatum* are edible and gratefully acid. The genus is divided into fifteen sub-genera, which vary very much in habit. Some have a turnip-shaped root and no proper stem; others have a distinct leafy stem; and a good number are under-shrubs with thick fleshy stems.

1. PELARGONIUM AUSTRALE (*Willd.*) var. *clandestinum*. The Southern Pelargonium.

SPECIFIC CHARACTER.—A more or less hairy, perennial herb; stem erect, simple or branched, 4 in.—2 ft. high. Leaves orbicular or ovate, deeply cordate at the base, 3-5-lobed, lobes coarsely or finely toothed, or serrate. Petioles slender, 2-6 in. long. Peduncles axillary, longer than the leaves, pubescent, many-flowered. Flowers small, $\frac{1}{2}$ in. broad, in 10-12-flowered umbels, with whorled, ovate, acuminate bracts at the

base. Pedicels, $\frac{1}{3}$ — $\frac{1}{2}$ in. long, pubescent, with scattered white hairs. Sepals unequal, ovate, acuminate; spur short, gibbous, or none. Petals unequal, $\frac{1}{12}$ — $\frac{1}{6}$ in. long, deep pink, longer than the sepals, spathulate, notched. Stamens about 5, fertile, the rest reduced to membranous scales. Carpels very hairy, their tails lined on the inner face with white silky hairs. Seeds minutely dotted.—*Handbook of the New Zealand Flora*, p. 37.

DESCRIPTION, etc.—Fig. 2, Plate No 16.—The “KOPATA.”—This pretty perennial herb is abundant throughout both Islands, especially near the sea coast. It is also found in Tristan d’Acunha, South Africa, and Australia. It generally grows about a foot in height, and displays numerous umbels of flowers. The flowers are pink, small, but many together; and, when minutely examined, are very pretty, resembling in miniature some of the fancy garden varieties, the petals being marked in a manner similar to the larger and well-known sorts. It blossoms in November, and continues so nearly all the summer. Towards the latter part of the time, during the hotter and dryer weather, its leaves turn from green into shades of red, yellow, and brown combined, presenting a very pretty effect. The leaves sometimes attain a large size, measuring from four and a-half to five inches in diameter. A lotion made from the leaves is used by the Maoris to reduce inflammation in scalds and burns, whilst outsettlers find them serviceable as a poultice to effect a speedy and certain cure for sores on the backs of horses. Kopata springs up indigenously upon nearly all newly-cultivated soil, and becomes a hardy weed. A prostrate variety of this plant has been reported by Mr. W. S. Hamilton as growing in the Southland District, which varies in height from two to eight inches or more, with dark brownish-purple foliage, and a much-branched, prostrate, almost creeping stem. The rootstock is fusiform, very short and stout. Its flowers are small, slightly irregular, and pure white. This variety has been named *prostrata*, on account of its recumbent habit.

GENUS III.

OXALIS (*Linn.*) The Wood Sorrel.

GENERIC CHARACTER.—Stemless or branching, usually slender, perennial, acid herbs, with alternate or tufted, usually stipulate, 3-foliolate, or pinnate leaves, and orbiculate leaflets. Flowers regular. Sepals, 5, imbricate. Petals, 5, contorted. Disks and glands, none. Stamens, 10, all fertile. Ovary,

5-lobed, 5-celled; styles, 5; cells, 1-or more ovuled. Capsule, loculicidal; valves more or less cohering together, and by the septa to the axis. Seeds with an arilliform, fleshy coat, that bursts elastically; albumen fleshy.—*Handbook of the New Zealand Flora*, p. 38.

DESCRIPTION.—A very large genus, of which the greater number of species occur in tropical America and at the Cape of Good Hope. They are herbs, or more rarely shrubs, and one, *Oxalis scandens*, from Mount Quindiu, in South America, is a climber; but by

far the greater number have a stem reduced to a rhizome, sometimes subterranean, sometimes appearing above ground, and often taking the shape of a bulb or forming a tuber. In these the leaves are all produced in a tuft. In some of the bulbous species, as *O. cernua*, bulbs are also produced in the axils of the leaves. The leaves of most of the species consist of three entire leaves, which are usually inversely heart-shaped (such are the New Zealand species), and occasionally slightly sensitive, as in *O. stricta*. The leaves contain an acid juice. Sometimes the leaflets are reduced to two, or even one, when the leaf appears to be simple; and, finally, a few have even this solitary portion deficient, which occurs in such specimens as *O. fruticosa* and *O. leptopodes*, which have flat, dilated, leaf-like petioles. One section of the genus (*Biophytum*) has pinnate leaves, with many pairs of pinnae, but no terminal leaflet. In one of these from India, *O. sensitiva*, these compound leaves are nearly as sensitive as in the "Sensitive plant," for they contract on the slightest touch. Three specimens occur in Britain. One of these, the common wood sorrel, *O. acetosella*, has a scaly rhizome, with a tuft of leaves at the top, and solitary white flowers more or less veined with purple. This plant has a pleasant acid taste from containing binoxolate of potass; and hence it was once used in medical practice as a refrigerant in fever, and as an anti-scorbutic in scurvy. It still remains in the British Pharmacopeia, though fallen into disuse. The other British specimens are *O. corniculata* and *O. stricta*. *O. acetosella* is said to be the Shamrock of Ireland, though some prefer *Trifolium*, and other plants have been suggested. The New Zealand species are:—(1.) *O. corniculata*: stems, elongate, branching; flowers, yellow. (2.) *O. Magellanica*: Stems, short or none; flowers, white. The foliage of both affords a grateful acid.

1. OXALIS CORNICULATA (*Lim.*) The Native Oxalis.

SPECIFIC CHARACTER.—An erect or decumbent, branched, slender, glabrous or pubescent herb, usually with a perennial root; branches, 1-10 in. long, erect, ascending, or more usually prostrate, sometimes matted together. Leaves, 3-foliolate; leaflets deeply obcordate, $\frac{1}{2}$ -1 in. long, glaucous below; stipules,

small or none; petioles slender, very variable. Peduncles, axillary, 1-6-flowered, variable in length. Flowers most variable in size. Petals, yellow, notched. Capsules, oblong or linear.—*Handbook of the New Zealand Flora*, p. 38.

DESCRIPTION, etc.—Fig. 4, Plate No. 16.—The "NATIVE OXALIS."—This little herb is abundant throughout both Islands, especially on the eastern coasts, in dry sunny localities. There are five known varieties of this plant, all of which differ in habit, some being erect, some rigid, and some creeping. The Oxalis commences to bloom late in September or early in October, and continues, almost uninterruptedly, to display its brilliant little yellow flowers until late in Autumn. During the extreme heat of Summer it appears to languish somewhat, when the blooms are not so plentiful; but it revives with the cooler weather, and continues to bloom vigorously until the sunny days become

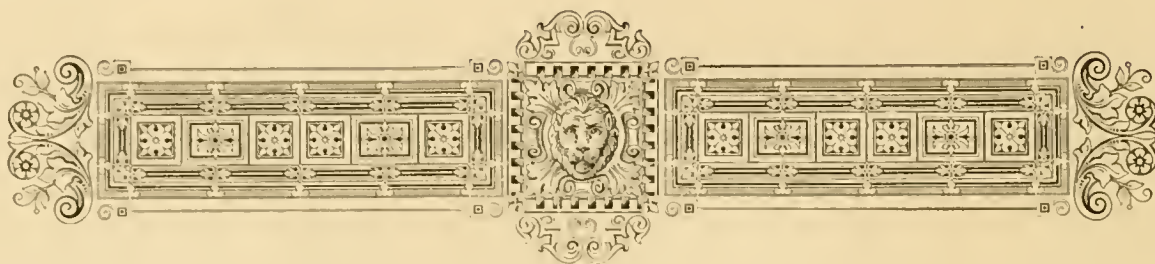
few, towards the end of May. It has been asserted that the Oxalis only displays its flowers on sunny days, but it is not absolutely correct, as we have ourselves seen its expanded flowers displayed on a very cloudy and rainy day, late in the month of May. The flowers vary in size on different plants, the largest ones being about half an inch in diameter. They are said to contain a good deal of honey, but possess no fragrance. For fertilization they are supposed to be dependent on insects. The foliage has a pleasant acid flavour similar to the common wood sorrel *O. acetosella*, of Britain. Many species of the genus are in cultivation, the flowers of which are handsome in form and brilliant in colour. One of them, *O. crenata*, has an erect leafy stem, and umbellate flowers, which are yellow, streaked with purple. It is a native of Peru, and is largely cultivated about Lima for its very acid leafstalks and tuberous roots. This plant is well known as the one which, some years ago, was introduced into Europe as a substitute for the potato. The tubers are soft and watery, and resemble a Jerusalem Artichoke in flavour. In appearance they are similar to the potato. It was expected that it would prove a valuable substitute for that edible; but this, however, has not been realized, the tubers being considered insipid, and the produce small, not exceeding half a pound to the plant. The leaves have been recommended as a substitute for rhubarb in tarts; but the best way of using them, however, is in salads.

2. OXALIS MAGELLANICA (*Forst.*) The Straits of Magellan Oxalis.

SPECIFIC CHARACTER.—A small, glabrous or pubescent, stemless, rather succulent species, 3–4 in. high. Rhizome creeping, perennial, covered with imbricate scales (old stipules). Leaves, 3-foliolate; leaflets, broadly obovate, glabrous, glaucous below. Petioles usually hairy. Peduncles radical,

1-flowered, 2-bracteolate, often longer than the leaves. Sepals, ovate, obtuse. Petals, pure white, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, oblong-obovate or obovate, often oblique and ciliated. Capsules, globose.—*Handbook of the New Zealand Flora*, p. 38.

DESCRIPTION, etc.—Fig. 5, Plate No. 16.—This elegant little plant is indigenous to both Islands, being found in the damp woods and along the stony beds of mountain rills in the sub-alpine and alpine regions. In some instances it has been detected growing among the snow, in full bloom. It is very nearly allied to the European Wood Sorrel, *O. acetosella*, and is recorded in the “*Handbook*” as identical to the one found at Cape Horn. On this account it bears the name of “Magellanica.” The same species is common in similar situations in Tasmania and South Chili. The flowers are white, and vary in size. Like *O. corniculata* they are scentless, and it is doubtful if they contain honey. The foliage has an acidity, pleasant to the taste.



CHAPTER XIV.

ORDER XIV.—RUTACEÆ. The Rue Family.

CHARACTER OF THE ORDER.—Shrubs and trees. Leaves opposite or alternate, exstipulate, pellucid-dotted, usually fragrant, simple or compound. Flowers, regular, hermaphrodite. Sepals and petals, 4 or 5, spreading, imbricate or valvate. Stamens, usually 8 or 10, free, inserted at the base of a tumid disk; anthers, versatile. Ovary, of 4 or 5 more or less united

carpels; styles, 4 or 5, wholly combined, or by a capitate stigma only; cells, 2-ovuled. Fruit capsular, of 4 or 5 coriaceous, 2-valved, 1-seeded cocci; outer coat separating from the inner, which is chartaceous, dry, and elastic. Seeds, oblong; testa, crustaceous; albumen, copious or none.—*Handbook of the New Zealand Flora*, p. 39.

DESCRIPTION OF THE ORDER.—



CONSTITUTES a very large natural order of trees and shrubs, rarely embracing herbs, including the Rue, Orange, Cape Diosmas, Australian Boronias, and many other plants differing in certain points from the above ordinal character, abounding in the temperate regions of the Southern Hemisphere, especially in South Africa and Australia. Taken in its most extended sense, the order is divided into seven tribes; several of which, and not always those which are most distinct in character, are often considered as separate orders. They are:—*Cuspariæ*: natives of tropical America; *Ruteæ*: dispersed over the temperate regions of the Northern Hemisphere; *Boroniæ*: natives of Australia; *Xanthoxylicæ*: dispersed over the tropical regions of both the Old and New World; and *Toddaliæ*: chiefly tropical, in both the New and the Old World. The leaves are frequently opposite, simple, or more generally compound, always more or less marked with glandular dots, and often strongly scented. The flowers are usually hermaphrodite and regular, sometimes showy, and often sweet scented. The fruit is a capsule or berry, rarely a drupe. The name of the order is taken from the genus *Ruta*, which derives its name from the Greek word *rus*, to preserve, in allusion to the effects of the medicinal properties of the

plant on the health. The common Rue, *R. graveolens*, is a native of Southern Europe, and is commonly cultivated in Britain. It is a somewhat shrubby plant, two to three feet high, with pinnately-divided bluish-green leaves, and yellowish flowers disposed in corymbs. The powerful fetid odour and acrid taste of this plant depends on the presence of a volatile oil. Rue is used medicinally as a stimulant and narcotic in flatulent colic, hysteria, &c. Its active properties are such as to admit of its much more general use, but practitioners have been perhaps deterred from employing it by the symptoms of acrido-narcotic poisoning induced by an overdose. Locally applied, Rue is a powerful irritant. One species, indeed, *R. montana*, is said to be so powerful that it is dangerous to handle the plant, even when the hands are protected by gloves. Rue was employed medicinally by the ancients: for ages it was considered potent to ward off contagion, and is still employed to keep off noxious insects. Rue enters into the composition of the French perfume called "Vinegar of the Four Thieves." The Italians are stated to eat the leaves in salads. Shakespeare speaks of it as "Herb of Grace," because holy water was sprinkled with it. In "Hamlet" Ophelia is made to say, "There's fennel for you, and columbine; there's rue for you, and here's some for me; we may call it Herb grace o' Sundays." Rue is easily propagated by seeds, cuttings, or slips of the young plants taken in Spring, and planted in a shady border. It delights in a poor, calcareous soil, in which it will thrive for many years. The order in New Zealand consists of two genera, viz.: (1). PHEBALIUM, a shrub with pentamerous flowers and simple leaves; (2). MELICOPE, shrubs with tetramerous flowers and compound leaves.

GENUS I.

PHEBALIUM (*Ventenat.*) The Phebalium.

GENERIC CHARACTER.—Shrubs. Leaves alternate in axillary, or terminal corymbs, white. Calyx, small, 4 or 5-lobed or parted. Petals, 4 or 5, imbricate or valvate. Stamens, 8 or 10; filaments, filiform, glabrous. Ovary, 2-5, parted

almost to the base; style, simple, rising from between the lobes; stigma, capitate; cells, 2-ovuled. Coeci, 2-5, truncate or rostrate; endocarp, separating. Testa, smooth, black, shining.—*Handbook of the New Zealand Flora*, p. 39.

DESCRIPTION, etc.—A very large genus confined exclusively to Australia and New Zealand. In the former country it consists of small trees as well as shrubs. In New Zealand it is represented chiefly by a shrubby character. The name of the genus is said to be derived from the Greek word *phibaleé*, a myrtle, in allusion to the appearance of some of the species.

1. PHEBALIUM NUDUM (*Hook.*) The Naked Phebalium.

SPECIFIC CHARACTER.—A shrub or small tree, 12-15 ft. high, everywhere glabrous; branches very slender. Leaves, alternate, 1-1½ in. long, spreading, linear-oblong or narrow oblong-lanceolate, obtuse, obscurely crenate, narrowed below into very short petioles, coriaceous, paler, and dotted below. Flowers in terminal, many-flowered corymbs, whitish, ¼-½ in.

diam., on pedicels ⅓-¼ in. long. Calyx very small, 5 lobed. Petals, 5, linear, obtuse, with narrow overlapping margins. Cocci, ½ in. long, obtusely rhomboidal, compressed, wrinkled; often only one ripens, splitting down the front and back into 2 valves.—*Handbook of the New Zealand Flora*, p. 39.

DESCRIPTION, etc.—Fig. 1, Plate No. 17.—The “MAIREHAU.”—This shrub is peculiar to the northern portion of the Northern Island, and is most prolific at the Bay of Islands. The whole of its parts possess a strong, fragrant, resinous smell, to which the Maoris are very partial. It is not an unusual occurrence for the Natives to adorn their hats with sprays of its thin lithesome branches when they make excursions into the woods after the wild pigeon. The reason of this adornment is not easy to discover, unless the native sportsmen suppose that the foliage may deceive the birds they are in pursuit of, and permit them to get closer up to their game; or, it may be, that they have a *peuchant* for the perfume, which they are pleased to gratify. The specific name of the “Mairehau” is due to the entire absence of hairs or downy covering over its entire parts—being, as it were, naked. The foliage is a bronze green colour, intermingled with splashes of red, presenting a very singular appearance, and giving the impression that the leaves are metallic. They retain their fragrance for a length of time, even after they have been dried. Sir J. D. Hooker says, in his notes, that the New Zealand species is closely allied to the Queensland *P. elatius*, but the flowers are larger, the petals longer, the corymbs more flattened, and the leaves taper less to the base; and that they may prove to be local forms of one species. A reference to our plate will familiarize the reader with the general appearance of the Mairehau, where its pretty corymbs of myrtle-like white flowers and pink buds are carefully portrayed.

