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# Journal of the New Zealand Institute of Horticulture

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## SUPERIOR NEW ZEALAND PLANTS SUITABLE FOR CULTIVATION.

BY B. C. ASTON, F.N.Z.INST.

(Continued from p. 77, December, 1930.)

The Bledisloe Trophy, given by His Excellency the Governor-General, and the gold medal given by the Wellington Horticultural Society, have been awarded to Mr. C. H. Treadwell, of Lower Hutt, as the recipient of the first annual award for that gardener who makes the growth of New Zealand plants the chief feature of his display. A few words about the winning garden may appropriately head this article. This garden is situated just above the Lower Hutt railway station on a level site excavated from the hillside, some 150 feet above the railway, and here Mr. Treadwell has experimented with the growing of New Zealand plants for the last thirty years. Access to the garden from the road is gained by two paths and a road winding through a regrowth of shrubs similar to the coastal forest clothing the slopes of the Hutt Road, and composed chiefly of *Brachyglottis*, *Fuchsia*, *Nothopanax*, *Melicytus ramiflorus*, *Aristolelia serrata*, *Coriaria arborea*, *Leptospermum scoparium*, *Macropiper*, *Hebe*, *Corynocarpus*, *Coprosma*, *Freycinetia*, *Phormium*, and a number of tree and other ferns. The shady sides of the road give shelter to terrestrial orchids which make a short annual display. The aggressive invasion of two aliens, *Tradescantia* and *Leycesteria*, is regrettable, but the naturalisation on a clay bank of an alien heath has charmingly filled a gap that nothing else would. Some rhododendrons have also naturalised themselves. Arrived at the top of the terrace, one passes a comparatively recent grove of Pohutukawa (9 feet) which gives a splendid display of red flowers in summer. Emerging from this, a striking view of the whole length and breadth of the harbour bursts on the observer. The garden proper is screened off from the southerly gales by a belt of ten feet high *Dodonaea viscosa*, one of the trees called by the Maori "Akeake." A happy association is a mature well-grown Puriri (*Vitex lucens*), planted by the owner some thirty years ago, with a surrounding bed of *Polypodium diversifolium*, which is climbing the trunk. Behind this is another clump

of trees, which include *Pseudopanax Chathamica*, bearing fruit, *P. crassifolia trifoliolatum*. Well formed paths lead in every direction down a gentle slope, which becomes a precipice at the margin of the garden, not however, too steep to prevent all sorts of shrubs growing on what is really the road line, giving cover to many birds, including the mellifluous tui, but steep enough to keep the gardener from worrying about fences, that bane of the nature lover and unremunerative sink for capital. Passing a dry wall covered with the exquisite *Rubus parvus*, quite a novelty in gardens, one notices on the bank above a finely grown specimen of *Carmichaelia Williamsii*. The top of the declivity is protected by some Ngaio and a row of very large leaved Karakas, the fruits of which are also unusually large. On one of the rock gardens is a well grown specimen of *Dracophyllum latifolium*, a plant of an unusual habit of growth recalling that the Screw-pine.

A New Zealand garden, to be successful, must to a great extent fashion itself, and he is a wise gardener who realises this and allows Nature to lead the way, because knowledge is so scanty that one must largely learn what is the correct treatment of New Zealand plants by observation. In this garden the Manuka pushes itself almost to the front door. A nurse alike to the mighty forest trees in early growth, and to the tenderest orchid, the Manuka seems to provide shelter, light, food, and moisture to a multitude of desirable plants, even such exotics as Rhododendrons germinating freely under the Manuka's fragrant shade.

To realise when a group of plants is happy is the essence of success. Here, for instance, is a shelter belt of Akeake trees (*Dodonaea*) which have become somewhat lanky and bare of trunk, but by underplanting with *Senecio laxifolius* the gap is filled with a green and white shrubbery, a very prosperous issue out of the difficulty of stopping the draught from southern breezes on this exposed site. One must not, however, be so one-sided as to exclude all plants which are not native to this country. Such an action would verge on bigotry and prevent the use of an excellent device for a wind-proof live fence. One of the most effective known in use here is an impenetrable bamboo windbreak which skirts the eastern edge of this hanging garden, giving a draughtless area where many plants requiring shelter can be grown. Further Rhododendrons are grown to perfection in this garden, represented by a range of hybrids and species, many from Forrest's Asian collections, while other plants which flourish well are a large collection of Irises and many Daffodils on grassy slopes and elsewhere. The main theme of this garden is, however, undoubtedly reserved for New Zealand plants: more especially is the value brought out of grouping and massing of individuals of one species together for effect, which would be lost if stray individuals only were grown. The protean *Pratia angulata* provides a form from South Westland, which here and there covers the ground with a network of scrambling stems plentifully besprinkled with large *Lobelia*-like flowers. Another border feature is a 12-foot row of *Arthropodium cirrhatum*, from the Poor Knights Islands, a fine plant with larger leaves than the local Mabel Island lily. Also, in deep shade,

is a well grown clump of *Colensoa physaloides* bearing large deep-blue fruit. The exhibition of single specimens, is, however, not lost sight of, but these are sympathetically grouped together and not left to be supported by the label alone. That there is an art in doing this no one who sees this half-acre plot containing all sorts of plants from Stewart Island to the North Cape and from sea level to the limits of alpine vegetation will deny.

*Dracophyllum latifolium* is represented by three well grown specimens (up to 8 feet) with a characteristic habit somewhat resembling that of a Screw-pine. Other rare species are *D. Urvillianum*, *D. Townsonii*, and the beautiful scented *D. strictum*. Other rare shrubs are *Pseudopanax ferox*, *Carmichaelia* like *Williamsii*, but with different-coloured flowers, from the Poor Knights Islands, the feathery *Olearia virgata*, the prickly *Cyathodes robusta*, the golden Tainui, *Pomaderris elliptica*, *P. rugosum*, and *P. phylicaeifolium*; various well grown Kowhais (*Edwardia*, 15 feet) from the Chatham Islands (*E. chathamica*), a beautiful fine-leaved species (9 feet), from Nelson (*E. Treadwellii* of Cheeseman) which grows true from seed, and *E. prostratum* (4 feet) with dark orange-coloured flowers and black seeds. Near here a bank of *Rubus Barkeri* is another example of a first-class foliage plant giving a massed effect.

On the rock garden are some rare Veronicas, notably *Hebe Bishopiana* and a number of the whipcord species, some rare dwarf Carmichaelias, the queer coral plant from the arid district of Otago, *Corallospartium crassicaule*, and nearby an allied shrub from Marlborough with a perfect weeping habit, *Chordospartium Stevensonii*. One must mention a sapling Kauri (about 10 feet), a Rimu (12 feet), several Phormium bushes with the most wonderful striping of leaf in bronze, brown, white, pink, and green colours, a bronze Cabbage-tree, *Cordylina Australis*, a fine shrub of *Ackama*, a clump of *Cladium Sinclairii*, *Hymenanthera Chathamica*, *H. obovata*, *Fuchsia procumbens* massed on a dry wall in large red fruit, together with many rare ferns (two from Auckland Islands), and a clump of the choice *Dicksonia lanata*, making up a rich feast of study for the gardener or botanist. A grove of the island Pohutukawa (*M. metrosideros kermadecensis*, 12 feet) is a very unusual garden sight, while the beautiful but slow Southern Rata, *M. umbellata*, 8 feet, is here as in other Wellington spots very shy in flowering. Other specimen trees include *Plagianthus betulinus*, *Phyllocladus trichomanoides*, 10 feet, *P. glauca*, and *Persoonia toru*. A Hinau (*Elaeocarpus dentatus*, 20 feet) is the only plant which was originally on this site when the garden was laid out. Smaller rare plants include *Olearia Traillii*, a bronze-leaved *Dodonaea*, *Hebe gigantea*, and *Senecio Huntii*. A nearby stump was massed with epiphytic orchids.