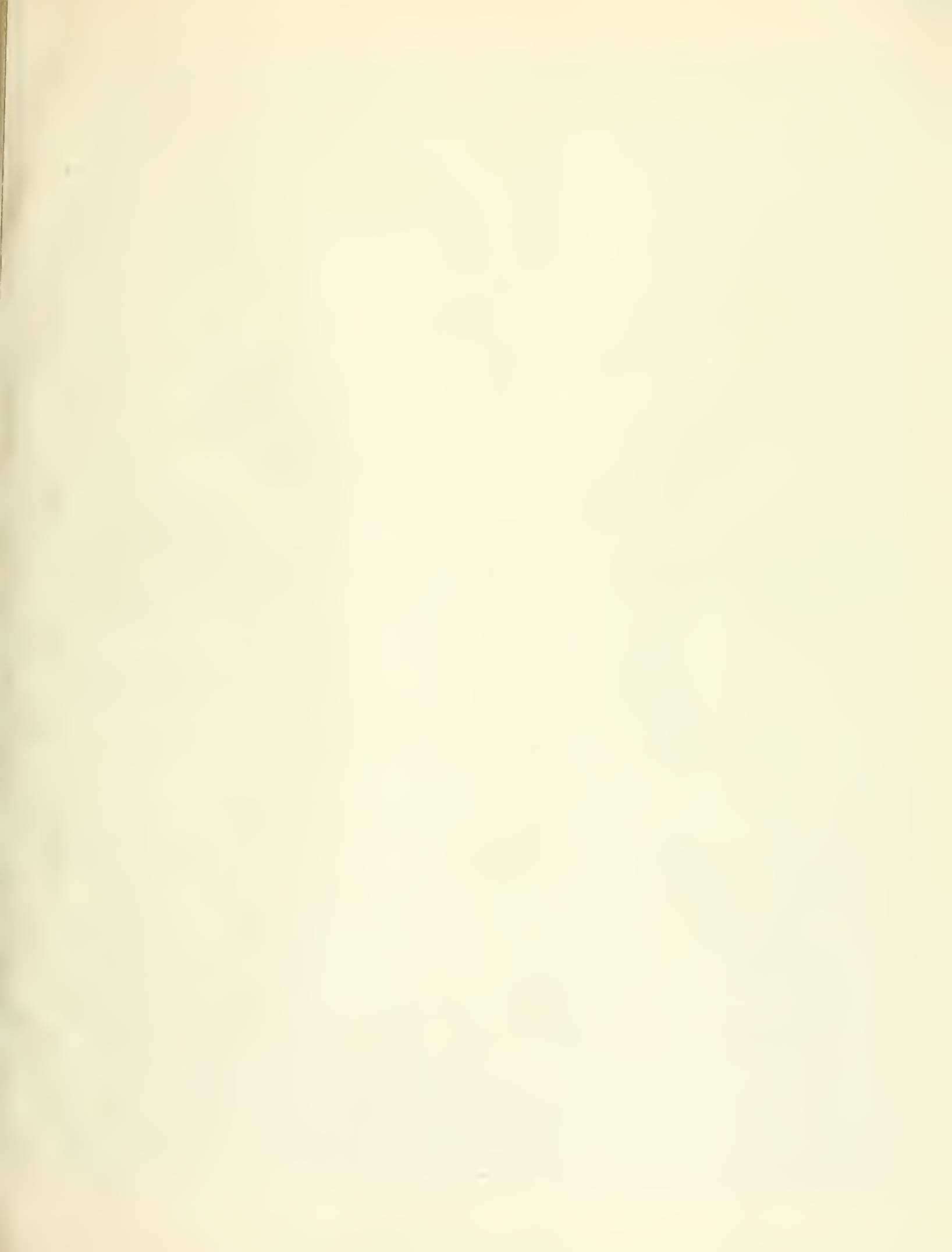
GENUS II.

MELICOPE (*Forst.*) The Melicope.

GENERIC CHARACTER.—Glabrous shrubs. Leaves, opposite or alternate, simple or compound, pellucid dotted. Flowers, in axillary, many or few-flowered cymes, more or less uni-sexual. Sepals, 4, deciduous or persistent. Petals, 4, sessile, spreading, valvate or imbricate, with inflexed tips. Stamens, 8; filaments, subulate. Ovary, 4-lobed, 4-celled;

style, 1, or 4 coalescing into 1 from between the lobes; stigma, capitate; cells, 2-ovuled. Cocci, 1-4, spreading, free; endocarp, separating. Testa, shining; albumen, abundant; embryo, slightly curved.—*Handbook of the New Zealand Flora*, p. 29.

DESCRIPTION, etc.—A Pacific Island genus, very variable in habit, which does not extend westward into Australia. The two New Zealand species, *M. ternata* and *M. simplex*, are extremely dissimilar in habit. In the first named the leaves are opposite and 3-foliolate; whilst in the latter the leaves are alternate or fascicled, and 1-foliolate.





1. —Phebalium nudum.

2. —Melicope ternata (Flower and Fruit.)

1. MELICOPE TERNATA (*Forst.*) The Ternate Melicope.

SPECIFIC CHARACTER.—A small glabrous tree, 12–15 ft. high; branches, rather stout. Leaves, opposite, 3-foliolate; leaflets, 3–4 in. long, ovate or linear-oblong, acute, quite entire, longer than the petioles. Flowers, $\frac{1}{2}$ in. diam., greenish-white, in peduncled, trichotomous, axillary cymes; bracts, deciduous.

Petals, ovate, longer than the stamens; margins, imbricate. Ovary, quite glabrous; style, short. Carpels, 4, spreading, coriaceous, strongly wrinkled; seed, small, black, projecting from the fissure, attached by a slender funicle.—*Handbook of the New Zealand Flora*, p. 49.

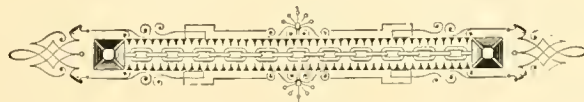
DESCRIPTION, etc.—Fig. 2, Plate No. 17.—The “WHARANGI” or “TATAKA.”—This small tree is indigenous to the Northern Island, and the Nelson District, in the Middle Island. It is not found south of the latter locality, its place being supplied by *M. simplex*. The Wharangi seldom attains any great size, partaking more generally of the character of a shrub than that of a tree. It has pale green, trifoliolate leaves, and presents a somewhat pleasing appearance. It blossoms in September and October, but its small greenish-white flowers are not very attractive. The arrangement of the fruit is very peculiar, consisting of four carpels placed in a cruciform manner, each containing a single black seed suspended by a thread, and projecting from the opening when nearing the ripening stage. The wood is light, and has a peculiar satiny lustre. It is used by cabinetmakers in Auckland for inlaying purposes, and is much esteemed.

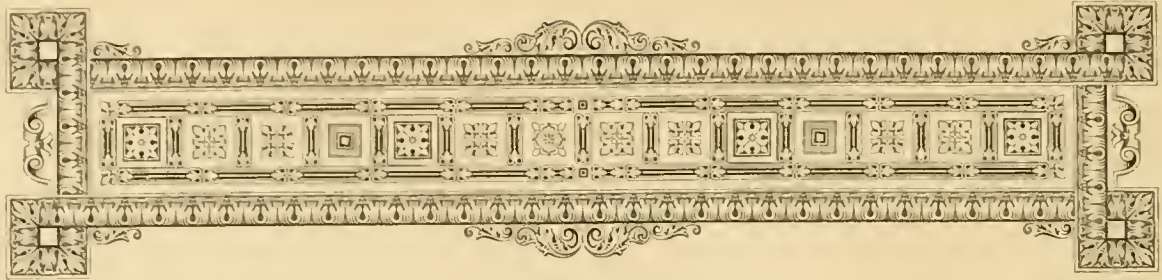
2. MELICOPE SIMPLEX (*A. Cunn.*) The Simple Melicope.

SPECIFIC CHARACTER.—A glabrous shrub, 6–8 ft. high; branches, slender. Leaves, alternate, scattered or fascicled, small, of 1 (rarely 3, of which the lateral are minute), orbicular-obovate or ovate, obtuse, doubly crenate leaflet, $\frac{1}{2}$ – $\frac{3}{4}$ in long, jointed on the top of a flattened, almost winged petiole, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, which is broader towards the leaflet, and channelled above. Pedicels, several together; axillary, slender,

longer than the petioles, 1–4-flowered, bracteolate at the forks. Flowers, very small, greenish-white. Petals, linear-oblong, shorter in the male flowers than the stamens, valvate, or with the edges a little overlapping. Ovary, oblong, hirsute; style in the female flowers, slender; stigma, capitate. Fruit as in *M. ternata*, but much smaller.—*Handbook of the New Zealand Flora*, p. 49.

DESCRIPTION, etc.—This shrub is indigenous to both the Northern and Middle Islands. It is most common in the Middle Island, and is abundant in Otago. It is in every way more slender, and a very different looking plant from *M. ternata*. The flowers, which are very small and greenish-white, are sweet scented. They are not produced in large masses, as in *M. ternata*, and are therefore not very conspicuous. The wood is of no economic value.





CHAPTER XV.

ORDER XV.—MELIACEÆ. The Melia Family.

CHARACTER OF THE ORDER.—Trees (rarely shrubs). Leaves, usually pinnate, alternate, exstipulate. Flowers, regular, generally hermaphrodite. Calyx, small, 4 or 5, lobed or parted, imbricate. Petals, 4 or 5, contorted, valvate or imbricate, often long, sometimes united to the staminal tube. Disk, free, or wanting, sometimes tubular within the stamens. Stamens, usually 8 or 10, more or less united into a tube,

bearing the sessile anthers within its mouth, which is often toothed or split. Ovary, free, 3-5-celled; style, single, terminal; stigma, capitate; cells, 2-ovuled. Fruit, a drupe, berry, or capsule, usually the latter, coriaceous, 3-celled, loculicidally 3-valved. Seeds generally solitary in the cells, mostly arillate and exalbuminous.—*Handbook of the New Zealand Flora*, p. 40.

DESCRIPTION OF THE ORDER.—



THIS is a very large order of tropical forest trees, of which various genera present characters of the flower and fruit at variance with the above description. They are chiefly found in the equatorial parts of America and Asia, and possess bitter tonic and astringent properties. The Mahogany, *Swietenia mahagoni*, the Satin Wood, *Chloroxylon swietenia*, and the Pride of India, *Melia azedarachta*, all belong to this order. *Melia azedarachta* is used in India as a febrifuge, and its fruit yields an oil, which is used for domestic purposes and as an anti-spasmodic. The root is bitter, and is employed as a vermifuge. Oils are also produced from species of *Trichilia* and *Carapa*. There are upwards of 40 genera in the order, and above 180 species. New Zealand is represented by only one species, *Dysoxylum spectabile*.





KOHE-KOHE.—*Dysoxylum spectabile*.

1. DYSOXYLUM (*Blume.*) The Dysoxylum.

GENERIC CHARACTER.—Large forest trees, often fetid, or with a garlicky smell. Leaves, alternate, pinnate. Flowers, rather small, in axillary panicles. Calyx, short, 4 or 5-lobed, toothed or parted, imbricate. Petals, 4 or 5, linear-oblong, valvate, sometimes united at the base, and with the staminal tube, which is cylindric, 8 or 10-toothed; anthers, 8 or 10, included. Disk, tubular, sheathing the 3-5-celled ovary.

Capsule, coriaceous, globose or pyriform, 1 5-celled, 2 5-valved, splitting down the middle of the cells; valves, with the septa on their faces. Seeds, large, arillate or naked, oblong; hilum, broad, ventral; testa, brown, shining; cotyledons, very large; plumule included or exerted.—*Handbook of the New Zealand Flora*, p. 41.

DESCRIPTION, etc.—A large genus of timber and forest trees, natives of tropical Asia, Northern Australia, and the Pacific Islands. Some of the largest and most valuable timber trees in Java are members of this genus.

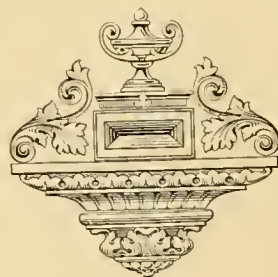
1. DYSOXYLUM SPECTABILE (*Hook., F.*) The Beautiful Dysoxylum.

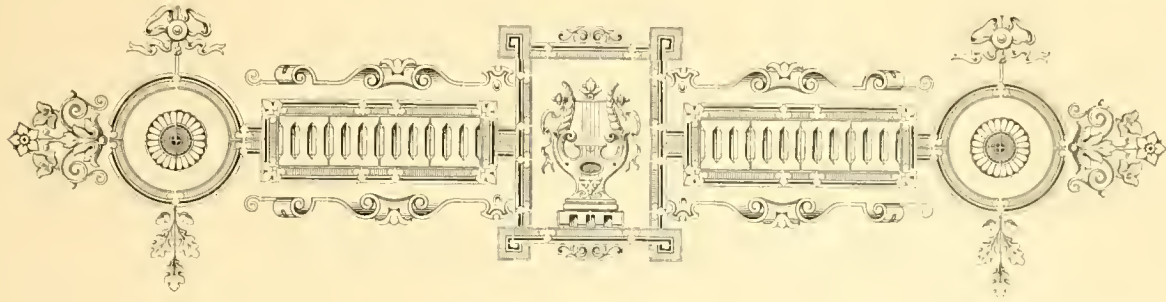
GENERIC CHARACTER.—A large tree, 40-50 ft. high. Leaves, 1 ft. or more long, pinnate; leaflets, about 4 pairs, alternate, petioled, oblong, obovate, acute, 3 6 in. long, quite glabrous, entire, oblique at the base, narrowed into the terete petiole. Panicles, 8-12 in. long, usually growing from the trunk, sparingly branched, ebracteate. Flowers, shortly

pedicelled, $\frac{1}{2}$ in. broad. Calyx, lobes very small, ciliate. Petals, linear, patent, obtuse. Staminal tube, cylindric, fleshy, crenate; anthers, quite included, sessile on thickened prominences. Style, very slender; stigma, disciform. Capsule, obovate, pendulous, 1 in. long. Aril, scarlet.—*Handbook of the New Zealand Flora*, p. 41.

DESCRIPTION, etc.—Plate No. 18.—The “KOHEKOHE.”—This interesting tree is indigenous to the Northern Island, but is often local. It is plentiful at the Bay of Islands and along the East Coast. In the Middle Island it does not occur south of Nelson, where it is rather rare. It grows from sea level up to 1,500 feet on the ranges. The Kohekohe has very handsome pinnate, pale green, walnut-like foliage, and often attains a height of 40 or 50 feet. In the diameter of its trunk it rarely exceeds three feet. The timber is compact, red, and tough, but not durable. It is valuable in the construction of furniture, but is only utilized for that purpose in the Auckland District. It is used extensively for fencing purposes in some districts; and the Maoris, where no more suitable wood offers, make it into oars for their whaleboats. The tree is generally called by the settlers “The Native Cedar.” The young bark is said to contain tonic properties allied to quinine, but no authentic analysis exists to confirm it. It is, however, well known that the whole tree possesses, more or less, a bitter property, and, when any part is immersed in water, imparts to it an intensely bitter flavour having the taste of hops, more particularly when the young bark, leaves, or capsules are used. A spirituous infusion of the leaves is considered to be a good stomachic. The tree blossoms in June, when the long, drooping panicles of pale-coloured flowers, which measure from eight to twelve inches, and grow from the main trunk, or older branches, are very attractive and interesting. The flowers contain large quantities of honey in their cup-like receptacles, which are much frequented by bees, and from which the Tui

(*Prothemadera Novæ Zelandiæ*) extracts, with its long brush-tipped tongue, the much-relished nectar. In common with many other New Zealand trees, both fruit and blossom are displayed at the same time. The flower is called "Tapia" by the Natives. Both blossom and fruit are carried on a pedicel or branch, springing directly out of the trunk or branch of the tree. The aril, or fruit, is eaten by the wild pigeon, (*Carpophaga Novæ Zelandiæ*), with avidity. The foliage, owing to its bitter flavour, is distasteful to cattle and sheep. The Kohekohe was originally known botanically as *Hartighsia spectabilis*, so named by A. Jussieu, a celebrated French systematic botanist. The careful and graphic delineation of this tree in our plate will convey to the reader, in a forcible manner, the interesting peculiarities of this useful and beautiful member of our New Zealand flora.





CHAPTER XVI.

ORDER XVI.—OLACINEÆ. The Olax Family.

CHARACTER OF THE ORDER.—Shrubs or trees. Leaves, simple, alternate, rarely opposite, exstipulate. Flowers, regular, axillary or terminal, hermaphrodite or uni-sexual. Calyx, small, 4 or 5-toothed, lobed or parted. Petals, 4 or 5, free, or coalescing into a tube, valvate. Stamens, 4 or 5, hypogynous (or at the base of a disk). Ovary, free, 1 or imperfectly 3-5-celled; style, long or short; stigma, often lobed;

ovules, 1-3, collaterally pendulous from below the top of the cell, or from the top of a central, erect, free placenta. Fruit, usually a 1-celled, 1-seeded, dry or fleshy drupe. Seed, pendulous; testa, very thin; albumen, copious, fleshy; embryo, minute, terete.—*Handbook of the New Zealand Flora*, p. 41.

DESCRIPTION OF THE ORDER,—

ALARGE tropical order, containing many genera of very various characters not included in the above description, and often extremely difficult of determination, on account of their minute flowers, and almost microscopic ovaries and ovules. The only New Zealand genus is also a native of Norfolk Island and the West Coast of Australia. The typical genus of this order is *Olax* from which it is named. It consists of about two dozen species of small trees, mostly natives of Asia and Australia.

1. PENNANTIA (*Forst.*) The Pennantia.

GENERIC CHARACTER.—Trees. Leaves, alternate, entire or toothed. Cymes, many-flowered. Flowers, polygamous. Calyx, minute, 5-toothed. Petals, 5, valvate. Stamens, 5, hypogynous; filaments, filiform, free, flattened at the base; anthers, versatile. Ovary, oblong, obscurely trigonous, 1-celled; stigma, almost sessile, discoid, 3-lobed; ovule, 1,

pendulous below the top of the cell. Drupe, small, fleshy; stone, crustaceous, obtusely 3-gonous, grooved on one face, and perforated on that face below the apex; a flattened cord passes up the groove, enters the cell by the foramen, and bears the pendulous seed at its tip.—*Handbook of the New Zealand Flora*, p. 41.

DESCRIPTION, etc.—This genus is a small one, consisting of trees, natives of New Zealand, Norfolk Island, and the West Coast of Australia. In Norfolk Island the genus is represented by *Pennantia Endlicheri*, and in New Zealand by *P. corymbosa*.

1. PENNANTIA CORYMBOSA (*Forst.*) The Corymbose Pennantia.

SPECIFIC CHARACTER.—A small, very graceful tree, covered with white, sweet-smelling flowers, 20-30 ft. high; bark, whitish; wood, brittle; twigs and young cymes, pubescent. Leaves on short petioles, 1-3 in. long, ovate, obovate or oblong, obtuse, sinuate or toothed, rarely entire, often turning

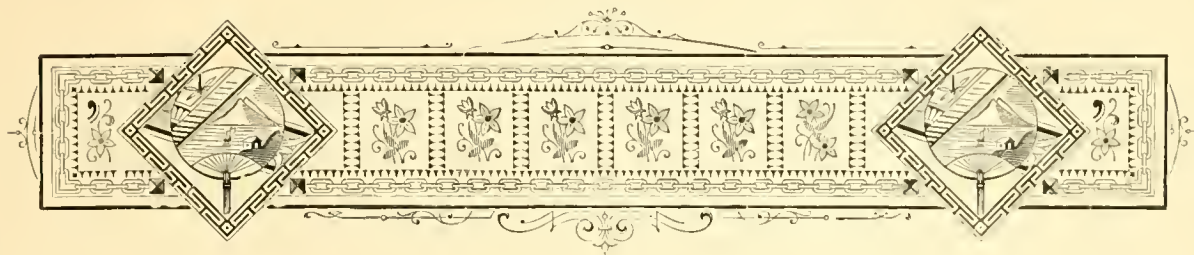
black in drying. Male flowers largest. Filaments longer than the petals; ovary reduced to a papilla; pedicels jointed below the calyx. Berries, ovoid, black, fleshy, with purple juice, $\frac{1}{2}$ in. long.—*Handbook of the New Zealand Flora*, p. 42.

DESCRIPTION, etc.—Plate No. 19.—The “KAIKOMAKO.”—This very graceful small tree, which, in the season, produces an abundance of sweet-scented flowers, is indigenous to both Islands, but is most common throughout the Middle Island. In the North it is chiefly found in mountain woods. It seldom grows more than 30 feet in height, and blossoms in December, when it is indeed a spectacle, being mostly covered with cymes of handsome, fragrant, white flowers. The bark is whitish, not unlike that of the Pukatea, (*Atherosperma Novæ Zelandiæ*). The wood is white, very brittle, but splits freely. In former days the Maoris used this wood in conjunction with that of the Hinalima, (*Melicytus ramiflorus*), or other woods of a soft nature, to obtain fire by friction. On this account the tree was much prized, and bore an economic value, which it does not at present. The process employed in this very useful proceeding was exceedingly tedious, not to say laborious. A stick of the Kaikomako, having been well dried and scraped, was rubbed vigorously backwards and forwards upon another piece of wood selected for a bed. The continued pressure and friction caused shreds of carbonized fibre from the woods in contact to accumulate at the base of the stick, which, in due course, commenced to smoke and then ignite. It is needless to say that this primitive method to obtain fire is now, except under extreme circumstances, or by way of experiment, dispensed with, the Maori finding the burning glass or the wax match of the Pakeha more satisfactory and more expeditious for the purpose. The pretty, egg-shaped berries are described by the “*Handbook*” as black; but, as a matter of fact, they are purple when ripe, as shown in our plate. In the Middle Island the Kaikomako is often confounded by the settlers with the Ribbon Wood trees, (*Hoheria populnea*, and its varieties,) they being very similar in general appearance. The foliage of the Pennantia in its young state is small and rounded; but, as the tree matures, the leaves assume an oblong character, measuring nearly three inches in length. The wood has no specific value, nor is the tree known to possess any medicinal properties. In suitable localities it should prove a very graceful addition to shrubberies and hedgerows as an ornamental tree.





KAIKOMAKU, — *Panicum curvipes*



CHAPTER XVII.

ORDER XVII.—STACKHOUSIÆ.

CHARACTER OF THE ORDER.—Herbs, perennial rooted. Leaves, narrow, alternate, almost exstipulate. Flowers, in terminal spikes or racemes, greenish-white or yellow, hermaphrodite, regular. Calyx with a small, hemispherical tube, and 5 small, imbricate lobes. Petals, 5, inserted at the edge of a disk which lines the calyx tube, erect, linear or spatulate, free, or united by their edges above the base only, their tips imbricate, reflexed. Stamens, 5, free, erect; filaments, slender,

2 shorter than the others. Ovary, sessile, free, sub-globose, 2-5-celled, and lobed or parted; styles, 2-5, connate or free; stigma, simple, or 2-5-lobed; ovules, solitary, and erect in the cells. Fruit, of 2-5 indehiscent, globose, angled or winged cocci, attached to a central column. Testa, membranous; albumen, fleshy; embryo, straight.—*Handbook of the New Zealand Flora*, p. 42.

DESCRIPTION OF THE ORDER.—



DIFFERING in so many points, this order has been universally adopted as distinct from *Celastraceæ*, to which it was formerly allied as a genus. It consists of about 20 species, all Australian excepting two, one from New Zealand, and the other from the Philippine Islands. They are all herbs, with a perennial, often woody stock, and simple or little-branched stems. The flowers are very minute, white or yellow, in a terminal raceme. None of the species present any interest beyond their botanical structure.

1. STACKHOUSIA (*Smith.*)

SPECIFIC CHARACTER.—*S. minima* (Hook., F.)—A minute, slender, glabrous herb, with slender, running rhizomes, sending up erect, leafy branches, 1-2 in. high. Leaves, $\frac{1}{6}$ - $\frac{1}{4}$ long, scattered, linear or obovate, acute, fleshy, quite entire.

Flowers, very minute, in few-flowered spikes. Calyx lobes, 5, spreading. Petals united at the middle. Anthers, pubescent. Ovary, 3-lobed; style, 3-cleft; cocci, usually one only ripens.—*Handbook of the New Zealand Flora*, p. 42.

DESCRIPTION, etc.—This very minute herb is indigenous to both Islands. In the North it is found on the open lands of the East Coast, and in the Middle Island in clefts of rocks on the Ribbon Wood Range. It bears very minute greenish-white flowers, and, as a plant, would be deemed insignificant, rarely growing above two inches in height.



CHAPTER XVIII.

ORDER XVIII.—RHAMNEÆ. The Buckthorn Family.

CHARACTER OF THE ORDER.—Trees or shrubs. Leaves alternate, rarely opposite, stipulate. Flowers regular, hermaphrodite. Calyx, superior or inferior, 4 or 5-toothed or lobed; lobes triangular, valvate, often having a raised ridge down the centre, and an incurved thickened tip. Petals 0, or 4 or 5, minute, scale-like, very concave, placed between the teeth of the calyx, and often smaller than them. Stamens, 4 or 5, very small, inserted with the petals, opposite to, and often hooded by them. Disk hypogynous or epigynous. Ovary,

superior or inferior, 3-celled; style, 1; stigma, capitate or 3-fid; ovule solitary, and erect in each cell. Fruit of 3 cocci, either free and subtended by the calyx, or more or less immersed in, or adnate to the calyx; cocci often crustaceous, lenticular, dehiscing down the inner face. Seed, erect; albumen, fleshy; embryo, large; cotyledons, orbicular; radical straight, terete.—*Handbook of the New Zealand Flora*, p. 42.

DESCRIPTION OF THE ORDER.—



EMBRACES trees or shrubs inhabiting the tropics, in the mountainous regions of India and Abyssinia, and the temperate countries of both hemispheres. The majority of the species are shrubs, varying from one to eight or ten feet high, though some occasionally grow as high as fifteen or twenty feet, and form small trees, many of them being armed with stout spines. The *Alaternus* (*R. alaternus*), is an evergreen shrub or small tree, native of the South of Europe and North of Africa, of which several varieties are grown for ornamental purposes in English gardens. It has smooth, serrated leaves, varying from egg-shaped to elliptical or lance-shaped, and green flowers of separate sexes, without petals. It was introduced into Britain in 1629. *R. catharticus*, the Purging Buckthorn, is a native of Britain. It is a stiff, very much branched shrub, growing from five to ten feet high, frequently having branches terminating in a sharp thorn-like point. The flowers are yellowish-green, with very narrow petals, and grow in dense clusters. The berries, which are black and shining, are about the size of a pea. The juice of the unripe berries is of the colour of saffron, and is used for staining paper. The

juice of the ripe berries mixed with lime forms the sap green of painters; but if the berries be gathered late in the autumn, the juice is purple. The berries were formerly used by rustic practitioners as a purgative medicine; but, on account of the violence of their action, has fallen into disrepute, although Syrup of Buckthorn is included in our pharmacopœias. The Alder Buckthorn, *R. Frangula* also affords a colouring matter, and its wood yields a superior charcoal for making gunpowder. But the most important commercial product of the genus is the dyeing material used by calico printers, and known as "Yellow berries," or "Persian berries," considerable quantities of which are annually imported from Asiatic Turkey and Persia. Although usually ascribed to *R. infectorius*, the Staining Buckthorn, they are probably collected indiscriminately from several species. The berries of *R. infectorius* are used for dyeing leather yellow, and the Turkey leather, or yellow Morocco, is generally supposed to be coloured by them. From the bark of two species, *R. chlorophorus* and *R. utilis*, the Chinese prepare a beautiful green dye, called by them "Tokao," and by our merchants "Chinese green indigo," considerable quantities of which have been imported into Lyons, in France, and used for dyeing silks, the shades of green imparted by it being exceedingly beautiful, especially when seen under the influence of artificial light. A similar dye has since been extracted from *R. catharticus*. The name of the order is derived from the Celtic word *ram*, signifying a tuft of branches, which the Greeks have changed to *rhamnos*, and the Latins to *ramus*. All the species are easily propagated by seeds or layers, and most of them by cuttings. They will grow in any soil that is dry. The New Zealand genera, which are also Australian, consist of:—(1). POMADERRIS, tomentose shrubs, with alternate leaves; (2). DISCARIA, a spiny glabrous bush, with leaves opposite, or none at all.

GENUS I.

POMADERRIS (*Labill.*) The Pomaderris.

GENERIC CHARACTER.—Shrubs, more or less covered with stellate down. Leaves persistent, alternate. Flowers small, in umbellate cymes, usually pedicelled; bracts, deciduous. Calyx tube adnate with the ovary; limb, 5-lobed, deciduous or reflexed. Petals, 5 or none. Stamens, 5; filaments longer

than the petals; anthers free. Disk, epigynous. Ovary more or less inferior; style, short, trifid. Capsule small, its 3-valved tip free, containing 3 plano-convex cocci, which split down the face, or open by the falling away of an oblong lid.—*Handbook of the New Zealand Flora*, p. 43.

DESCRIPTION, etc.—A genus of about twenty species, peculiar to Australia, Tasmania, and New Zealand. The majority of them are found in the former countries, three only belonging to New Zealand. They are all erect, branching shrubs, or rarely small trees. They are distinguished from *Cryptandra* and other allied genera by the flowers being destitute of bracts, by the stamens being longer than the petals, and by the three one-

seeded pieces into which the fruit separates not splitting in halves, but having a large opening on the inner face. The generic name is derived from the Greek words *poma*, a covering, and *derris*, a skin, in reference to the manner in which the fruits are loosely invested by the tube of the calyx. Several Australian species, such as *P. apetela*, *P. discolor*, *P. betulinus*, and *P. elliptica* (the Kumarahou of the Maori), and others, are occasionally met with in green-houses in Britain. They produce a profusion of small yellowish-brown or whitish flowers, and are much admired. *P. apetela* forms a small tree in New South Wales, and yields a hard, close-grained wood, there called "Cooper's wood." The New Zealand species consist of:—(1.) *P. elliptica*, with elliptic leaves, two to three inches long, and cymes many-flowered. (2.) *P. Edgerleyi*, with oblong leaves three-quarters of an inch in length, and racemes many-flowered. (3.) *P. phyllicifolia*, with linear leaves one-quarter to half an inch long, and cymes few-flowered. (4.) *P. Tainui*, with elliptic oblong leaves, obtuse at both ends, and cymes many-flowered.

1. POMADERRIS ELLIPTICA (*Labill*). The Elliptic-leaved Pomaderris.

SPECIFIC CHARACTER.—A branching shrub or small tree, covered, except on the upper surface of the leaf, with stellate, white or grey down. Leaves, 2-3 in. long, elliptic-oblong, obtuse at both ends, or acute at the tip, quite entire, white

below; petioles, $\frac{1}{2}$ in. long. Cymes terminal, much-branched, very many flowered, 2-6 in. diam. Flowers fragrant. Calyx tomentose, and covered with silky hairs. Petals with crisped margins.—*Handbook of the New Zealand Flora*, p. 43.

DESCRIPTION, etc., Plate No. 20.—The "KUMARAHOU."—This fragrant shrub is indigenous to the Northern Island only. It is abundant on the dry hills towards the north of Auckland, particularly in certain portions of the Bay of Islands District. It was first discovered by Banks and Solander, the botanists who accompanied Captain Cook on his visit to these Islands in 1769. Its presence is rather a sure indication of a poor and sterile soil. Nevertheless, when the hill-sides are adorned with the rich golden blossoms of the "Kumarahou," in the month of October, the scene is a lovely spectacle. The handsome and variegated foliage, mixed with the old gold-coloured masses of blossoms, presenting a most tasteful and charming combination. This same plant is common in many parts of temperate Eastern Australia, and Tasmania. It is generally believed that the Kumarahou cannot be grown successfully in rich or generous soil, but experiments in that direction have proved to the contrary. In fact, under liberal treatment the plant has been found to show a marked improvement both in flower and in foliage. To those of our readers who are fond of a handsome shrub we would strongly advise them to introduce this beautiful Pomaderris into cultivation, as it will well repay for the trouble. As faithfully as we have portrayed the plant, there still remains a beauty untouched, which the skill of the artist's pencil and the finest combinations of colour fail to effect.