The general aspect is that of an old garden on which considerable taste and thought has been lavished in the lay-out. The paths are gravelled and edged with Box. Labels are present, but restricted to the inconspicuous position they should occupy, and rocks when required are naturally arranged, thus escaping the usual morbid tombstone effect.

In the first portion of this article the writer drew attention to the beauty of the common white-flowered Manuka (*Leptospermum scoparium*) which is well worthy of the horticulturist's attention, as this species includes at present many wild forms which differ from each other in the size of the leaf, flower, and habit of growth. Selection in the field would quickly yield results, as individuals are easily propagated from cuttings. A beautiful study of the Manuka in flower, by Mr. Beken, the well-known photographic artist of Christchurch, is here reproduced, and the writer would tender him thanks for permission to print the other pictures by him in this and the preceding article. The Manuka will grow on almost any kind of soil, whether dry or wet, so long as carbonate of lime is not present in the soil. A most painstaking and successful amateur gardener in England has completely failed to grow the crimson flowered Manuka (known as *L. Nichollsii*) on the chalk downs. Manuka plants are easily raised from seed, but with all the New Zealand myrtaceous plants it is better to spread the fine seed on a damp surface and cover with some material which will keep the soil damp and darken it. Such seed will then germinate in millions, whereas if buried in the soil the germination may be much scantier. With Manuka scrub, cut when the capsules are unopened and placed on the ground, the writer has seen a wonderful response from the seed shed from the prone branches. The North Island gum lands, in the vicinity of Auckland city, afford as the common scrub plant a charming species, named by Dr. Cockayne *L. scorparium incanum*, which has various degrees of pink striping on the white petals. It commences to flower very early in the season, at Wellington (600 feet) so soon as July or August, when the pink colour is well seen, but this fades with exposure and possibly with the age of the flower. This is one of the species recommended for selection in the field. The Manuka is being tried as a hedge plant at the Open Air Plant Museum, Wilton's Bush, and is showing every sign of succeeding as such.

Another plant previously mentioned which may now be illustrated is *Ourisia macrocarpa* of the Southern Alps. *Ourisia* is a charming genus requiring shade and moisture. The writer's experiments with the North Island *O. macrophylla* have shown that it is easy to grow provided the roots are kept moist, but if the water-content of the soil falls too low the leaves give, by wilting, a warning signal of the need for watering. This species produces abundance of fertile seed, which germinates readily on a damp, cool bank at Karori, commencing to flower in August. As garden plants, the *Ourisias* are likely to attain a very first rank when the right conditions of cultivation are generally known.

*Helichrysum*, *Gnaphalium*, and *Raoulia* are three genera which supply plants having a world-wide use in special kinds of gardening. For the rock garden and crazy pavement *Raoulia australis* is in many horticultural price lists for the class of plants known as carpeters, that is, plants which have a mat-like habit of growth which fills in odd spaces with a thick pile, in this case, of silvery and golden growth. In addition to this species there are several others such as *R. lutescens*, *R. subulata*, *R.*



*Helichrysum bellidioides.*

Photo by BEKEN.



*Leucogenes grandiceps.*

Photo by BEKEN.



*Leptospermum scoparium.* Photo by BEKEN.



*Ourisia macrocarpa.* Photo by BEKEN.



*tennicaulis* (which prefers damp ground such as river gravels). *R. glabra* is a taller plant suitable for climbing on rocks. When established all these species have a charming effect, but must be kept weeded, otherwise the clovers tend to invade the mats and spoil their beauty. Most *Raoulias* require full exposure to sun.

Another group of these plants are those known as "Vegetable Sheep," which have excited the wonder of botanists by the extraordinary growth-form adopted, being a woolly mammillated mass with roots often deeply embedded in rocks, of which the plant is so much a part that the use of a crowbar and pickaxe is required to detach the growth. These "Vegetable Sheep" flourish at the limits of the flowering plants on mountains. The author has recorded them at about 9,000 feet on the inland Kaikoura Mountains, a higher altitude than any given in Cheeseman. One would like to see these established on rock or moraine gardens, but the writer does not know of any attempt that has been successful. An alpine house affords the best hope of success, and this has been accomplished on a small scale by growing "Vegetable Sheep" in pots. The enormous plants seen on the mountains may be the result of many years' growth.

*Helichrysum bellidioides* is a good plant for the rock garden owing to its rapid and adaptable growth. A picture of it in its natural habitat is shown.

*Gnaphalium Lyallii*, *G. Keriensi*, and *G. trinerve* are three plants which revel in a somewhat damp, steep situation, producing numerous flowers of the everlasting-daisy type in profusion.

Two species of New Zealand *Leucogenes* are alpine plants which have a superficial resemblance to the well-known edelweiss (*Leontopodium alpinus*). The New Zealand plants are, however, far finer than the European edelweiss, and one, the North Island *Leucogenes leontopodium*, is quite easy to grow. A picture of the South Island species, *L. grandiceps*, is here given flowering in its native habitat in the Southern Alps.

In special forms of gardening there are a number of small striking New Zealand plants which are, from the horticultural point of view, of importance on account of their unusual characters. It is a great delight to the gardener to be able to grow really well for the first time any horticultural novelty. The wardener who first domesticated the Pohutukawa in Wellington must have been as delighted with his success as the Aucklander who grew and made common the almost extinct tropical-looking *Meryta Sinclairii*, so that it is now one of the commonest New Zealand shrubs grown, as well as one of the handsomest. There are still many New Zealand plants left to popularise for growing in the rock or moraine garden, the water or bog garden, the sand garden, the fern garden, or for house decoration.

Water and rock gardens present great possibilities for cultivating a number of good plants which grow in stagnant moist soil conditions, and are intolerant of drought such as occurs in the ordinary herbaceous border. That some are small in size is no bar to the growth of desirable

plants in the rock garden, and should not be in the bog or water garden. In the minute bladder-worts (*Utricularia*) the flowers though small are beautifully formed and vivid in their violet colouration. Some sundews have quite large flowers, particularly *Drosera binata*, and most species require boggy soil. A most delightful New Zealand musk, without, however, any scent, is *Mimulus repens*, with very bright blue flowers flourishing in salty marshes. A distinctly pretty New Zealand primrose (*Samolus repens*) occupies a similar habitat. The exquisite *Veronica canescens* is equally at home in the bog garden and in drier situations. It is a plant highly spoken of by English gardeners, but hardly ever seen cultivated in New Zealand. A number of orchids with very beautiful flowers are usually found in wet soil. The *Thelymitra* contains species with large blue or pink flowers and is never seen in cultivation. A number of other orchids with white flowers may also be grown for the bog garden, notably the very rare and sweetly scented *Prasophyllum patens*, which grows two or three feet high. A liliaceous plant, *Herporhizon*, with varying blue and white flowers, is common in mountain swamps and will greatly delight the eye, while in the drier conditions of the bog garden the New Zealand Gentians, hitherto the despair of all cultivators of New Zealand plants, might be grown from fresh seed kept damp until planted.