KUMARANDU. — *Pomadouria elliptica*.

2. POMADERRIS EDGERLEYI (*Hook., F.*) Mr. Edgerley's Pomaderris.

SPECIFIC CHARACTER.—A small bush, more or less covered with yellow stellate pubescence and ferruginous flocculent tomentum, especially on the younger branches. Leaves, $\frac{3}{4}$ in. long, shortly petioled, oblong, obtuse at both ends, above

smooth or scabrid, and covered with deeply-impressed veins; below with soft, white or red tomentum, and very prominent veins. Racemes lax, few-flowered; flowers imperfect in my specimens.—*Handbook of the New Zealand Flora*, p. 43.

DESCRIPTION, etc.—“MR. EDGERLEY'S POMADERRIS.”—This rare little bush is peculiar to the Northern Island, and is extremely local, being known only on the hills south of Whangarei Harbour, and at Coromandel. The appearance of the plant, and more particularly the young branches, is very peculiar, being covered with a rusty-velvety coating, which gives it a soft, rich character. It blooms in November, but not nearly so profusely as the Kumarahou (*P. elliptica*), nor are the flowers so rich or so deep a yellow. It may be noticed that Sir J. W. Hooker, in his specific description, speaks of this plant as having lax racemes of flowers, which were very imperfect in the specimens forwarded to him. The flowers in the other species are arranged in cymes, which gives a very distinct character to them. The plant *P. Edgerleyi* is closely allied to the Australian species *P. betulinus*. Its specific name is in honour of Mr. Edgerley, a botanist of repute, who contributed several interesting and important botanical specimens for embodiment in the “*Flora Nova Zelandie*.” It is an agreeable duty for us to report that our Fig. 1, Plate No. 20, is a representation of a Pomaderris, which may upon further investigation prove to be a new species. It is similar in possessing the same rusty-velvety tomentum on its young branches, and beneath the leaves, but differs from *P. Edgerleyi* in size of foliage and other particulars. Mr. Buchanan, F.L.S., to whom we referred the plant, informs us that it is unlike any Australian form, and is a much smaller form than his specimens of *P. Edgerleyi*. The species in question was collected at Tairua, where it assumes the form of a bush about five feet high, and is rather plentiful. It appears to be quite local, and blossoms in December.

3. POMADERRIS PHYLICIFOLIA (*Todd.*) The Heath-like-leaved Pomaderris.

SPECIFIC CHARACTER.—A small, erect, fastigiately-branched heath-like downy shrub, the branches villous. Leaves small, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, spreading, linear-oblong, coriaceous, the margins rolled back to the mid-rib, obtuse, grooved

down the middle above, rather scabrid above, with short white hairs. Flowers numerous, in axillary few-flowered cymes, scarcely longer than the leaves, apetalous.—*Handbook of the New Zealand Flora*, p. 43.

DESCRIPTION, etc., Fig. 2, Plate No. 21.—The “Tauhinn.”—This small heath-like shrub is peculiar to the Northern Island, and grows abundantly in certain localities on dry fern hills. It blossoms in October, very profusely. The flowers are a pale lemon colour, and scentless. In this species the inflorescence is axillary, or growing in the angles formed by the leaves and the branches; whilst, in the preceding ones, the flowers

are produced at the ends of the branches. The leaves of the Tauhinu are small, leathery, and have a peculiar rolled form, the margins curling back to the mid rib, whilst the surface is deeply grooved down the middle. This plant is common in Tasmania. Its specific name is due to the heath-like appearance of its foliage.

4. POMADERRIS TAINUI (*Hector.*) The Tainui Pomaderris.

SPECIFIC CHARACTER.—A small, shrubby tree, 20 ft. high, with numerous irregular branches; smooth, brownish-grey bark. Young branches and under side of leaves covered with white stellate tomentum; leaves, 2-4 in. long, elliptic-oblong, obtuse at both ends, irregularly crenulate, glabrous and dark-green on the upper surface, with distant stellate bases on young leaves, principal veins very prominent, buff

coloured. Flowers small, in open thyrsoid panicles, leafy at the base, buds nearly globular; calyx, about $1\frac{1}{4}$ lines long, with stellate leaves, the tube being very short. Petals, none. Anthers tipped by a small gland; styles divided to the middle, with club-shaped, almost capitate, stigmas; capsule not seen.—*Transactions and Proceedings of the New Zealand Institute*, 1878, Vol. XI, p. 428.

DESCRIPTION, etc.—This small tree is a very local plant, being confined to about an acre of ground on a spur of the low sandy hills that extend along the coast, between the Mokou and the Mohakatina Rivers, on the West Coast of the Northern Island. It was first discovered by Sir James Hector, in 1878, during a visit to the Mokou District, under circumstances of much interest, the story of which is best told in his own words, as rendered to a meeting of the members of the Wellington Philosophical Society, in January, 1879:—"The peculiar habit of the tree," he remarked, "first attracted my attention, having resemblance to a clump of apple trees, so that, at first glance, I thought it to be an old orchard or cultivation. I afterwards was much interested in hearing from the Natives that a peculiar tree was growing on the spot where their ancestors first camped when they abandoned the Tainui canoe, in which they came from Hawaiki, and that this tree had sprung from the rollers or skids and the green boughs that were brought as flooring to the great canoe. On my doubting this, they offered to take me to the place, and if I could not recognise the tree as being found elsewhere in New Zealand, they would consider it as proof that the tradition was correct. To my surprise they took me to the clump of trees I had previously observed; and, as it is certainly quite distinct from any plant hitherto described from New Zealand, the tradition receives a certain amount of confirmation; and I need hardly point out that, if it were true—and we could hereafter determine the original habitat of this tree—it might give us a clue to the whereabouts of the mythical Hawaiki, or the place whence the Maori originally emigrated to New Zealand." The botanical description of this plant points to its close alliance to *Pomaderris apetala*, a native of Australia and Tasmania. Its specific name is accorded to it by the discoverer in honour of the great canoe, and as that by which it is known to the Maoris.

GENUS II.

DISCARIA (*Hook.*) The Discaria.

GENERIC CHARACTER.—Very much branched, glabrous, usually rigid, tortuous, spiny shrubs or small trees, often leafless. Branches decussately opposite, terete, green, transversely grooved or articulate at the nodes. Flowers axillary, pedicelled, nodding, small, green. Calyx membranous, inferior or adnate at the base, with the ovary with obconic or campanulate limb, and 4 or 5 recurved lobes. Petals none, or 4 or 5. Stamens,

4 or 5. Disk adnate to the base of the calyx, annular, entire or lobed. Ovary, free or sunk in the base of a calyx, subglobose, 3-lobed; style, slender; stigma, 3-lobed; Drupe dry, coriaceous, of 3 cocci; capsular, when ripe, the cocci separating and splitting down their faces.—*Handbook of the New Zealand Flora*, p. 44.

DESCRIPTION, etc.—A considerable genus in South America, nearly allied to *Colletia*, but differing in having no petals. One species, *Discaria Australis*, is common to Tasmania and Australia, and another to New Zealand. All of the twelve known species are spiny undershrubs of no beauty, some almost leafless, and others with minute, oblong or spatulate, smooth leaves. The small opposite secondary branches terminate in a sharp spine, and towards their base are found, in twos or threes, the little flowers, which have a short, bell-shaped calyx tube, and from four to five small, scale-like, hooded petals. The New Zealand species is known as *Discaria toumatou*.

1. DISCARIA TOUMATOU (*Raoul.*) The Native Thorn.

SPECIFIC CHARACTER.—A thorny bush in dry places; becoming a small tree in damper localities, with spreading branches and branchlets, reduced to spines 1 2 in. long. Leaves small, $\frac{1}{2}$ – $\frac{2}{3}$ in. long, fasciated in the axils of the spines, absent in old plants, linear, or obovate-oblong, obtuse or retuse, smooth or pubescent, quite entire or serrate. Flower,

$\frac{1}{2}$ in diam., apetalous, white; pedicels and calyx minutely downy. Calyx tube short, obscure; lobes, 4 or 5, broadly ovate. Disk broad, with a narrow up-turned edge. Capsule, size of a pepper-corn.—*Handbook of the New Zealand Flora*, p. 44.

DESCRIPTION, etc., Fig. 3, Plate No. 21.—The “TOUMATOU.”—This species grows as a thorny bush in dry places on the East Coast and interior of the southern part of the Northern Island, and throughout the Middle Island. In the mountainous districts of the Middle Island it assumes the form of a small tree, sometimes attaining a height of fifteen feet, with a trunk from four to six inches in diameter. The wood is very tough, and is much valued by the settlers for axe, tool, and stock-whip handles. In the low lands, where the bush form exists, the plant in certain localities covers acres of ground, and, by its dense and tangled growth, becomes perfectly defiant to intrusion by man or beast, its large and formidable spines presenting an obstacle which both biped and quadruped evince a decided repugnance to. The plant is very generally known throughout the Colony as “The Wild Irishman.” In the Middle Island, more particularly towards Otago, it is called the “Native Thorn.” If properly trained, this plant would form a handsome and impenetrable hedge that would be stronger than White Thorn (*Crataegus oxyacantha*). The sharp spines, it is asserted, were formerly

used by the Maoris as puncturing instruments in tatooing. The *Discaria* blooms in September in the North, and a month later in the South. The flowers are small, white, and sweet scented, and are produced in abundance along the under side of the branches. They are said to produce a very large quantity of honey, and are fertilized by insects. The seed vessel or capsule, when mature, becomes about the size of a peppercorn. The generic name of the plant is due to the disk of the flower being adnate, or united to the base of the calyx. The able compiler of the "*Handbook*" recognises this species as distinct from the Australian plant, relying on the absence of petals and the minute pubescence on the pedicels and flowers.





Fig. 1

Fig. 2

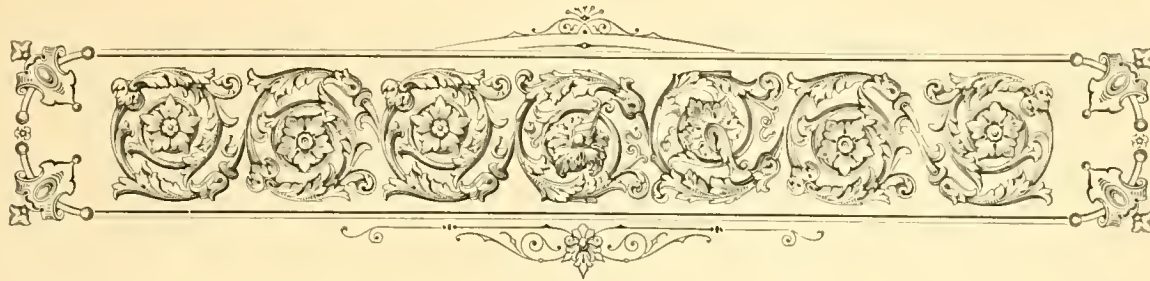
Fig. 3

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1. POMADERRIS, New Species.

2. POMADERRIS PHYMIFOJA

3. DIMERARIA TUUMATOU



CHAPTER XIX.

ORDER XIX.—SAPINDACEÆ. The Soap Worts.

CHARACTER OF THE ORDER.—Trees, rarely shrubs. Leaves alternate, rarely opposite, simple or compound, exstipulate. Flowers regular or irregular, uni- or bi-sexual. Sepals, 3-5, imbricate or valvate. Petals, none, or 3-5, generally small, often with a scale on their inner face. Disk, none, or complete or incomplete. Stamens, 5-8, hypogynous, or

inserted within the disk. Ovary, entire or lobed, usually 2-3-celled; style, simple; stigma, 2-3-lobed; ovules, 1-2 in each cell, fixed to its axis. Fruit, very various. Seeds usually exalbuminous, with large, solid or spirally-twisted cotyledons and incurved radicle.—*Handbook of the New Zealand Flora*, p. 44.

DESCRIPTION OF THE ORDER.—

NERY large and complicated order of tropical and temperate region plants, of which some genera present characters not noticed in the above description. There are above seventy genera, chiefly tropical, which are distributed into five tribes or sub-orders. The typical genus, *Sapindus*, is found in both hemispheres, mostly within the limits of the tropics, and consist of trees and shrubs, the fruits of which are fleshy externally, and do not open when ripe. Those of several species are acrid, and are called “soap-berries,” from their being used in the tropics as a substitute for soap, their outer covering or shell containing a saponaceous principle (*saponine*) in sufficient abundance to produce a lather in water. Among the species thus used are:—*S. saponaria* and *S. incœqualis* in the New World, and *S. rarak* and *S. emarginatus* in the Old. Their excessively-hard, round, black seeds are used for making rosaries, necklaces, bracelets, buttons, etc., and a medicinal oil is extracted in India from those of *S. emarginatus*. The outer covering of the fruit of some species, such as *S. esculentus*, and *S. senegalensis*, is eatable, but their seeds are poisonous. The order in New Zealand consist of two genera, viz.:—(1). DODONÆA, leaves simple, disk none; and (2). ALECTRYON, leaves pinnate, disk 8-lobed.

GENUS I.

DODONÆA (*Linn.*) The Dodonœa.

GENERIC CHARACTER.—Shrubs or trees, often covered with a viscid exudation. Leaves simple (or pinnate), exstipulate. Flowers unisexual or polygamous, apetalous, regular. Sepals 3-5, imbricate or valvate. Male flower, Disk 0 Stamens 5-8 filaments very short; anthers linear-oblong,

4-angled. Female flower, Ovary sessile, 3-6 angled; cells 2-ovuled. Capsule membranous or coriaceous, septicidally 3-6 valved; valves broadly winged at the back. Cotyledons spiral.—*Handbook of the New Zealand Flora*, p. 41.

DESCRIPTION, etc.—A very large Australian genus, of which a very few species, including the New Zealand ones, are scattered widely over the warmer regions of the globe. Few of them exceed ten feet in height, and almost all have their leaves more or less covered with a clammy gum. The fruits are membranous, with their angles produced into their papery rounded wings. The leaves of *D. viscosa*, one of the most widely diffused species, have a somewhat sour and bitter taste, and the plant is from this circumstance called in Jamaica “Switch Sorrel.” The leaves of *D. Thunbergiana*, a native of South Africa, are said to be used against fevers and as a purgative. The genus bears the name of Dodœens, a Belgium botanist and physician of the sixteenth century. It is represented in New Zealand by *Dodonœa viscosa*.

1. DODONÆA VISCOSA (*Forst.*) The Viscid Dodonœa.

SPECIFIC CHARACTER.—A small glabrous tree, 6-12 ft. high, with very hard wood, variegated black and white, and compressed viscid young shoots. Leaves 2-3 in. long, on short petioles, linear-obovate, obtuse, acute, or retuse, quite entire, membranous, veined. Flowers small, in terminal, erect,

few-flowered panicles. Sepals ovate, subacute. Anthers large, almost sessile. Fruit $\frac{1}{2}$ in. long, orbicular, 2-lobed at both ends, on slender pedicels, 2-3-valved; valves with broad, oblong membranous veined wings. Seeds with dark reddish-brown testa.—*Handbook of the New Zealand Flora*, p. 45.

DESCRIPTION, etc.—Plate No. 22.—The “AKE-AKE.”—This small tree is abundant in dry woods throughout the Islands. It sometimes attains a height of 30 feet, when it affords a dark, heavy timber of even compact grain, and has great durability. Generally the timber is variegated black and white, in the smaller growths. By the settlers it is sometimes called “Lignum Vitæ” on account of its density and weight, being the heaviest of New Zealand woods. The Ake-Ake blossoms in September, and bears small uni-sexual, or on some plants both male and female flowers. They have no petals, and to outward appearance are composed solely of a little bundle of short filaments or threads tipped with their rather large anthers. The fruit or seed-vessel is very peculiar, consisting of a flattened membranous capsule, the valves of which are broadly winged at the back. Our plate represents the plant with nearly matured fruit. In the early stages the valves and wings are green, but gradually become a pale brown as the fruit ripens. The wood is used by the Maoris in the manufacture of clubs, and other warlike implements. Owing to its extreme toughness and durability its name has passed into a



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AKE-AKE — *Dodonaea viscosa*.

proverb amongst the Natives, suggestive of lasting endurance, "Ake, Ake, Ake," signifying "for ever and ever." This species is likewise a native of Australia, the Pacific Islands, and the tropical regions of the Old and New World.