There is a whole host of plants which will give a distinction and charm to the water garden. The tallest is the stately Raupo (*Typha*), some magnificent water rushes (*Eleocharis*), and the Nigger-head (*Carex secta*). These all grow in water, while many other kinds of rushes and sedges will find places to their liking closely adjacent to water. Floating on the surface several species of naiads (*Potamogeton*) might be employed, while of submerged plants there are a number, *Myriophyllum*, etc. A charming climbing nettle (*Urtica linearifolia*), originally discovered in the North Island by the writer on Lake Papaitonga, is common on the Nigger-head there. Where there is a drip of water, that glorious foliage plant *Elatostema* should certainly be grown. It must have brought great joy to the heart of the first cultivator of this plant at York Bay, who established it perfectly on damp rocks near a waterfall. Altogether the nature lover who sets out to make a water garden of New Zealand plants has a wealth of material, and will no doubt make many interesting cultural discoveries in this unknown territory.

Mention of foliage plants calls to mind that the greatest claim to charm of the New Zealand flora is the wonderful range in the shape and colour of plant leaves. This is above all others a green land, well symbolised by the fern leaf. If all the millions of acres of forest which have been converted into grass land under the claims of agriculture were left to themselves the whole would soon become again an evergreen forest. The variety of colour in the purely vegetative portion of the above-ground plant includes white, pink, bronze, deep purple, and every shade of green imaginable, while the shape of the leaves is still more varied. Because of these qualities most New Zealand shrubs make excellent decorative plants for indoor ornaments, apart from the great wealth of

ferns and the two New Zealand palms which, of course, are obviously well adapted for such a purpose. Among the ferns one must not forget the giant maiden-hair fern of New Zealand which is such a rare and local plant, *Adiantum formosum*, and which the writer has successfully grown for some years in a room. The fronds of this species are beautifully robust and tall, growing to three feet in height. The neglect of this plant in the past is somewhat unaccountable. It is abundant in the wild state in the bush adjoining the Palmerston North public gardens and in the Manawatu Gorge.

Grasses and grassy or iris-leaved plants are a numerous component of the flora, and one from which highly decorative plants for garden, house, or fernery may be selected. The true grasses provide several notable garden plants, the most conspicuous of which is the Toitoi or giant plume grass (*Arundo conspicua*). This plant is esteemed in Europe, and in comparison with the well known Pampas grass it is superior in that it produces the graceful plumes at a much earlier season of the year. The Toitoi is a plant which gives a character to the wild countryside, sharing with the Cabbage-tree and the Flax a distinctive habit which recalls a New Zealand landscape. When chaffed, the leaves of Toitoi are greedily eaten by stock, which are unable to browse on it to any extent when growing, owing to the saw-like edge of the leaves and their tough nature. It is interesting to note that the food-value judged by chemical analysis compares very favourably with that of oaten chaff. As this grass grows in the most exposed and rocky soils as well as in swamps its economic utilisation may be possible in the future. The ripened plumes provide seed which attracts the grain-eating birds often to be observed swinging gracefully in the wind while they search for the ripened grain.

*Stipa arundinacea* is another handsome grass of tussocky habit with very long flowering panicles, and quite at home in the garden, but seen to best advantage on a steep bank where the very long flowering portion can develop. Both the *Arundo* and the *Stipa* freely distribute their seeds, which germinate readily in the garden, so that a supply of young plants is always available for those who desire them. *Danthonia* is a genus which supplies some handsome, tall plume-grasses. *D. Cunninghamii*, a grass of the scrub zone, is particularly attractive and easily grown. The snow grasses, *D. Raoulii* and its varieties, are also well worth growing, being handsome additions to the shrub garden.

Grassy or iris-like leaf-plants include the astelias, which provide many handsome clumps of green sword-shaped leaves which vary according to the species in the extent of hairiness of the leaves. In some the hairs are so numerous as to give the leaves a silvered appearance (*A. Cockaynei*). In others they are almost hairless (*A. nervosa*), which closely resembles a New Zealand Flax plant. Others again have marginal hairs giving an attractive fringed look to the leaves, while one of the most charming is a little bog-alpine plant with very large bright crimson fruit (*A. linearis*). Some grow high up in the forks of trees (*A. Solandri*) forming huge tufts.

*Dianella* is a grassy-leaved tufted plant, which likes the shade, and in season produces most charming deep-blue berries, poisonous but highly attractive, borne on long slender stalks. *Libertia*, the New Zealand iris, is a tufted plant with a capacity for standing hardship or exposure, and producing numbers of pure white flowers succeeded by yellow capsules full of seed, which germinates readily. One species spreads vigorously by underground roots on sandy shores. A diminutive species which would grow very well in a fernery or as a pot plant, *L. pulchella*, may be obtained from the upper rain-forest of the mountains.

The handsome cyperaceous *Cladium Sinclairii*, with its broad green leaves and rich dark-brown panicles, so common a plant on the dripping cliffs of the Wanganui River, does quite well in moist spots.

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## MAGNOLIAS—HISTORY AND CULTURE.

BY C. SNOW, N.D.H. (N.Z.).

The Magnolias and Tulip-trees of our plantations belong to the Magnoliaceæ, a family of trees and shrubs natives of tropical Eastern Asia and North America, rare in tropical South America; none have yet been found in Africa, and very few in Australia or New Zealand. There are about nine genera and seventy species, the chief genera being *Drimys*, *Illicium*, *Liriodendron*, and *Magnolia*. There is no European representative. They have, like the Ranunculaceæ, several distinct sepals, petals, stamens, and pistils. Their leaf-buds are enclosed in membranous stipules and the carpels usually cohere in a kind of cone. The genus *Magnolia* is named in honour of Pierre Magnol, who died in 1715, Professor of Medicine and Prefect of the Botanic Gardens, Montpellier, and author of *Botanicum Mospeliense* (1676) and other works. The species are chiefly large trees with immense leaves with axillary and very fragrant flowers. This genus comprises about twenty species of elegant and ornamental green-house or hardy evergreen or deciduous trees and shrubs, of which thirteen are natives of Japan, China, and the Himalayas, and the rest of North America. No one is ignorant of the grandeur of Magnolias, or of the delicious, though sometimes dangerous, fragrance of their blossoms, but it is less generally known that they are allied to the trees that produce the famous Winters bark and Melambo bark, and that they possess medicinal qualities of no common power; in fact, the bark of all of them is said to have a bitter flavour, without any astringency, combined with a hot, aromatic principle. In the United States the bark of *Magnolia glauca* and *Liriodendron tulipifera* is employed for the same purpose as Jesuits' bark.

*Magnolia glauca* is deciduous, and is known in America by the names of White Laurel, Swamp Sassfras, or Beaver-tree. It bears the last name because the root is eaten by beavers, and is, in fact, used for bait for catching this animal.