GENUS II.

ALECTRYON. (*Gartner.*) The Alectryon.

GENERIC CHARACTER.—A lofty tree, with tomentose branchlets. Leaves alternate, unequally pinnate, exstipulate. Panicles branched, axillary and terminal, many-flowered. Flowers small, almost regular, unisexual. Calyx 4 or 5-lobed; lobes villous within, rather unequal, imbricate. Petals 0. Disk small, 8-lobed. Stamens 5-8, inserted between the lobes

of the disk. Anthers large, almost sessile. Ovary obliquely obovate, compressed, one celled; style short, stigma simple or 2-3-fid; cell 1-ovuled. Fruit gibbous, pubescent, tumid or globose, with a compressed prominence on one side, rather woolly, indehiscent. Seed sub-globose, arillate; cotyledons spirally twisted.—*Handbook of the New Zealand Flora*, p. 45.

DESCRIPTION, etc.—This genus is confined to New Zealand, which has only one representative species (*Alectryon excelsum*), a very beautiful and valuable tree, resembling in foliage the English Ash.

1. ALECTRYON EXCELSUM. (*D.C.*) The Lofty Alectryon.

SPECIFIC CHARACTER.—Leaves 4-10 in. long; leaflets alternate, the young ones lobed and cut, serrate in young plants, petiolate, 2-3 in. long, obliquely ovate-lanceolate, acuminate, obscurely crenate, tomentose below, as are the petioles. Panicles 6-8 in. long, much branched, branches

stout and spreading, densely tomentose, as are the flowers. Calyx pilose. Anthers deep red. Ovary hairy, hidden by the copious hairs at the base of the calyx. Capsule $\frac{1}{2}$ in. long. Seed globose, in a large scarlet aril.—*Handbook of the New Zealand Flora*, p. 45.

DESCRIPTION, etc.—Plate No. 23. The "TITOKI," or "TITONGI." This very beautiful and valuable tree is indigenous to both Islands, but is most plentiful in the forests of the North Island. The trunk generally attains a height of fifty or sixty feet, and often measures three feet in diameter, but is usually smaller. It affords a fine-grained compact timber of great toughness and elasticity, similar to Ash, and is well adapted for the purposes of the machinist and the shipwright. It is very valuable for coach-building, and in the construction of wheels, but is not durable when exposed to the weather, unless protected by paint or varnish. It is, however, very suitable for the handles of carpenters' tools. The tree blossoms in September and October, when it is covered with large panicles of small dark crimson flowers. When the fruit matures in the succeeding month of January, the Titoki becomes brilliant with luscious looking crimson arils, tipped with their coal-black globular seeds, having somewhat the appearance of raspberries, seated in dainty nut-brown cups or capsules. The fruit is not pleasant to the taste, possessing a strong astringent flavour, but the native children eat it with a relish. Formerly the Maoris extracted an oil from the seeds, which was used for anointing the hair and persons of their chiefs. Every fourth year the Titoki is said by

the natives to give a superabundance of fruit, so that, in that year every one could use the oil and a little red pigment, and thus for once look like a chief without being one, hence the saying, "Ko nga raugatira a te tau Titoki," "Chiefs of the 'Titoki year," (Colenso.) The fruit when ripe is eaten by the wild pigeon, the Tui, and other native birds. When the seeds fall they readily germinate, and young plants are generally plentiful beneath the parent tree. The Titoki is peculiar to New Zealand, and should, therefore, on that account be a tree of additional interest.





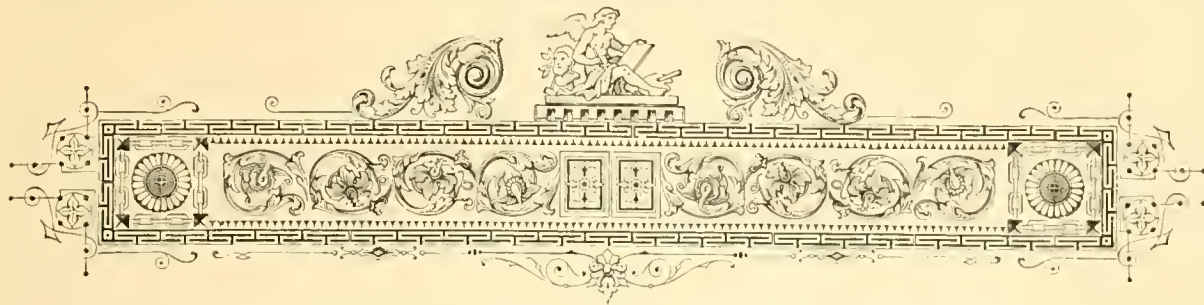
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FLOWER OF TITOKI.

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TITOKI. — *Alectryon excelsum*.



CHAPTER XX.

ORDER XX.—ANACARDIACEÆ. The Anacards.

CHARACTER OF THE ORDER.—Trees. Leaves alternate, simple or compound, exstipulate. Flowers regular, usually small, unisexual or hermaphrodite. Calyx 3-7-fid or-partite. Petals 3-7 or none. Disk usually annular. Stamens as many as the petals, alternating with staminodia, or twice as many, inserted on or at the base of the disk. Filaments free; anthers versatile. Ovary free in the female flower; 1 or 2-5

celled. In the male often of 4 imperfect carpels. Styles 1-3. Ovule solitary, pendulous from a basal funicle, or from the wall, or top of the cell. Fruit superior, usually 1-5 celled; drupe with hard putamen. Seed, exalbuminous; cotyledons thick, fleshy; radicle, short.—*Handbook of the New Zealand Flora*, p. 45.

DESCRIPTION OF THE ORDER—



LARGE tropical order, rarer in temperate climates. When trees or bushes have a resinous, milky, often caustic juice, dotless leaves, and small inconspicuous flowers, with an ovary containing a single ovule suspended at the end of an erect cord, it is pretty certain that they belong to this order, of which more than 400 species are described. Among the products of the order are the Mango fruit and the Hog Plum of the West Indies; the nuts named Pistachios and Cashews, the Black Varnish of Burmah, and elsewhere—Mastic, Fustic, etc. These varnishes are extremely acrid, and produce dangerous consequences to persons who use them incautiously. The name of the order is derived from *Anacardium*, a genus of woody plants, which are chiefly remarkable for their kidney-shaped fruit, which is placed on the end of the thickened, fleshy, pear-like receptacle. The only New Zealand genus, *Corynocarpus*, is endemic, and allied to the Mango. In Australia the order is unknown.

GENUS I.

CORYNOCARPUS. (*Forst.*) The Corynocarpus.

GENERIC CHARACTER.—A small, perfectly glabrous tree. Leaves, alternate, broad, bright-green, entire, coriaceous. Flowers in branched terminal panicles, small, green. Calyx, 5-lobed; lobes rounded, imbricate. Petals, 5; perigynous, rounded, concave, erect, imbricate, jagged. Disk, fleshy, 5-lobed. Stamens 5, inserted between the lobes of the disk, alternating with 5 petaloid, jagged scales. Ovary, sessile,

ovoid, 1-celled, narrowed into an erect style, stigma capitate; ovule, pendulous below the top of the cell. Drupe, obovoid, fleshy; endocarp coriaceous and fibrous. Seed, pendulous; testa membranous, adherent to the cell; cotyledons, plano-convex, radicle minute.—*Handbook of the New Zealand Flora*, p. 46.

DESCRIPTION, etc.—A genus restricted to New Zealand, with only one species, *Corynocarpus lævigata*; said to derive its name from its club-shaped fruit, and smooth, laurel-like leaves. The tree is valued for its beauty by the settlers, and for its fruit by the Natives. The pulp of the drupe is eaten in its raw state, but the seed itself when partaken of, without certain preparation, is poisonous. The berry is called in Maori “Pakaraka.” The tree is indigenous to the sea coast, but is found occasionally far inland, where it has been planted by the Natives. It occurs at Chatham Islands, and is said by Dr. Dieffenbach to be endemic. It has, likewise, been found on the Kermadec Islands, by the party who proceeded there to annex them to New Zealand, in August, 1887.

1. CORYNOCARPUS LÆVIGATA. (*Forst.*) The Smooth-leaved Corynocarpus.

SPECIFIC CHARACTER.—A leafy tree 40 ft. high. Leaves, 4-7 in. long, oblong, or lanceolate, sub-acute, shining, on short, stout petioles. Panicles, erect, thyrsoid, spreading, 4 in. long. Flowers, small, globose, $\frac{1}{8}$ in. diameter, greenish

white, inodorous, in short, stout pedicels. Petals, as long as the calyx-lobes, concave. Filaments, stout, subulate. Ovary, small, glabrous. Drupe, 1 in. long, oblong.—*Handbook of the New Zealand Flora*, p. 46.

DESCRIPTION, etc.—Plate No. 24.—The “KARAKA.” This well-known and handsome tree is peculiar to the Northern Island. It is found abundantly near the seashore, where it forms groves, though it sometimes occurs inland, probably the result of propagation by the Maoris in former times, for food purposes. It is stated that a group of Karaka exist at Little Akaroa, in the Canterbury district, and two or three solitary trees occur at Collingwood, and at Karamea, in the Nelson district, in all instances undoubtedly the outcome of Native culture. The tree attains a height of from thirty to forty feet, and has a trunk from one to two feet in diameter. The wood is white, short-grained, and soft, splits well, but is not durable. The broad, glossy foliage, with its cool undershade, marks the Karaka as an object of interest to the weary traveller on a hot summer's day. Its wide-spreading branches offering a welcome retreat from the sun's rays. Horses and cattle are exceedingly fond of its foliage, and thrive well upon it. The tree blossoms in October, but its flowers are small, green, and inodorous. It is best seen to advantage in the month of February, when it is laden with tempting looking





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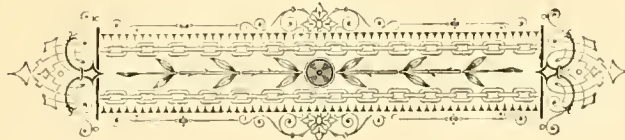
KARAKA — *Corynocarpus laevigata*.

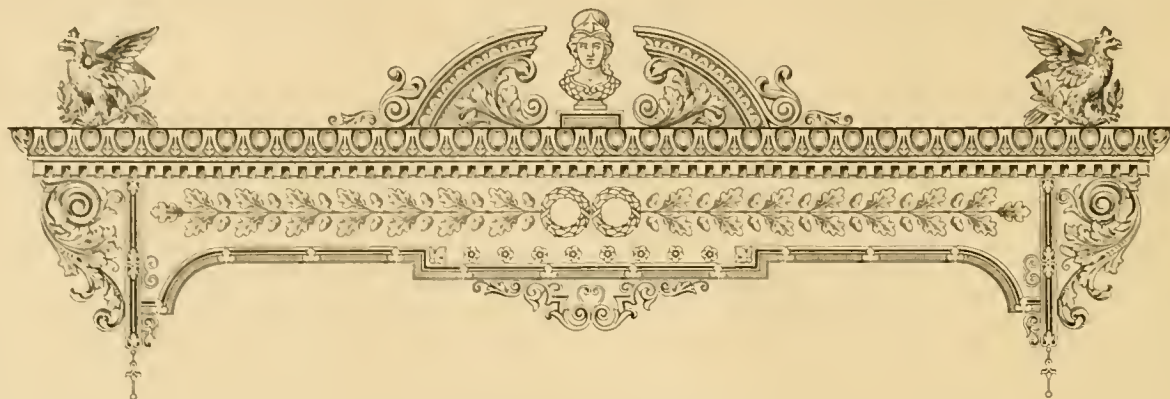
C. F. YOUNG

golden fruit, which affords a ready supply of nutritious food to the Wild Pigeon, and the Kaka. The fruit, or drupe, as it is technically called, is ordinarily about the size of a plum, and shaped like an egg, turning from a dark green into a rich golden colour as it ripens. The Natives in many parts, even to this day, gather it in large quantities, as an article of food, but in olden times it proved a staple article of subsistence, and on that account, as well as for its handsome appearance around their villages, the Karaka was held in much veneration by them.

“ . . . Umbrageous, cool, and green,
Branches well-clothed, and golden fruit,
Reflecting back the sun's most ardent sheen.
A very tree of life and joy.”

It was customary with the Maoris, when approaching, on important occasions, the graves of their ancestors, to adorn their heads with a chaplet of the leaves of this tree. The fleshy part, or covering of the kernel, is edible, but it has a sweet insipid flavour, which is much appreciated by the Maori, but is rather distasteful to the European. The raw kernels are poisonous, and when eaten in that state produce spasmodic pains, giddiness, and partial paralysis, to obviate which effects they are steamed for twenty-four hours, and then either buried in earth, or allowed to soak in running water for some days. The kernels thus prepared become quite innocuous, and remain sound for a length of time, in a dry store. The Karaka is in cultivation in the south of England, and is much admired as a handsome tree. It may be grown from cuttings, but is best and easiest raised from seed. It luxuriates in a rich damp soil. Seedlings should be planted out when they are about six inches high, and in cultivation are generally hardy. It is a very excellent addition to a garden, and being an evergreen, is always fresh and beautiful. The tree is not known to possess any useful medicinal properties, but this is amply compensated for by its fruit-producing character, and its great beauty.





CHAPTER XXI.

ORDER XXI.—CORIARIEÆ. The Hide-tanning Family.

CHARACTER OF THE ORDER.—Sarmentose, glabrous, leafy under shrubs, with angular branches. Leaves, opposite, or rarely 3-nate, exstipulate, entire. Flowers, hermaphrodite, solitary, or racemed, axillary, regular. Sepals, 5, triangular-ovate, imbricate, persistent. Petals, 5, hypogynous, triangular, shorter than the sepals; after flowering becoming fleshy and closely appressed to the carpels. Stamens, 10, hypogynous, all free, or 5 of them adnate to the petals; filaments short;

anthers large, rough. Carpels, 5 or 10, whorled round, and adnate to a fleshy torus, 1-celled; styles, 5 or 10, free, flexuose, stigmatiferous all over; ovules, solitary, pendulous. Fruit, 5-8, small, indehiscent, compressed, oblong, crustaceous achenes, keeled on the back and sides, enclosed in the fleshy petals. Testa, membranous; albumen, thin; cotyledons, plano-convex; radicle, very short, superior.—*Handbook of the New Zealand Flora*, p. 46.

DESCRIPTION OF THE ORDER.—



SMALL order of shrubs and herbs; native of Southern Europe, the Himalayas, the South American Andes, New Zealand and the Kermadec Islands. The New Zealand species and their forms are all similar to those found in the South American Andes. The fruit of the European species, *Coriaria myrtifolia*, is poisonous, and is said to have proved fatal to some French soldiers in Catalonia. The leaves have also been used to adulterate Senna—a dangerous fraud, as they are stated to have caused tetanic convulsions, and subsequent coma. The seeds of the New Zealand species, *C. ruscifolia*, are poisonous if eaten, and the young succulent foliage is deleterious and often fatal to cattle if eaten in quantity. The name of the order is derived from the Latin word *corium*, a hide, relating to some of the species being used for tanning and dyeing leather.



GENUS I.

CORIARIA (*Linn.*) The Coriaria.

GENERIC CHARACTER.—Shrubs and herbs, with angular branches. Leaves opposite, or rarely 3-nate, exstipulate, entire. Flowers in racemes, hermaphrodite. Calyx, 5-parted, bell-shaped. Petals, 5, fleshy, with a prominent ridge internally. Stamens, 10, arising from beneath the ovary, which

consists of 5–10 carpels arranged obliquely upon a thickened receptacle. Stigmas, 5. Ovules, solitary, pendulous, inverted. Fruit, of 5–8, small, crustaceous, indehiscent achenes, concealed by the membranous sepals and fleshy petals.—*Ed. Art Album New Zealand Flora.*

DESCRIPTION, etc.—A genus of shrubs and herbs, of rather uncertain position, made to constitute a distinct family, under the name of *Coriariæ*. New Zealand is represented by three species, viz. :—(1.) *C. RUSCIFOLIA*, a perennial shrub with leaves one to three inches long; (2.) *C. THYMIFOLIA*, a small annual, with leaves ovate or lanceolate, from one-quarter to one inch long; and (3.) *C. ANGUSTISSIMA*, a herbaceous annual, with leaves narrow-linear, lanceolate, one-quarter-of-an-inch long.