Kalm states that these trees may be discovered by the scent of the blossoms at the distance of three-quarters of a mile if the wind is favourable, and that it is pleasant beyond description to travel in the woods at the flowering season, especially in the evening. They are known to retain their flowers for three weeks and even longer. The berries also look very handsome when they are ripe, being of a rich red colour, hanging in bunches on slender threads. Coughs and other pectoral diseases are said to be cured by putting these berries into brandy, of which a draught is taken every morning. The wood is made use of for joiners' planes.

Dillen remarks that the flowers never open in the morning, and that the calyx falls off at the second opening of the flower, but the petals dry on the plant and the scent resembles that of the Lily of the Valley with an aromatic mixture. The flowers are of a creamy-white colour, beautifully compact and small, being only two or three inches in diameter. The species grows to the height of fifteen feet.

Another very useful deciduous species, and one of the hardiest, is *Magnolia acuminata*, which forms a fine, large tree. In its native habitat it bears a fruit about three inches long, like a small cucumber, and is hence called "Cucumber-tree" in North America. It is found in the valleys in fertile soil from Pennsylvania to Carolina. The flowers are yellowish, mixed with pale blue, scarcely scented, and not remarkable for their beauty. They are produced from May to July. This species attains a height of fifty to sixty feet. From its fruits can be obtained a tincture that has some reputation for removing attacks of rheumatism. Also, from the fruits of *Illicium anisatum* (or Aniseed-tree) comes the material which flavours the liqueur called Anisette de Bourdeaux.

The most noble species of all is *Magnolia grandiflora*. This most conspicuous evergreen is in England planted in sheltered situations, and grows best against a wall, with a warm aspect. Its large white blossoms, having an agreeable scent, are especially attractive in late summer and autumn. It is much more tender than the other American species. This stately evergreen rises in its native country to the height of seventy to eighty feet, dividing into many branches, which form a large pyramidal head.

The Exmouth variety of *M. grandifolia* was raised from the seed of an old tree in Sir John Collington's garden in that place. It is amongst the hardiest, and flowers earliest, and most freely.

*Magnolia tripetala* (Umbrella-tree) is remarkable for its leaves, the largest in the genus being fourteen to fifteen inches long, and about five to six inches wide, narrowing to a point at each extremity. They are placed at the ends of the branches in a circular manner like an umbrella, hence its name. Its height is thirty to thirty-five feet. The flowers are white, with a slight, not altogether agreeable perfume, and the wood is soft and spongy; the leaves drop off earlier than in the other deciduous North American species.

Nothing has yet been said about the Japanese section, which is the most difficult to grow to perfection. *Magnolia hypoleuca* may take the lead as one the stateliest of the deciduous Magnolias, and is an exceptionally fine tree for the park and landscape. It is a noble tree, of open habit, with long spreading branches, often attaining a height of one hundred feet in the rich damp forests of Yezo, but usually much less in other parts of Japan. The leaves are as imposing as those of the Umbrella Magnolia, and are of obovate form, bright green above and glaucous beneath, thirteen to fifteen inches long, and seven to eight inches broad. The flowers are amongst the largest in the genus, being from six to seven inches across, with creamy-white petals and red-purple anthers.

*Magnolia parviflora* is a beautiful species, and a native of Japan, where it forms a small tree or shrub of pleasing outline. The flowers, which are freely produced even from the young plants, have a perianth of the purest white, which at first is of globose form, but when fully expanded is four inches in diameter; the numerous rose-red stamens with short white filaments forming a broad ring round the prominent carpels are a conspicuous ornament of the flower.

Another very handsome Japanese is *Magnolia Watsoni*, of somewhat bolder habit than *Magnolia parviflora*, and is distinguished from that species by several characters, among which the most obvious are the flowers being larger with differently shaped perianth segments, the stamens larger and more incumbent on the petals, and yellow, with blood-red filaments. The leaves are larger, having longer petioles, and are glaucous beneath and not cuspidate. The flowers are four to five inches in diameter, and when first expanded are delightfully fragrant; the perfume somewhat resembling that of the Carolina Allspice (*Calycanthus floridus*). The flowers are produced in succession during several weeks.

*Magnolia Campbelli* is a very elegant deciduous tree, in its native habitat in the mountains of Sikkim often attaining a height of one hundred to one hundred and fifty feet. The flowers are very large, crimson and white, slightly fragrant, six to ten inches in diameter; leaves, large, ovate lanceolate, silky beneath.

*Magnolia conspicua*, Yulan being the vernacular name, is much valued as a free flowerer, and on account of the early appearance of its white odoriferous blossoms produced from February to May. In China it rises to the height of seventy to eighty feet, and is one of the earliest and most beautiful of outside flowering trees.

*Magnolia Soulangeana nigra* is a lovely Japanese Magnolia, and is presumably a hybrid between *Magnolia conspicua* and the purple *Magnolia obovata*, as it closely resembles same, except that the flowers are darker in colour than the supposed natural hybrid.

*Magnolia stellata*, Starry Magnolia, is a very pretty tree, and generally flowers before the leaves fully develop. The flowers are white, about three inches in diameter, and sweet scented.

Worthy of note also is *Magnolia fuscata*, a slow and dwarf-growing evergreen shrub. It grows to the height of from two to four feet, and has small oblong leaves, which are bright green. The flowers are produced in early spring and are small and very sweet scented, like a rich melon, or between a melon and a pineapple. In colour they are dull purple. A native of China, the most showy and significant part about the species is that the young branches and petioles are covered with brown tomentosum.

*Magnolia pumila* requires stove heat, and is a most distinct sweet-smelling variety.

Thus it is not exaggerating to say that Magnolias contribute several distinct species towards the ornamentation of our parks, gardens, and conservatories, the flowers having a more delicious fragrance than any others. *Magnolia* is a genus of very showy and elegant plants when in flower, and all species are worthy of extensive cultivation.

Magnolias succeed best in warm positions, and in a moderately rich soil, which should be of a free open texture. Great care should be taken in transplanting them in order that no fibrous roots are broken off, as they are somewhat impatient of root disturbance. Judgment should also be exercised with a newly planted bed as regards protection from cold weather and frost, this being easily done by covering the soil with a good coating of stable manure, and wrapping the trunks with a mat, transplanting being done in May.

*Magnolia glauca* and some others grow best in peaty soil, in a moist situation. They are generally increased by layers put down in the spring or autumn, or by seed. When the layers are first taken off they should be potted in a mixture of loam and peat, and placed in a close frame till they have made fresh roots. None of the leaves should be taken off or the tops shortened as the plants will not succeed so well if this is done, for the more branches and leaves left on them the sooner they will strike roots. Some cultivators cut off many of the leaves and shoots from the layers when they are first taken off, thinking that the roots will not have so much to nourish, but this is the very reason that considerable portions of the crops are lost. Layers of any kind of shrub, when first taken off, should not have a single leaf removed until they have made fresh root, even if their tops flag ever so much. As long as there is life it will draw up the sap and help the plant to root afresh.

The Chinese kinds are often inarched or budded on *Magnolia obovata*, which takes readily. Veneering and side-cleft grafting are also practicable, the stocks operated upon being placed in a close frame until union is effected.

*Magnolia fuscata* and any of the weak species may be increased with facility from cuttings taken off as soon as ripe, and planted in a pot of sand under glass. The seeds of the North American species are received annually from that country when ripe, and should be sown as soon as

possible after their arrival, and kept moist until they germinate, in pots of light rich soil, covering them half an inch deep. The pots may be placed either in a hot bed or in a warm sheltered position. Seeds may be sown in the open ground, and when the plants are of sufficient size they should be planted out singly into pots and sheltered till they have taken fresh roots. They should be protected from the cold weather and frost by a frame for two or three successive winters, giving them the benefit of the open air in mild weather.

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## AFFORESTATION ON SAND DUNES AND WASTE AREAS GENERALLY.

BY W. WICKENS, N.D.H. (N.Z.).

In introducing this subject, dealing principally with sand dunes, I desire to mention to readers of this Journal that most of my statements are based on experiences covering some fifteen years in England and Wales, but more than fifty-three years have been practically followed up in this Dominion. During twenty-nine years of those, I held the responsible position of Superintendent to the Christchurch City Council, in charge of city parks, gardens, and forest plantations. I have given the whole of my life to the study of landscape culture of trees, especially the successful establishing of forest on waste land areas, including sand dunes—a vast country area in this Dominion which I can claim to be fairly well acquainted with. Much valuable information has been obtained by me through close observation of plantations carried out in past years by pioneers who exercised wise judgment in their selection and planting of exotic species of trees.

### PLANTING OF SAND DUNES FOR CHRISTCHURCH CITY COUNCIL.

#### A Report on Tree-planting Operations Carried out at Bottle Lake Sand Reserves.

The Bottle Lake Reserve is a part of the well-known Forty-mile Beach. It consists of some 1500 acres, having a frontage of about three miles to the sea. The situation is just north of New Brighton, in the vicinity of Christchurch. The general formation is sand dune of an undulating nature, consisting largely of recent sand drift on the larger portion of the reserve. Other parts are low lying and stationary, showing a sour, brackish tendency. These lower areas in many places are covered with manuka scrub and grasses favourable to sour places. The dunes and hillocks are in some cases disposed to favour such growth as gorse, broom, and in some places bracken. The whole area is subject to



the prevailing cold north-east winds in the spring and summer months. The hot north-west winds also sweep across, making it very difficult to establish the plants necessary to check and overcome these sand drifts exposed to an open sea coast.

In the year 1909, as these areas were continually causing some concern owing to the inland drift of sand which was encroaching on good pasture land, the City Council at that time asked for a report on these sand drifts in the hope that further experiments might prove satisfactory for the staying of drift sands by the planting of trees. A study of the conditions of the soil showed that the low-lying areas of a brackish character would be unsuitable to many species of trees that had been advocated, such as Eucalyptus and certain species of Abies and other conifers which possess a deep root system and take a long time to mature. The hillocks and dunes indicated more freedom for surface root action, and appeared to be favourable for species of conifers inclined to rapid growth, such as *Pinus insignis*, *P. larico*, *P. muricata*, and *P. maritima*. If the planting of these proved successful it would provide overhead cover, which, combined with the natural shedding of their needles, would secure the overhead moisture, and forest conditions would be obtained. This would have the effect aimed at for staying the sand drift, and would eventually improve the area for more valuable uses in later years.

*Methods Adopted.*—Before any action was decided upon a fairly extensive reference was made to available local authorities. Most of these applied only to inland areas. Investigations showed that in Canterbury there were several blocks of sterile land that had been planted for many years, and from these it was seen that several species of conifers could safely be experimented with in the neighbourhood of the sand areas I was asked to report upon. Several of these plantations consisted of conifers of various species, and in most cases growing round home-steads of many years standing. These showed good results, and were considered of some guidance as to what species to adopt for economical and extensive planting which would meet with success.

*Views on Commercial Timber.*—The production of timber as a commercial proposition was not the dominant feature of this planting. The first consideration was the staying of drift sand which was then threatening to overwhelm good inland pasture land. At the same time it was requested that trees with some timber value should not be overlooked when experiments were being carried out. Although I strongly advocated *Pinus insignis* as a species with many advantages for this particular work, there was at that time considerable prejudice being brought to bear with the Council against its adoption, and this necessitated delay for several years.

*Planting and Species Experimented With.*—As soon as planting was decided upon, operations of an experimental nature were commenced on a small scale. A block (No. 2340) consisting of about 300 acres, running parallel with Rothersey Road, and measuring about 30 x 5 chains,

including a ride of access, was set aside. The first plantation was with Austrian and Corsican pines, followed up in later years with *Pinus Muricata*, *Maritima*, and *Ponderosa*, all of which proved successful with practically no losses. In 1914 I obtained permission to experiment with Insignis Pines to the extent of a few thousand. These were spaced out the same as in previous planting, that is, four feet each way in the experimental area. They took the place of *Abies excelsor*, a spruce fir which had proved a failure. Owing to the satisfactory results obtained it was decided by the Council, in 1915, to extend the planting on a much larger scale.

It was also decided to establish a nursery in a favourable locality for producing trees that would not suffer extremes when transferring to sand dunes. To accomplish this, an area was selected, a somewhat similar distance from the sea coast, consisting of medium quality of soil suitable for good root action and favourable for carrying on the important work of close-in cutting of roots, a proceeding that often had to be followed up when seasons favoured excessive growth. Great importance is attached to the wise selection of the nursery for the successful carrying out of plantation work. Owing to the marvellous success of Insignis Pine and its prospects of staying the sand, I considered it would be wise to give preference to this species over all other pines, following up with *Pinus laricio* and *Ponderosa*, and Austrian pines planted in considerable numbers. As I found this last named species succeeded better when planted so as to enjoy shelter from the faster growing Insignis Pine, I planted blocks which were so arranged as to break the prevailing East winds.

*General Layout, Fire Breaks and Rides.*—Close planting had already proved successful in staying sand drift and smothering all inflammable undergrowth. It was clearly evident, therefore, that if extensive wide divisional fire-breaks were adopted the success of the undertaking would not be accomplished. While extensive wide divisional fire-breaks are absolutely necessary when the milling of timber in established or matured forest is proceeding, it does not in any way follow that wide breaks are necessary for the protection or preservation of juvenile forest. In Canterbury it is the open spaces where tussock, grass, and other inflammable growths are allowed to become established, followed by frequent and prolonged periods of drought that create anxiety where juvenile forest exists. Although some planting lines had previously been set off half a chain within the boundary fence of unformed public roads that had a right-of-way through these reserves, the councillors that were interested requested the planting to be extended to the road, agreeing that an impenetrable evergreen foliage wall formed by the pines bearing down to the ground, would prove a much safer protection against fire than half-chain wide lines open to the prevailing winds.

#### TREES EXPERIMENTED WITH.

*Pinus Austriaca.*—This pine having been planted in considerable numbers by the State Forest Department, was advocated, among other

species, for planting in the experimental area. Two and three-year-old plants were secured and planted, being allotted a four-foot spacing. A general practice followed for this class of pine. A very successful strike was obtained, with practically no losses, which showed exceptional endurance on the part of this species on sand frequently subjected to drought. My experience of the Austrian Pine on sand is that it is subject to be attacked by *Cherma laricio*, a white aphid, especially in the trees' early stages at the nursery, also for a time after being transferred to the plantations. But it eventually grows out of it when advanced to a size that gives shade against the heat of the sun. A fairly large number of these pines have been somewhat irregularly mixed with its sister pine, *Pinus laricio*, so as to obtain results in later years. At present the indications are that the Corsican Pine is inclined to more advanced growth which has a tendency to force the slower-growing species.