1. CORIARIA RUSCIFOLIA (*Linn.*) The Ruscus-leaved Coriaria.

SPECIFIC CHARACTER.—A perennial shrub, 10–18 ft. high; trunk, 6–8 in. diam.; branches often long and flexuose. Leaves oblong, or obovate, acuminate or acute, 3–5-nerved, sessile or shortly-petioled. Racemes 8–12 in. long, drooping,

many-flowered, pubescent; pedicles, $\frac{1}{3}$ in., slender, bracteolate at the base. Flowers, $\frac{1}{6}$ – $\frac{1}{8}$ in. diam., green. Anthers, in some flowers, imperfect. Petals full of purple juice when the fruit is ripe.—*Handbook of the New Zealand Flora*, p. 46.

DESCRIPTION, etc.—Plate No. 25.—The “TUTU,” or “TUPAKIHI.”—This well-known shrub is abundant throughout both islands, and grows luxuriantly in rich soil, its presence amongst the indigenous vegetation indicating, by its growth, whether the quality of the land be good or otherwise. The general form of the plant is that of a bush, with long flexible branches growing directly from the root; but sometimes, though rarely, it assumes the form of a tree, with a trunk five or six feet in height, and from four to six inches in thickness, the branches extending from the crown of the trunk in a graceful drooping manner, producing a very pleasing effect, more especially when the tree is in fruit. Beneath the shade of such an one, the Authors have upon occasions screened themselves from the hot glare of the summer’s sun. The flowering commences in September, when the long racemes are covered with small greenish red flowers, which grow very quickly, and ultimately in February and March, develop into the fully-ripened juicy fruit (the so-called fruit being nothing more or less than fleshy petals). The juice of these petals was formerly used by the Maoris as a beverage, and was considered rich and wholesome. In preparing it for use, it was carefully strained into calabashes, excluding the seeds, and kept for household consumption. Mixed with their fern-root, it was considered a very delicious accompaniment. A wine similar to elder-berry has been made from the juice by Europeans, and is much esteemed for its flavour and richness. The seeds are poisonous, the noxious principle being in an oil

contained in them. The effects that result from eating the seeds are convulsions and delirium, which continues for several hours, and frequently terminates in death. If emetics are administered promptly, cases are not, however, fatal. In country districts, parents and others having control of children would do well to warn them of the danger of eating the seeds of the Tutu plant. The succulent young shoots are poisonous to cattle, more especially when eaten by the animals when hungry. The effects produced are a partial paralysis of the brain, which causes staggering and falling, with a seeming disposition to rush at objects, the eyes of the animal turning up in a distressing manner, whilst it sinks repeatedly upon its knees during the convulsion. Should the victim fall, speedy relief is afforded by making an incision in the ear, and allowing the blood to flow. Sometimes if this relief is not speedily forthcoming the beast succumbs to the poison. Should the animal attacked not fall, the virulence of the poison will pass off in a short time. Sheep introduced into a new district will often suffer from Tutu, the leaves of which they are exceedingly fond, but generally the attack is only slight, as they mostly nibble and walk on. When a sheep is overcome, it rushes on a few paces with its neck extended, then stops, staggers, and falls. Raising the head above the spine, and keeping it steady for a short time affords relief, and the attack passes away. It is generally asserted that horses will not eat the Tutu, but, on the other hand, it is likewise believed that they do, though sparingly, and then only in very hot weather, and in combination with other food which renders it innocuous. The Ground Tutu, *C. thymifolia*, of the Middle Island, is, however, said to be highly poisonous to horses. In any case the Tutu plant is best eradicated from enclosures where horses are kept, to prevent mischief occurring to them. A remarkable instance is on record of the death of an elephant in New Zealand, which was poisoned by eating Tutu. The incident is related by the late lamented scientist, Sir Julius Von Haast, and occurred some years ago to an elephant which was landed in Otago, and marched inland by its owner, for a considerable distance. Arriving at a suitable halting place, where the vegetation was abundant, the owner determined to give the animal a rest, and a few days feeding. The grass, which had been burnt off during the previous season, had shot up again with renewed vigour, and amongst it was a fine crop of succulent young plants of *Coriaria ruscifolia*. The elephant fed amongst the herbage for four hours, and afterwards went to a neighbouring stream, and drank freely. In turning back the animal began to reel, fell on the ground, and died after three hours; so that it took only seven hours from the time the beast began to feed until it died. It would seem from this incident that the poison must have been very virulent. The skeleton of this elephant may now be seen in the Museum at Wellington. The European plant, *C. myrtifolia*, is as poisonous as its New Zealand congener, *C. ruscifolia*, and produces convulsions,

delirium, and death. The Maoris extracted a good blue-black dye from the bark of the Tutu, which they used effectively in colouring their mats and ornamental baskets. The root of the European species, *C. myrtifolia*, is used for tanning purposes. As cultivation spreads throughout the Islands, it is satisfactory to know that the *Coraria* is fast disappearing, though to eradicate it effectually it must be turned up by the roots, which when dry should be burnt off. Simply cutting the plant down will do no good, as it springs up again with increased vigour.

2. CORIARIA THYMIFOLIA (*Humb.*) The Thyme-leaved Coriaria.

SPECIFIC CHARACTER.—A much smaller annual (?), usually more pubescent plant than *C. ruscifolia*, sometimes only a foot or so high, with small, ovate-lanceolate leaves, shorter racemes and smaller flowers; large forms of it, how-

ever, seem to be connected with smaller ones of the former, both in New Zealand and America.—*Handbook of the New Zealand Flora*, p. 46.

DESCRIPTION, etc.—This plant is common in various places throughout the Islands, ascending to 5,000 feet. It is likewise a native of the Kermadec Islands, and South America, where it ranges from Mexico to Peru, at elevations of from 4,000 to 12,000 feet. In Otago it is commonly known as the Small Ground Tutu, and is said to be highly poisonous to horses. It derives its specific name from the small Thyme-like appearance of its foliage.

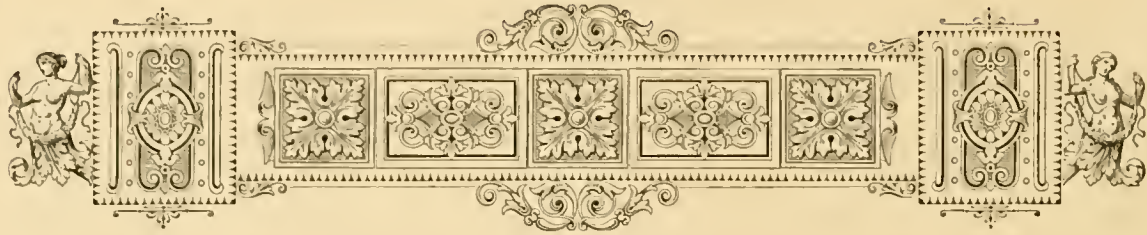
3. CORIARIA ANGUSTISSIMA (*Hook., F.*) The Very Narrow-leaved Coriaria.

SPECIFIC CHARACTER.—A small, bright-green annual species, 6–18 in. high, with the habit of *C. thymifolia*; but the branches are glabrous, very slender, more dense, and the

leaves are very narrow, linear-lanceolate, or subulate; $\frac{1}{4}$ in. long.—*Handbook of the New Zealand Flora*, p. 47.

DESCRIPTION.—This small species is found on Mount Egmont, and on the top of the Ruahine Mountains, in the Northern Island; and is abundant in sub-alpine localities from Nelson to Otago. The Editor of the "*Handbook*" says that this plant, in his opinion, passes into *C. thymifolia*, but that all his New Zealand correspondents regard it as a distinct species. It is known in Otago as the Annual Herbaceous Tutu, and may be regarded as poisonous, favouring as it does *C. thymifolia* in habit, anyhow, it should always be looked upon with suspicion, as belonging to a family of bad repute.





CHAPTER XXII.

ORDER XXII.—LEGUMINOSÆ. (Tribe *Papilionaceæ*.) The Pea and Bean Family.

CHARACTER OF THE ORDER.—Herbs, shrubs, or trees. Leaves alternate (rarely opposite), stipulate, mostly compound; leaflets usually entire. Flowers irregular, hermaphrodite. Calyx, 5-toothed, or cleft, or 4-toothed by the union of the upper lobes. Corolla, papilionaceous, *i.e.* of 5 petals, the upper (standard) broadest, outside in bud often reflexed; the two next lateral (wings), vertical, and parallel; the two lowest also vertical and parallel within the wings (forming the keel), often combined by their lower edges. Stamens, 10, 9 usually

united into a membranous tube sheathing the ovary, the upper free, rarely all free. Ovary, sessile, or stipitate, generally long, flattened, 1-celled, tapering into a straight, or upturned style; stigma, small, simple, lateral, or capitate. Fruit, a 1 or more seeded legume, splitting into 2 valves in all the New Zealand genera, except *Carmichaelia*. Seeds, exalbuminous; cotyledons, thick, plano-convex; radicle, short.—*Handbook of the New Zealand Flora*, p. 47.

DESCRIPTION OF THE ORDER.—



THIS order is a very large one, and the plants occur in all parts of the world, but are abundant in tropical countries. It forms, in Australia, a great proportion of the indigenous vegetation—herbaceous, shrubby and arboreous,—but is less developed in New Zealand than in any other part of the world. It has been divided into three sub-orders, *viz.* :— (1.) *Papilionaceæ*; (2.) *Cæsalpiniciæ* and *Mimosææ*. The first-named sub-order is alone peculiar to New Zealand. Some of the plants of the order are nutritious, others tonic and astringent, others purgative, and a few poisonous. They supply timber, fibres, gums, dyes, and various economical substances. Amongst the useful plants may be noted peas, beans, lentils, kidney-beans, and pulse of various kinds—lupins, clover, lucerne, medick, sanfoil, liquorice, tragacanth, indigo, and kino. Amongst the poisonous plants are *Coronilla varia*, *Cytisus laburnum*, *Gompholobium uncinatum*, and *Physostigma venenosum*, the Ordeal beans of Calabar. There are about 550 genera and 7,000 species. The New Zealand species consist of :— (1.) CARMICHELIA, shrubs, leafless, or leaflets in 1 to 3 pairs—flowers small; (2.)

NOTOSPARTIUM, free, with pendulous, chord-like branchlets, leafless—flowers pink; (3.) SWAINSONIA, a herb, with leaflets in several pairs—flowers purple; (4.) CLIANTHUS, herbaceous undershrub, leaflets in many pairs—flowers large, scarlet; (5.) SOPHORA, shrubs or trees, leaflets in many pairs—flowers large, yellow.

GENUS I.

CARMICHELIA. (*Brown.*) The Carmichelias, or Native Brooms.

GENERIC CHARACTER.—Shrubs or small trees, usually quite leafless, or leafy in a young state only; branches terete, or more often flattened, grooved, or striate, green. Leaflets, in 1-3 pairs, obcordate. Flowers, small, pink, bluish, or white, in small lateral fascicles or racemes, inserted in notches on the edges of the branchlets. Calyx, short, cup-shaped, or campanulate, truncate, 5-toothed. Standard orbicular, usually reflexed. Wings more or less falcate, obtuse, arched at the base. Keel, oblong, incurved, obtuse. Upper stamen more or

less free from the others. Ovary, narrowed into a slender curved style, beardless, stigmatiferous at the very tip; ovules, numerous, 2-seriate. Pod, small, oblong, or orbicular, straight or oblique, with a short or long rigid subulate beak, thick, very coriaceous; valves opening at the tip only, or with the centre falling away from the persistent consolidated edges. Seeds, 1-3, oblong or reniform; funicle not thickened, radicle with a double flexure.—*Handbook of New Zealand Flora*, p. 48.

DESCRIPTION, etc.—A most singular genus of shrubs, confined to New Zealand. The branches are sometimes round, but more commonly flattened and tape-like. Some of the plants, when in a seedling condition, are furnished with unequally pinnate leaves; but after they are a few weeks old, no more leaves are produced. The flowers are small, very numerous, white, pink, lilac, or yellow in colour, and disposed in short racemes. The pods are roundish, slightly turgid, about half-an-inch long, and contain two or four seeds. They are remarkable in the family on account of a thin partition (replum) between the valves of the pod, which remains after the valves have fallen; to this partition the seeds are attached. The genus is named in honour of Captain Carmichael, a botanist of repute, who published an account of the plants of the Island Tristan d'Acunha. The genus is represented by over twelve species, and most probably there may be others. The family is very difficult to discriminate, and many intermediates are known to exist. Those at present known are:—(1.) *C. CRASSICAULIS*; (2.) *C. MUNROI*; (3.) *C. NANA*; (4.) *C. GRANDIFLORA*; (5.) *C. PILOSA*; (6.) *C. AUSTRALIS*; (7.) *C. ODORATA*; (8.) *C. FLAGELLIFORMIS*; (9.) *C. JUNCEA*; (10.) *C. ENYSII*; (11.) *C. UNIFLORA*; (12.) *C. WILLIAMSHII*; (13.) *C. KIRKII*.

1. CARMICHELIA CRASSICAULIS. (*Hook, F.*) The Thick-stemmed Carmichelia.

SPECIFIC CHARACTER.—Branchlets very robust, cylindrical, $\frac{3}{8}$ in. diameter, with many deep, parallel, tomentose grooves. Leaves not seen. Flowers in rounded fascicles of 6-12, $\frac{1}{4}$ – $\frac{1}{2}$ in. long, shortly pedicelled. Calyx and pedicels

densely woolly, lobes of the former ovate, obtuse; bracteoles at its base minute. Standard, large, reflexed. Ovary densely villous, with white silky hairs. Pod, unknown.—*Handbook of the New Zealand Flora*, p. 48.

DESCRIPTION.—This plant is an Alpine, and indigenous to the Middle Island. It is found on the Mount Torlesse Range, in the Canterbury district, at an elevation of from

3,000 to 5,000 feet, and in old moraines around Lake Ohau. It is likewise known on the Hawkdun and Mount Ida Ranges, in Otago. This very fine species is at once recognised by its stout, and deeply-grooved branches, and its large flowers, collected into a compact head, with woolly calyx, and large lobes. Its name is due to the robust character of its branchlets.

OTHER SPECIES OF CARMICHAELIA.

C. MUNROI. (*Hook, F.*)

Branchlets stout, slightly, or much compressed, $\frac{1}{6}$ in. diameter, striated, not grooved, quite glabrous. Flowers $\frac{1}{4}$ to $\frac{1}{3}$ in. long, in few lax-flowered racemes. Pedicels very slender. Found half-way up the summit of Maerac's Run. The very stout habit, and lax, large-flowered racemes, best distinguish this plant. It is named in honour of the late Sir D. Munro, a botanist of standing, who has added many beautiful Alpine species to the New Zealand Flora.

3. C. NANA. (*Col.*)

A very dwarf, glabrous, rigid shrub, two to four feet high, with fasciated leaflets, much compressed, minutely striated (streaked), erect branchlets $\frac{1}{2}$ to $\frac{1}{3}$ in. diam. Flowers $\frac{1}{4}$ to $\frac{1}{3}$ in. long. Calyx shorter than the slender pedicels, glabrous, or sparsely pilose, lobes rather large, and obtuse; bracteoles at the base, minute. Standard about as long as the wings. Ovary quite glabrous. Pod linear-oblong, $\frac{1}{3}$ to $\frac{1}{2}$ in. long, with a short straight beak, like the pod of *C. Australis*. It is indigenous to the Northern Island, in the dry mountainous country at the base of Mount Tongariro, and in the Middle Island on the Southern Alps. It is likewise a common plant on the Hawkdun and Mount Ida Ranges, in Otago, and occurs in the Upper Motueka Valley, Nelson.

4. C. GRANDIFLORA. (*Hook, F.*)

A much-branched glabrous shrub, with branchlets round, or compressed, $\frac{1}{2}$ to $\frac{1}{6}$ in. broad, deeply grooved, often leafy. Its flowers are $\frac{1}{4}$ in. diam. long, in peduncled, lax, broad, obtuse, 6 to 8 flowered, glabrous racemes, on slender pedicels half as long as the calyx. The standard is much larger than the wings. Pods in nodding racemes, narrow, oblong, $\frac{1}{4}$ in. long, gradually narrowed into a subulate beak, $\frac{1}{3}$ in. long. It has two pale brown seeds. The plant is indigenous to the Middle Island, at Milford Sound, the riverbeds of the Southern Alps, at an altitude of from 2,500 to 4,500 feet, and in the Otago

Lake District. It is a very distinct species, best known by the large flowers from which it derives its specific name, deeply-grooved branches, and 3-foliolate leaves. The flowers are said to be odoriferous.