*Pinus Laricio*.—This pine, which resembles closely the Austrian Pine, has some claim to be experimented with. Two and three-year-old plants were planted out on similar lines to the Austrian Pine and gave similar results, there being very few deaths. As this species of pine showed no indication of being attacked by blight it gave more inducement to raise it in larger quantities for plantation work. It gave every appearance of being thoroughly at home on sands, especially on the more recent drifts or hillock formation.

*Pinus Muricata*.—This pine, at the time of planting, was being raised and planted out to give shelter to other plantations of choicer pines, and being like the Insignis Pine, a vigorous grower, I was induced to raise sufficient trees both for the experimental area and to give shelter. I found that they made rapid growth on sand dunes, were inclined to branch more than *Insignis*, were less compact in character, and being of a brittle nature were given to breakages. As it is well suited for drift sand it is of value where other and better classes of timber are not obtainable.

*Pinus Ponderosa*.—This well-known pine gave fairly good results when mixed with Austrian and Corsican Pines in the experimental area, the trees making similar growth. I raised fairly large numbers for plantation work, where it was possible to provide shelter, as I had previously proved them to be very sensitive to the cold prevailing East winds, which caused their beautiful foliage to turn brown and stunted their growth. I found this pine, although given to excessive branching, succeeded well in low-lying areas that were unsuitable to many other varieties. Regarding its future results on sand, I am not able to make any remarks.

*Abies excelsa*—*Spruce Fir*.—A valuable species of conifer, both for ornamental and commercial purposes. In the early days it was extensively raised, and no doubt was looked upon as a valuable and useful conifer for culture in this Dominion. Unfortunately this beautiful species fell a victim to the red mite, and consequently, like *Pinus sylvestris*, had to be discarded. An experiment with 10,000 four-year-

old trees was made. In the second year after planting, however, the extremely dry surface of the sand so favoured the red mite that it completely overwhelmed the plants.

*Cupressus Macrocarpa*.—This valuable species of conifer has many advantages in this Dominion if suitable localities are selected. Many trees of this species are to be seen growing quite successfully on the sand, and in some instances near the sea coast. These, generally, have been grown on residential sections, where, without doubt attention after planting was given in order to ensure their success, a proceeding that could not be adopted on a large scale, such as at the Bottle Lake sand dunes. As an experiment 10,000 were raised with that object. A low-lying area of about half an acre given to grass was selected and dug over, turning the grass under several months previous to planting. Two-year-old well rooted trees were used, and planted in lines three feet apart, with the idea of suppressing the excessive branch growth that this species is liable to. Under this method every tree grew, making exceptional headway. To test their success under the ordinary way of planting adopted for pines, one-half was planted as a mixed plantation with Austrian and Corsican Pines. Although successful at first, they made no headway, most of them finally disappearing.

*Pinus Scopulorum*.—This species of pine was being planted by the New Zealand State Forest Department at the time that I was induced to raise considerable quantities, treating them on the same lines as other species. With me, after a few years culture, they proved to be very slow in growth, with no promise of any value for sand dunes. And I may say the same respecting inland areas of a sterile nature. They proved very slow both in the nursery and after transferring to plantations, completely failing to serve the purpose in view, namely, the retention of moisture, which can only be obtained by rapid growth so as to secure forest conditions, so important to overwhelm undergrowth that at all times is responsible for fires on windswept, dry areas. Consequently I did not hesitate to discard this species of pine.

*Pinus Rigida*.—As there were various swampy places throughout these sand dunes, I obtained some seed of this species of pine to test their suitability for low-lying places. Experiments with strong two-year-old trees, that proved successful both in the nursery and when transferred to permanent situations in the forest plantations, proved them to be light in foliage, giving no shade for retention of moisture or the cramping of undergrowth, features indispensable for success on sand dunes.

*Pinus Sylvestris*.—This well-known pine is much grown in the United Kingdom for its valuable timber. Unfortunately very little can be said in its favour for culture on sand dunes or on inland areas of a higher elevation where the conditions were thought likely to favour its growth. As a test, I raised a few, which did not sufficiently establish their growth in the nursery to warrant transferring to the plantations, blight having overtaken them in their early stages. Reliable and practical



PLATE 1

shows a chain-wide public road which divides Block No. 2343, 300 acres, principally *Pinus Insignis*, and Block No. 2340, 336 acres, and shows a plantation of *Pinus Laricio* planted 5 feet apart.

It illustrates a fire-break producing scrub and grass which becomes dry and inflammable and readily causes fire.

During the later period of establishing these plantations there were several cases of ground fires on this and other similar breaks, but these could not spread into the plantations owing to the dense growth of trees which had overwhelmed all undergrowth.

This shows how necessary it is to have close-grown evergreen facings on all fire-breaks or public ways.



PLATE 2

showing a ride or road of access for use during planting of a large area. To accomplish the consolidation of the loose sand it was necessary that these roads of access be fairly narrow, about 30 feet, so that when the growth had advanced somewhat the trees would form a natural canopy, shutting out the sun and light and creating natural shade. The dropping of the pine needles would form a forest floor and complete the consolidation process over the whole area. These rides are most necessary when planting. As large quantities of young trees have to be transplanted with as little delay as possible, any interference such as is being advocated of recent years by thinning and trimming, means the undoing of all previous work, as the use of these rides for horse traffic in sledging and removal of trimmings, simply ploughs up and destroys the forest floor.

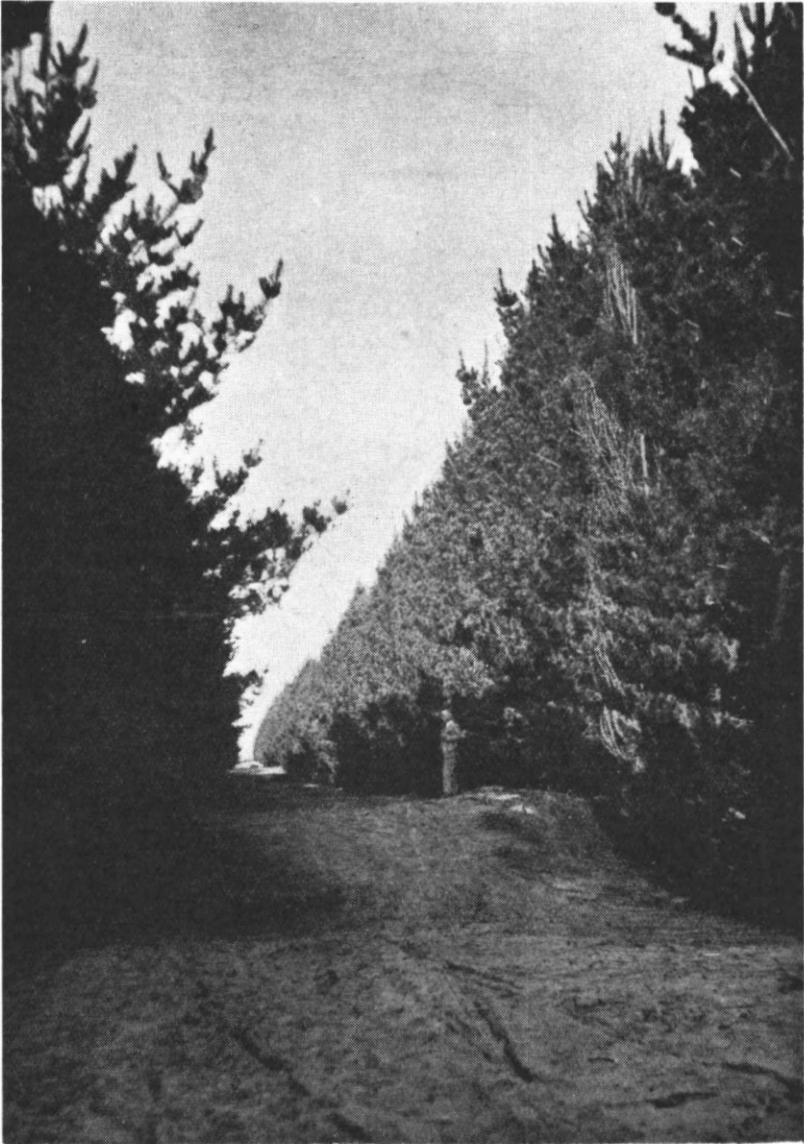


PLATE 3.

Illustrating an avenue or break in the forest, also the methods adopted in general lay out and planting of moving sand dunes. After succeeding in the experimental areas and proving that it was possible to establish pine trees on the sand, the next problem was the preservation of the forest from fire. It appeared that the present-day methods of two-chain-wide fire-breaks would not serve the purpose, as wide spacing of the trees and wide fire-breaks would not stop the shifting sand; further it would allow the growth of scrub and grass which, being of a light, inflammable nature, at most seasons of the year would be a constant danger.





nurserymen had given every consideration possible in the hope of obtaining some success throughout the various inland plantations of Canterbury. There is still to be seen a stray tree of this pine growing among other pines in old plantations. They do not seem to be suited for culture in many parts of this Dominion.

*Eucalypts*.—In order to be able to give satisfactory answers to many questions respecting gum trees and their possibility of successful planting on sands, several experiments were made under all conditions on the various formations existing. Strong hardy plants were raised and given fairly sheltered situations, such as some of the earlier planted pines offered. *Eucalyptus postrata*, *E. globulus*, *E. Gunnii*, *E. Macarthuri*, *E. viminalis*, and a few other species were planted. The majority were successful strikes, making good growths, especially in the autumn, as Eucalypts are accustomed to do. Like some other species of trees they fell victims to early autumn and late spring frost, which practically killed the whole of them, as they showed no signs of recovering after the third growing season. Any further attempt at growing Eucalypts was considered inadvisable. Even had they not been frosted, gums could scarcely be expected to be of much value to accomplish the object desired, namely, staying sand drift, the nature and peculiar construction of their foliage not lending itself to giving shade or retention of moisture, an indispensable feature when dealing with sand dunes.

*Lombardy Poplar*.—As this species of deciduous trees was seen growing in the neighbourhood, and in some instances flourishing on sand, and being regarded as of some value to plant for fire breaks, it was decided to raise 10,000 trees from cuttings. These were planted out in double lines four feet apart, in a line with the already planted pines on each side of the breaks. Strong two-year trees were planted, with some extra preparation of the sand not adopted for pines, in order to give them every chance of success. Although every tree grew, making early and promising growth, the late spring frost that these areas are liable to, cut the new growth severely. This was followed with the same experience after making the summer's growth, by early autumn frost, which, followed by bright sunny days, proved disastrous, especially in low-lying places where it was anticipated they would do best. The grey poplar, *Populus deltoidea* and *P. Balsamifera*, were planted, but suffered the same results. As the *Populus* family in general prefer a deep soil free from stagnant moisture, experiments with poplars were discontinued.

*Acacia melanoxylon*.—Influence was brought to bear to experiment with a fair number of this variety of wattle, and much enthusiasm was shown as to possible success. As an experiment, a sheltered situation in the neighbourhood of these reserves, with stationary sand deposit, was selected. At the same time extra consideration was given before planting by ploughing and other preparations that were not necessary for pine culture. In order to brighten their chance of success, trees were raised and grown in pots, which would guarantee a successful strike. As this locality is subject to early autumn and late spring frost, they fell victims in succession, their tender growth being cut so severely as to destroy all hopes of success.

## REPORT OF THE EXECUTIVE COUNCIL FOR THE YEAR ENDED 31ST MARCH, 1931.

The ninth year of the Institute's existence shows a record of steady work though financial limitations have prevented progress in some directions.

*Education.*—The report of the Examining Board fully sets out the position in this direction. No further applications for examination under "Group C" are now accepted, and at the end of 1931 it is intended to cease receiving applications under "Group B." Thereafter all candidates must be examined under Groups "A" or "D," which do not provide for concessions such as have been granted under the former Groups. The duties of the Examining Board have been rather less arduous than in the previous year, but the work done has been carried out with thoroughness. The members of the Board have placed the Institute and horticulture generally under a deep debt for the very great care they have shown in carrying on the educational work of the Institute.

*Journal.*—The Institute's Journal has now completed its second year of existence, and has been of much value in providing a point of contact between the Institute and individual members. The articles have been informative and interesting, and the Journal has contained records of the work of the Institute as well as providing information of benefit to horticultural students. Hearty thanks are extended to the Editor (Mr. W. R. B. Oliver) and his committee, and to the various contributors for the assistance given in making the Journal a valuable part of the Institute's work. It is regretted that financial considerations make it necessary to publish half-yearly in future instead of quarterly.

*New Zealand Horticultural Judges' Register.*—The first Supplement to the Register was issued in September last, and formed a valuable addition to the information contained in the main publication.

*Rules for Judging.*—Steps are being taken to prepare draft rules with a view to securing uniformity in judging throughout the Dominion. Thereafter the various interests concerned will be consulted, and it is hoped that when finally adopted the rules will constitute a valuable aid to uniformity in staging and judging at horticultural shows.

*Loder Cup.*—The second Loder Cup competition was held early in 1931 in connection with the Jubilee Show of the Dunedin Horticultural Society. The Cup was won by Mr. Henry Bennett, of Dunedin, who staged a very fine and extensive exhibit. It is a matter for regret that the element of competition was absent, Mr. Bennett's being the only entry.

*Nomenclature.*—The Fruit Nomenclature Committee set up last year is now functioning, and a number of matters have been dealt with.

*Plant Recording.*—The system of recording new varieties is now in operation, and during the year an apple ("Kidd's Orange Red"), and a rose ("Climbing Golden Emblem") have been recorded. In Canada the raisers of new varieties can receive protection under that Dominion's Trade Marks and Designs Act, and in the United States of America under the Plant Patents Act, 1930. The resolution of the Institute's recent Conference urging protection to the producers of new varieties of plants of their own propagation, has been brought before the New Zealand Government, and it is hoped that a means of providing effective protection will result.