5. *C. PILOSA*. (*Col.*)

A much distichously branched shrub, with branchlets notched alternately on either side, much compressed, $\frac{1}{12}$ to $\frac{1}{8}$ in. broad, fluxuose, deeply grooved. The flowers are minute, in small erect, dense, 10 to 15 flowered racemes. Standard much larger than the up-turned wings. Pods small, in pendulous racemes $\frac{1}{4}$ in. long. It bears its name from the silky-pubescent character of its branchlets, and its silky ovary. This species is known only on the East Coast of the Northern Island. It is peculiar in having the ground branchlets of *C. grandiflora*, and others, and the racemes of *C. odorata*, but the silky ovary distinguishes it from these and all its congeners except *C. crassicaulis*.

6. *C. AUSTRALIS*. (*Brown.*)

An erect, much-branched shrub, or small tree, with straight, quite flat, elongated branchlets, $\frac{1}{4}$ to $\frac{1}{2}$ in. broad, finely striated, with distinct alternate notches. Leaflets one or two pairs, broadly or narrowly obovate-cordate, or obcuneate, quite glabrous. Flowers small, $\frac{1}{8}$ in. long, in small 5 to 8 flowered, erect or spreading racemes. Standard broad, longer than the wings. This may be considered the typical species of the genus, and is common along the Eastern Coasts, and in the interior of the Northern Island, but does not occur within many miles of Wellington. It is recorded as being indigenous to the Middle Island, but the statement requires confirmation. The plant may easily be distinguished by its red seeds. It is called "Whakaka" by the Maoris.

7. *CARMICHAELIA ODORATA* (*Col.*) The Scented Carmichaelia.

SPECIFIC CHARACTER.—A much-branched shrub; branches distichous, terete, compressed or plano-convex, $\frac{1}{12}$ — $\frac{1}{10}$ in. broad, deeply grooved, pubescent towards the tips. Leaves, small, silky-pubescent on both sides; leaflets in two pairs, very small, $\frac{1}{8}$ — $\frac{1}{6}$ in. long, narrow oblong, obtusate, 2-lobed at the

tip. Flowers, minute, $\frac{1}{10}$ — $\frac{1}{8}$ in. long, in numerous, small, erect, many-flowered, pubescent racemes, very shortly pedicelled; bracteoles, minute, on the pedicel. Calyx-teeth rather long, acute. Pods in pendulous racemes, exactly like those of *C. pilosa*.—*Handbook of the New Zealand Flora*, p. 50.

DESCRIPTION.—Fig. 1, Plate No. 26—The "SCENTED-BROOM."—This beautiful species is indigenous to both Islands, being found on the East Coast of the Northern, and in the Nelson, Otago, and Canterbury districts of the Middle Island. It is very similar to *C. pilosa*, but differs from it in having a glabrous ovary. In habit this species varies to a surprising degree, but is remarkably constant in the structure of the flowers

and fruit. Sometimes the branches are prostrate, bearing a close resemblance to *C. juncea*, at others, erect or spreading; leafless and foliaceous specimens may be found growing side by side. The branches may be round and extremely slender, or excessively flattened, and broad, while the inflorescence may vary from a few scattered fascicles, to dense whorls, or many-flowered racemes, and not infrequently all the variations may be found in the same plant. The subject of our plate is a remarkably pretty foliaceous variety, with racemes of many parti-coloured flowers. The shrub is much prized in cultivation for its form, and the prodigal display of its flowers. In the North Island it blossoms in December, and matures its fruit about March, the pods containing two or three small seeds. It owes its name to the supposition that its flowers possess an odour, but the report is perhaps not reliable. If they do exhale a perfume it is but faintly.

S. CARMICHÆLIA FLAGELLIFORMIS (*Col.*) The Whip-like Carmichælia.

SPECIFIC CHARACTER.—A much-branched shrub, with almost fastigiate, numerous, very slender, compressed, rarely plano-convex grooved branchlets, $\frac{1}{10}$ — $\frac{1}{15}$ in. broad. Leaves not seen. Flowers, minute, $\frac{1}{10}$ — $\frac{1}{8}$ in. long, in pubescent, lax, 3-6-flowered fascicles, or open racemes; pedicels very slender;

bracteoles above the middle, or below the calyx. Pods, oblong or obliquely orbicular, about $\frac{1}{2}$ in. long, with a stout, subulate, straight beak $\frac{1}{12}$ in. long. Seeds, mottled with yellow or red, brown or black.—*Handbook of the New Zealand Flora*, p. 50.

DESCRIPTION, etc., Fig. 2, Plate No. 26.—The “NATIVE BROOM.”—This species, which is well known by its long whip-like branches, is found along the East Coast of the Northern, and in many parts of the Middle, Island, from Nelson down to Otago. It is the most common species in Southland. On Banks Peninsula, the branchlets are sometimes thread-like and pendulous, presenting a very elegant appearance; but in this state the flowers are produced sparingly. The leaves, which are not described by the editor of the “*Handbook*,” in his description of the plant, have since been determined by Professor Kirk, F.L.S., who states that they are 3-5-foliolate, with leaflets emarginate. The plant blossoms in the North Island in October and November, and the seed reaches maturity in February, when the valves become separated from the replum, and display the seed attached to its membranous attachment. Our plate clearly indicates the presence of the seed thus supported. The “Kakapo,” or “Ground-parrot” of the South Island, delights to chew the Broom into a ball, to extract the juice; by this, the Natives know the haunts of the bird. The European Broom, *Planta genista*, allied to our Carmichælias, is accepted as the emblem of humility, and has given its name to a race of English kings. It was assumed by Geoffrey, Earl of Anjou, the father of the first Plantagenet king—Henry the Second—as a floral badge. According to tradition, the Earl, when encamped on a heath just before a battle, plucked a golden spray, and placed it in his helmet. The flower gleamed everywhere, amid the swaying storm of battle, and the triumphant victor adopted his chance badge as his future device.

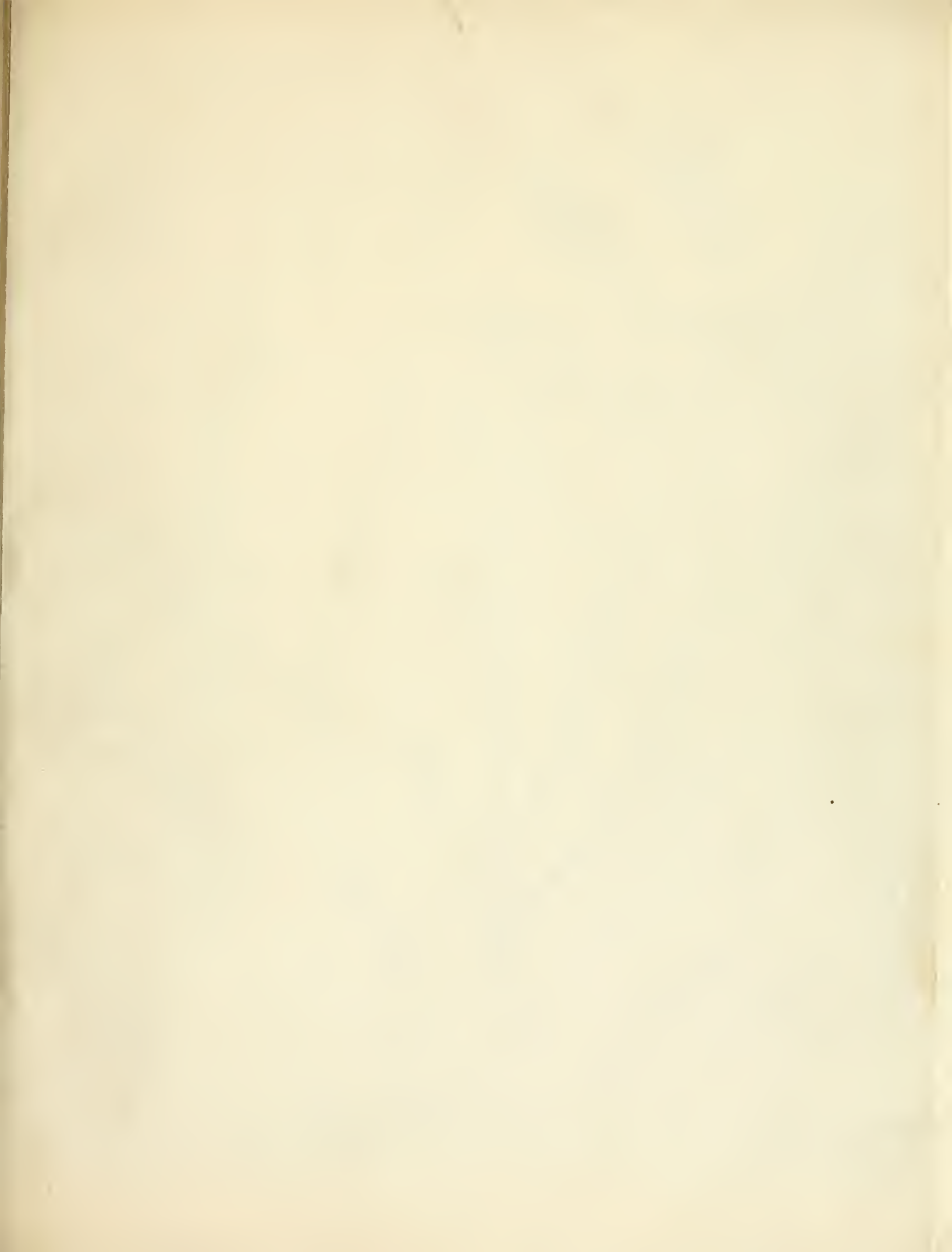




Fig. 4.

Fig. 3.

Fig. 3.

Fig. 2.

Fig. 4.

Fig. 2.

S. Featley

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1.—CARMICHAELIA ODORATA. 2.—C. FLAGELLIFORMIS and Fruit. 3.—C. WILLIAMSII and Fruit. 4.—NOTOSPARTIUM CARMICHAELIA and Fruit.

9. C. JUNCEA (*Col.*)

A small, slender shrub, a foot or less high, with very slender, compressed, often curved, grooved branches and branchlets, less than $\frac{1}{2}$ in. broad. The leaves are described by Professor Kirk, F.L.S., as unifoliate, or pinnately 3-5-foliate, silky, terminal leaflet much the longest; leaflets, ovate or linear, long, sometimes produced in profusion at the base of the branches, which are closely appressed to the ground and excessively compressed. It is due to us here to remark that much and valuable information on the genus *Carmichaelia* has been given by Professor Kirk, in an able article which appeared in Vol. XVI., "*Transactions and Proceedings of the New Zealand Institute*," 1883, and from which we have made copious notes; more particularly as many important characteristics of these plants are absent in the "*Handbook*," and remained undescribed until Professor Kirk's remarks were published. The flowers are minute, $\frac{1}{10}$ to $\frac{1}{8}$ in. long, in loose, small 4-8-flowered fascicles; calyx small, rather membranous; lobes small, and rather acute. Pod very minute. This species is found in the Northern Island, at the East Cape, in Hawke's Bay, and at Taupo. In the Middle Island, it is reported likewise from Akaroa, and on the Canterbury Plains.

10. C. ENYSII (*Enys and Kirk.*)

This plant forms dense, hard patches one to four inches in diameter, and scarcely exceeding one inch above the surface of the ground. The root and lower branches are stout; secondary branches one inch long, with small compressed branchlets. The leaves are small, orbicular in form and emarginate, on slender petioles. The flowers have not been described, but must be very minute. The seed-pods are solitary, $\frac{3}{10}$ in. long, and each contains one small black seed. This species is said to be one of the most remarkable plants in the Flora; the branches are so dense that it is impossible to thrust the finger between them. It is local and very rare, not more than a dozen plants having been found at present. The plant was discovered by Messrs. J. D. Enys and T. Kirk, on the terraces of the Porter River, Waimakariri, in the Canterbury District.

11. C. UNIFLORA (*T. Kirk.*)

A small straggling plant, with creeping stems, and slender, distant branches, allied to *C. nana*. Leaves not seen. Flowers solitary, $\frac{1}{4}$ in. long. It is a native of the Middle Island, and was found by J. D. Enys at Lochnavar, and in the Valley of the Poulter.

12. CARMICHÆLIA WILLIAMSII (*T. Kirk*). Archdeacon W. L. Williams'
Carmichælia.

SPECIFIC CHARACTER.—A leafless shrub. Branches excessively compressed, $\frac{3}{8}$ – $\frac{1}{2}$ in. broad, thin, with numerous parallel grooves, minutely pubescent when young, hoary or silky; notches alternate, distant. Leaves, unknown. Flowers, sparingly produced, solitary, or 2-3-flowered; fascicles, very large, with the pedicels fully 1 in. long; pedicels, slender, silky. Calyx, large, 5-toothed, acute, pubescent; corolla,

sharply curved upwards; petals, acute; stamens, diadelphous; ovary, shortly stipitate, glabrous; style, long, curved; stigma, capitate. Pods, on stout erect pedicels, slightly turgid, oblong or obliquely oblong, with a long straight beak 1-1 $\frac{1}{4}$ in., including beak. Seeds, 9-10, red, mottled with black.—*Transactions and Proceedings of the New Zealand Institute, Vols. XII. and XVI., Pp. 394, 386. T. Kirk.*

DESCRIPTION, etc., Fig. 3, Plate No. 26.—“ARCHDEACON W. L. WILLIAMS' CARMICHÆLIA.”—This fine species, in all respects the largest of the genus, is allied to *C. nana* in the structure of its flowers, but entirely lacks the rigidity of that species. The branches are slender for so large a plant; the notches are more distant than in any other species, and in the young state carry a single triangular scale as in *C. nana*; but in old branches the single scale is replaced by an aggregated mass of shorter scales, sometimes attaining the size of a small pea. The flowers are large and of a pale yellow colour. This contribution to our Flora was made by Archdeacon W. L. Williams, of Gisborne, to whom botanical science owes much for this and many other rare specimens with which he has from time to time enriched the stores of knowledge. We are much indebted to this gentleman for a specimen of the fine plant which adorns our pages. The species was named in honour of the discoverer. It is known only as growing in the Northern Island, at Raukokore Bay, the southern end of the Bay of Plenty, and at Hicks Bay, near the East Cape.

OTHER SPECIES OF CARMICHÆLIA.

13. *C. KIRKII* (*Hook., F.*)

This extremely slender plant is a native of the Middle Island in Cardrona Valley, and at Otepopo. It is a very distinct species, differing from all others in habit, flowers and fruit. The long flexuose branches are unable to support their own weight, and usually become interlaced with adjacent shrubs. Its branches are few, distant, extremely slender, two to three inches long, round and grooved. Leaves few, pinnately 3-5-foliolate. The flowers are half an inch long, on lax racemes, 3-5-flowered. It has a pod half an inch in length, and a stout broad replum. Named in honour of Professor T. Kirk, F.L.S., whose labours in botanical science are too well known to need commendation at our hands, to enhance their value.

GENUS II.

NOTOSPARTIUM. (*Hook, F.*) The Notospartium.

GENERIC CHARACTER.—A shrub or small tree, with slender branches, and pendulous branchlets, like whipcord. Leaves, not seen. Flowers, rather small. Calyx, campanulate, truncate; teeth, 5, short. Standard, obovate-obcordate, not auricled at the base. Wings, oblong, with an incurved auricle at the base, shorter than the hatchet-shaped keel. Stamens,

diadelphous. Ovary, nearly sessile, linear, tapering into a curved style, which is ciliated. Pod, shortly stipitate, linear, elongate, with a slender style, curved, torulose, compressed, membranous, indehiscent, many-jointed, many-seeded. Seeds, solitary in the cells, oblong, with a doubly-bent and twisted club-shaped radicle.—*Handbook of the New Zealand Flora, p. 51.*

DESCRIPTION, etc.—A most curious genus peculiar to New Zealand, and allied in habit, and in many other respects to *Carmichaelia*, but widely differing from it, and from all other known genera.

1. NOTOSPARTIUM CARMICHELIA. (*Hook, F.*) The Carmichaelia-like Notospartium.

SPECIFIC CHARACTER.—A small tree, with weeping branches, and pink flowers. Branchlets, 1 ft. or more long, compressed, grooved, $\frac{1}{10}$ in. broad, remotely toothed, giving off at the teeth many-flowered racemes, 1-1½ in. long.

Peduncle and short pedicels, pubescent. Flowers, $\frac{1}{4}$ - $\frac{1}{2}$ in. long. Pods, 1 in. long, $\frac{1}{12}$ in. broad.—*Handbook of the New Zealand Flora, p. 51.*

DESCRIPTION, etc.—Fig. 4, Plate No. 26.—The “NOTOSPARTIUM,” or “PINK BROOM.” This beautiful tree is indigenous to the Middle Island, and confined to the northern part of the Canterbury District, the Kaikoura Ranges, and the Upper Awatere, ascending to a height of 1,500 feet. It blossoms in December, when it is a charming spectacle, having its long weeping branches adorned with the beautiful pink pea-flowers, plentifully displayed. The plant, even in its native habitat, does not appear to be common.

GENUS III.

SWAINSONIA. (*Salisbury.*) The Swainsonia.

GENERIC CHARACTER.—Herbs; stems prostrate, erect, or climbing, sometimes woody at the base. Leaves, unequally-pinnate, stipulate; leaflets, many. Flowers in axillary, peduncled, racemes. Calyx, campanulate, 5-toothed. Standard, broad, open or reflexed, orbicular. Wings, narrow, auricled

at the base, as long as, or shorter than the obtuse keel. Style, slender, bearded on the upper or inner edge; ovules, many. Pod, ovate-oblong, or terete, inflated, or turgid, acute. Seeds, rather small.—*Handbook of the New Zealand Flora, p. 51.*

DESCRIPTION, etc.—A large Australian genus comprising herbs, or undershrubs, with flowers in axillary racemes, either purple, blue, red, or white. Some of the species, as *S. Greyana*, *S. procumbens*, as also *S. violacea* and *S. galegifolia*, are very handsome plants. The genus is represented in other parts of the world by *Astragalus*, the Milk Vetch, from which it is chiefly distinguished by the broader, and more expanded standard. New Zealand is represented by only one species—*Swainsonia Novæ Zelandiæ*, a small, sparingly-branched herb, with purple flowers.

1. SWAINSONIA NOVÆ ZELANDIÆ. (*Hook, F.*) The New Zealand Swainsonia.

SPECIFIC CHARACTER.—A small, low, sparingly-branched herb, covered with minute silky pubescence; branches, 2-4 in. long. Leaves, 1-2 in. long; leaflets, opposite, $\frac{1}{4}$ in. long, sessile, obovate-oblong, obtuse or retuse; stipules, ovate, obtuse. Peduncle, 1 in. long, bearing 5-8 racemed flowers. Flowers, purple, $\frac{1}{2}$ in. long; pedicels, rather shorter than the

calyx, bracteate at the base. Calyx, with rather long teeth, villous within, and on the edges, 2-bracteolate. Standard, without callosities; keel and wings nearly equal, straight. Ped. large, nearly 1 in. long, $\frac{1}{2}$ in. broad, acute at both ends, puberulous; valves, thin, coriaceous. Seeds small.—*Handbook of the New Zealand Flora*, p. 51.

DESCRIPTION, etc.—This species is peculiar to the Middle Island, in the Canterbury district, about the sources of the Kowai River, and in the Hurunui Valley. It may be said to be almost Alpine in habit, being found in the shingly river-beds, at an altitude of from 2,000 to 2,500 feet. It is very closely allied to the Tasmanian *S. lessertiaefolia*, which is a larger plant, with many-flowered racemes, the inflorescence of which is slightly different, having more obtuse, shorter, calyx-like teeth, and a more curved keel.

GENUS IV.

CLIANTHUS. (*Solander.*) The Clianthus.

GENERIC CHARACTER.—Herbs; stems woody below, branches often trailing. Leaves, pinnate, stipuled; leaflets, many pairs. Flowers, large, red, in pendulous racemes. Calyx, companulate, 5-toothed. Standard, ovate, reflexed, about as long as the keel. Wings, oblong, or lanceolate,

auricled at the base, shorter than the boat-shaped keel. Ovary, stipitate; style, ciliated below the apex; ovules, numerous. Pod, stipitate, terete, narrow-oblong, turgid, rostrate, many seeded.—*Handbook of the New Zealand Flora*, p. 52.

DESCRIPTION, etc.—A genus of most beautiful plants, found in New Zealand, Australia, and Norfolk Island. It is nearly related to a Cape of Good Hope family, *Sutherlandia*, which has bladderly pods, while the pods in the present are coriaceous. The plants are herbaceous, or woody, branching shrubs, with large handsome flowers, in terminal or axillary racemes. The name of the genus is derived from the Greek, and signifies "Glory Flower," a name peculiarly applicable to the plants. The Australian species, *Clianthus Dampieri*, or "Sturt's Pea," has the most beautiful flowers of the genus, *C. carneus*, a climber, with smaller flesh-coloured flowers, is a native of Norfolk Island, and New Zealand is well represented by *C. puniceus*, the "Parrot's Bill," a handsome under-shrub, well-known to most residents in the Northern Island.

1. CLIANTHUS PUNICEUS. (*Banks & Sol.*) The Crimson Clianthus.

SPECIFIC CHARACTER.—A branching, herbaceous, under-shrub, with prostrate or reclining branches, more or less covered with appressed hairs. Leaves, 4-6 in. long, unequally pinnate; leaflets, in 10-14 in. pairs, alternate, sessile, $\frac{1}{2}$ -1 in. long, linear, oblong, obtuse; stipules, triangular. Flowers, 6-15, in a raceme, scarlet, pendulous, 2 in. long. Calyx,

$\frac{1}{5}$ - $\frac{1}{3}$ in. long. Standard, ovate, acuminate, reflexed when fully expanded. Wings, falcate, acute, or obtuse, half as long as the standard. Keel, very large, boat-shaped, falcate, narrowed into a long beak.—*Handbook of the New Zealand Flora*, p. 52.

DESCRIPTION, etc.—Plate No. 27.—The "KOWHAI-NGUTU-KAKA" or "PARROT'S BILL." This extremely handsome shrub is peculiar to the Northern





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BECK & COFFINS, CHROMO-LITHO.

KOWHAI-NGUTU-KAKA.—*Clanthus puniceus*.

Island. It is alluded to by Sir J. D. Hooker, the illustrious botanist, and compiler of the "*Handbook*," as one of the most beautiful plants known. It has been asserted by some, that it is not indigenous to New Zealand, but there is nothing to warrant such a statement, in fact, the known history of the plant tends to oppose such a theory. Admitting that it is not found growing in a wild state in various parts of the country discloses nothing, inasmuch as there are many other New Zealand plants which were originally confined to one special area; the *Clanthus* being one amongst that number. The plant was first seen by Banks and Solander, the distinguished naturalists, when they accompanied Captain Cook on his voyage to New Zealand in 1769. Specimens were at that time taken to England by these gentlemen, and the plant was named *Clanthus puniceus* by Dr. Solander, who established its genus. It is supposed that the specimens were collected at some place on the East Coast, north of Tologa Bay, in which district it has long been known to exist in a semi-wild state. Mr. Colenso, F.L.S., who arrived in New Zealand in 1834, and landed at the Bay of Islands, states that he saw, for the first time, this fine plant in bloom, growing in the gardens of the missionaries. He further says that he saw it growing wild, or naturally, on some islets at the entrance of the Keri-Keri River, Bay of Islands. At the same time he admits that he never, in all his travels in the North, met with it elsewhere growing in a wild state. He afterwards saw it in 1838 up to 1843, at various Maori villages on the East Coast, south of Hiek's Bay. These facts should prove to us that this species is indeed indigenous, though extremely local. In further support of this testimony, the plant is unknown to botanists as indigenous to any other part of the globe, and has, from their first knowledge of it, been referred to New Zealand. Like many other plants which were esteemed for their economic value the "*Kowhai-ngutu-kaka*" appears to have been held in appreciation by the Maoris, who took a pleasure in protecting and cultivating it for the sake of its beauty. In this manner it has been disseminated, and preserved from extinction. To this day straggling plants may be seen around the sites of old Native pahs on the East Coast and away inland, though the time is not far distant when this beautiful species, which cannot stand the ravages of cattle, will alone be found in cultivation. *C. puniceus* was first introduced into England for cultivation in 1831, and fetched a ready sale at five pounds each plant. It is now often to be met with there in greenhouses, or on open walls with a southern aspect, where it flowers freely if protected in winter, and is much prized for its great beauty. The plant may be grown from cuttings, or seed, the latter is preferable, and blossoms in its second year, during the months of September or October. It sometimes attains a height of five or six feet, and has a somewhat straggling habit. Should the branches be cut or trimmed towards the approach of the winter season, the exposure of the sap to frost will most probably kill the plant. Cattle or horses nibbling

the branches will likewise destroy it. The *Clanthus* for its great beauty, deserves more general attention at the hands of the settlers than is afforded it, and owing to its easy cultivation, should be a prominent feature in their gardens, making the glad months of spring gay with its rich clusters of drooping crimson flowers. Our plate portrays faithfully all the characteristics of this charming shrub.

GENUS V.

SOPHORA (*Lim.*) The Sophora.

GENERIC CHARACTER.—Small trees, or twiggy shrubs. Leaflet in many pairs. Flowers, pendulous, large, yellow in the New Zealand species. Calyx, rather inflated, urceolate, hemispherical, or campanulate; mouth, oblique, obscurely 5-toothed. Standard, obovate, very broad, shortly clawed. Wings, oblong, stipitate, shorter than the straight obtuse keel.

Stamens, 10, all free; ovary, stipitate, linear; style, slender, slightly curved, glabrous; stigma, minute; ovules, numerous. Pod, stipitate, elongate, moniliform, terete, angled or 4-winged, indehiscent or 2-valved, few- or many-seeded. Seeds, oblong; funicle not thickened.—*Handbook of the New Zealand Flora*, p. 52.

DESCRIPTION, etc.—A very large genus widely spread through the tropical and temperate regions of both the Old and the New Worlds. One of its species (*Sophora tomentosa*, a shrub of variable height) being found on the sea shores of Tropical Asia, Africa, America, and Australia. The species are not numerous, but they differ greatly in general appearance, some growing into trees of large size, while others are shrubs, and one or two, herbaceous plants. All, however, agree in having pinnate leaves, with usually opposite leaflets, and an odd one at the end. The flowers are pea-like, with a rather broad standard. *S. japonica* is a very handsome tree, long ago introduced into England from China. It is of quick growth, and forms a large round-headed tree, forty feet high or more, with smooth dark-green branches, and graceful bluish-green pinnate leaves, producing in the autumn at the points of the branches large, loosely-branching panicles of small whitish or cream-coloured flowers. In China the flowers of this species are used for dyeing a yellow colour, and are employed to give the fine yellow colour to the silk used for the garments of the Mandarins, and also for dyeing blue cloth, green. All parts of this tree possess purgative properties, and it is said that even those who merely prune it are affected, as also are turners, when employed upon its fine-grained, hard wood. The genus is represented in New Zealand by *S. tetraptera*, and its varieties small or middling-sized trees, variable in habit, foliage, and size of flower. The tree is sometimes known as *Edwardsia grandiflora*, its original specific name.

1. SOPHORA TETRAPTERA (*Aiton*). The Four-winged Fruited Sophora.

SPECIFIC CHARACTER.—Leaves exstipulate, 1-6 in. long; petiole slender or stout, covered with silky or ferruginous hairs; leaflets, 6-40 pairs, very variable—from broadly obovate to linear-oblong, $\frac{1}{4}$ - $\frac{3}{4}$ in. long, rounded retuse, or 2-lobed at the tip, on young plants, smaller, broader, glabrous, membranous; and in old, silky, or densely villous on one or both surfaces. Flowers, 1-2 in. long, yellow, in axillary, pendulous, 4-8-flowered racemes; peduncles short; pedicels, $\frac{1}{2}$ - $1\frac{1}{2}$ in. long,

flexuose, and calyx densely silky. Calyx rather gibbous, $\frac{1}{4}$ - $\frac{1}{2}$ in. long, hemispherical or urceolate; mouth very oblique. Standard hardly reflected, always short, obtuse. Wings linear-oblong. Keel nearly straight. Pods, 1-5 in. long, the joints oblong, 4-angled with 4 membranous wings, the outer walls separating from the coriaceous inner. Valves hardly dehiscent. Seeds, oblong, pale yellow-brown; cotyledons almost consolidated. —*Handbook of the New Zealand Flora*, p. 53.

DESCRIPTION, etc., Plate No. 28.—The “YELLOW KOWHAI.”—This species is abundant throughout both islands, and is found varying in size from a small shrub to a tree thirty or forty feet high, with a trunk from one to three feet in diameter. It ascends to a height of 2,000 feet above sea level; and it is observable that it differs much in habit, foliage, size and colour of flower, according to locality. It generally blossoms in the months of September and October, but sometimes earlier, and has been known in Poverty Bay to bloom as early as July, but such a phenomenon is of rare occurrence, and probably attributable to the influence of a mild season. The wood of the “Kowhai” closely resembles the European “Laburnum,” and possesses great strength. It has occasionally been used for railway sleepers, piles, house-blocks, survey pegs, etc., and is everywhere valued for its great durability. The heart wood is red in colour, and where used as house-blocks, fencing posts, and piles, has been known to last in a sound state for over twenty years. The appearance of the “Kowhai” when in full bloom is extremely pretty and striking, its masses of pendulous golden flowers presenting a unique and striking picture in the landscape, more particularly as at that season it divests itself of its foliage, or nearly so, except in certain damp situations, where it is to some extent retained, as presented in our graphic plate of this species. The varieties are:—GRANDIFLORA, a larger and more robust plant, with large flowers two inches long; and MICROPHYLLA, a plant with smaller flowers and of less robust habit; but these characters are not permanent, and many intermediate states exist. The variety *Microphylla*, and forms approaching *Grandiflora*, are common on the Island of Juan Fernandez and in South Chili. The specific name *Tetraptera* is due to the four-angled and four-winged construction of the seed pods, which is clearly shewn on our plate. The plant may easily be raised from seed, and is very hardy.





CHAPTER XXIII.

ORDER XXIII.—ROSACEÆ. The Rose Family.

CHARACTER OF THE ORDER.—Herbs, shrubs, or trees, erect or climbing; stems sometimes prickly or spinose. Leaves alternate, simple or compound, stipulate. Flowers regular, usually hermaphrodite; calyx-tube short and open, or urceolate and enclosing the carpels; lobes, 4 or 5, or none, often valvate. Petals, 4 or 5, rarely none, spreading, imbricate. Stamens numerous, few in *Acæna*, free, inserted on a perigynous ring or on the mouth of the calyx-tube; filaments subulate; anthers

short, didymous. Carpels, 1 or more, 1-celled, small, enclosed in the calyx-tube, or free and clustered on a torus; style, lateral, basal, or terminal; stigma capitate; ovules, 1 or 2. Fruit, of 1 or more small achenes, free or enclosed in the calyx-tube, or of many small, free succulent drupes. Seeds ex-albuminous; testa membranous; cotyledons plano-convex, radicle, short.—*Handbook of the New Zealand Flora*, p. 53.

DESCRIPTION OF THE ORDER.—



LARGE order very widely distributed throughout the world, which has been divided into the following sub-orders:—*Roseæ*, *Potentilleæ*, *Sanguisorbeæ*, *Amygdaleæ*, *Spirææ*, and *Pomeæ*. Many of the plants of the order yield edible fruits, such as raspberries, strawberries, brambles, plums, apples, pears, quinces, cherries, almonds, peaches, nectarines and apricots. Some are astringent, others yield prussic acid. The above ordinal character applies chiefly to the New Zealand genera. In some tribes (which do not occur in these islands), the calyx is apparently inferior, and otherwise differs from the character given above. The genera peculiar to New Zealand consist of:—(1.) RUBUS, a shrub, with climbing prickly stems; (2.) POTENTILLA, a herb, with pinnate leaves; (3.) GEUM, herbs, with simple or pinnate leaves; (4.) ACENÆ, herbs, with pinnate leaves.





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