*Bud Selection and Survey.*—The 1000 citrus trees growing at Mr. Herd's nursery, at Onehunga, are very healthy, and, on the whole, well grown for their age. A number of trees will be available for planting out this year. It is anticipated that a suitable area will be available in time to take the trees needed, and it is possible that arrangements will be made with private growers to take, on terms to be fixed, such surplus trees as may be available. This work is controlled by the Department of Scientific and Industrial Research, which is providing the essential funds, and the Institute is collaborating as far as possible. It is intended to send overseas a small trial shipment of 25 cases of New Zealand Grapefruit, for the purpose of testing transit conditions and market prospects. The New Zealand Fruitgrowers' Federation has been good enough to undertake to provide some financial assistance for this purpose, and the promised assistance is much appreciated. It is hoped that the trial shipment proposed will give effective assistance in establishing an outside market for this fruit.

*Preservation of Native Bush.*—Early in 1930 the Government convened a meeting at Christchurch to consider the destruction wrought in our native bush by wild deer, etc. The gathering was a representative one, and decided that wild deer should be effectively controlled—if necessary, to the point of extinction. Later in the year the New Zealand Forestry League convened a meeting to consider the question of wild life generally, with the result that a Wild Life Council (on which the Institute is represented) has been formed, and this body should prove of great value in helping to secure the control of wild life in the best interests of the Dominion. The Government has several parties actively engaged in the shooting of wild deer in the South Island. The Institute's Hawke's Bay Council drew attention to the damage caused by deer to the native bush in the vicinity of Lake Waikaremoana. This matter was taken up by the recent Conference of the Institute, and has since been actively pressed by the Executive. The Government expects to have a shooting party operating at Waikaremoana in June next for the purpose of destroying wild deer in that locality. Mr. Oliver, the Director of the Dominion Museum, made a recent visit to the Haurangi Range, East of Lake Wairarapa, and reported that the forest undergrowth there had been almost totally destroyed. The interest aroused in the matter of the forest damage by deer should result in an adequate control being established, and so put a stop to conditions which must ultimately have led to the complete destruction of the native bush.

In response to the representations of the Institute that the native bush on either side of the Te Whaiti-Waikaremoana Road should be preserved, the Minister in Charge of Scenery Preservation states that when the internal surveys of the Crown awards in the Urewera Reserve are taken in hand every attention will be given to ensure that the areas which should be permanently reserved for water conservation and for climatic and scenic purposes are properly defined and gazetted.

Dr. Holloway, of the Otago District Council of the Institute, reported on the desirability of preserving and securing access to some sub-Antarctic type of vegetation on the Maungatua Ridge, about twenty miles due west from Dunedin. The area in question forms part of Government leases, and as a result of representations made it is anticipated that the lessees will endeavour to meet the wishes of the Institute in this matter.

In conjunction with other bodies interested representations were made to the Government suggesting that inquiries be instituted as to the effect of the presence of opossums on our native flora and fauna. The paunches of 266 opossums from Kapiti Island and other localities were examined by Professor Kirk. On only rare occasions were traces of animal matter found. Professor Kirk stated, *inter alia*. "As is well known the opossum eats almost anything in the way of fresh vegetable matter, but not always the same things. It is important to note that the fruits and seeds of the forest are freely eaten, especially those that have fleshy parts, as nikau, passion flower, porokaiwhiri, karaka, and so on. . . . The opossum thus competes with birds . . . but I have never been in a forest in which, at the proper season, the floor was not littered with seed and fruit not consumed by bird or opossum." From this evidence it would appear that the opossum is not a serious menace to either the native flora or fauna.

During the past year the names of ninety-four ladies and gentlemen willing to act as Honorary Inspectors under the Scenery Preservation Act have been recommended to the Government for appointment. Further recommendations will be made as opportunity offers. These appointments should do much to preserve our scenic reserves and assist in the strengthening of a healthy public opinion on the subject. The cordial co-operation of Acclimatisation Societies and Alpine and Tramping Clubs in submitting the names of suitable persons is gratefully acknowledged.

*National Botanic Gardens.*—At the last Annual Conference this was the subject of the Banks Lecture by Mr. W. R. B. Oliver, M.Sc., Director of the Dominion Museum, which lecture materially assisted in arousing interest in the subject. At the Conference the following resolution was passed: "That this Conference again urges upon the Government the necessity for the establishment of a National Botanic Garden, where plants of economic and horticultural value could be introduced, propagated, tested, and distributed, and that an Advisory Board be

created to control this." The present financial situation is not favourable to the project, but it is hoped that later on effect may be given to the resolution.

*International Horticultural Congresses.*—One of the Institute's members, Mr. T. L. Lancaster, M.Sc., N.D.H. (N.Z.), represented the Institute at the 1930 Congress in London. The Institute is deeply indebted to him for the care and attention he gave to the work. The next International Horticultural Congress is to be held in Paris in 1932, when it is desired that the Institute be represented.

*Conference of Empire Horticulturists.*—This Conference was also held in London in 1930, and Mr. Lancaster was again good enough to act as the representative of the Institute. Many problems of vital interest to the horticulturists of this Dominion were dealt with.

*National Conference on Horticulture, Wellington, 1931.*—For some years past it was felt that there should be a closer co-ordination of the Dominion's horticultural interests, and efforts to this end resulted in the holding of a Horticultural Week in Wellington at the end of last January. This National Conference on Horticulture consisted of the individual Conferences of (a) the New Zealand Horticultural Trades' Association; (b) the Association of Directors of Parks and Reserves and (c) the New Zealand Institute of Horticulture. These bodies, in association with the Hutt Valley and Wellington Horticultural Societies, held a National Flower Show in the Town Hall on the two days immediately following the Conference, a splendid display of flowers and plants being staged. The Banks Lecture, an official dinner, and a sight-seeing tour provided further opportunities for collective effort and intercourse. The National Conference was very successful in every respect, and it is anticipated that similar gatherings in the future will still further unite and strengthen the horticultural interests of the Dominion.

*Condolences.*—The Executive records with deep regret the death of Mr. W. H. Taylor, for a number of years Horticulturist to the Department of Horticulture, and one of the first honorary Fellows elected by the Institute, and of Professor E. H. Wilson, of Arnold Arboretum, Harvard University, U.S.A., who was another honorary member of the Institute. The untimely death of the latter was due to a motor accident. The sympathy of the Institute goes out to the Hawke's Bay district for the tragic loss of life and property as a result of the great earthquake, which devastated the district at the beginning of February last. The people are courageously proceeding with the rehabilitation of the district, and it is hoped that they will soon regain their wonted prosperity.

*Congratulations.*—The hearty congratulations of the Institute are extended to Sir A. W. Hill, Director of the Royal Botanic Gardens at Kew, and an honorary member of the Institute, on the well-merited honour of knighthood recently conferred upon him.

*Overseas Visitors.*—During the year Mr. R. G. Hatton, M.A., Director of the Imperial Bureau of Fruit Production (East Malling Research Station, Kent, England), paid a visit to New Zealand, and his meetings with representatives of the fruit industry were much appreciated. During his stay in Wellington the Executive had the privilege of meeting him informally and listening to his description of some aspects of the work at East Malling. Another distinguished horticultural visitor was Major Loder, brother of the donor of the Loder Cup. Some of our members were able to assist him in his horticultural inquiries.

*Finance.*—For several years fees for diplomas granted without examination provided the Institute with a temporary source of income, which justified the issue of the quarterly Journal. This source of income has now ceased, and the membership is not increasing sufficiently to make up for the loss of receipts from diploma fees. As will be seen from the statement of accounts, the cash in hand at the end of the year was nearly £100 less than at the beginning, and this necessitated the introduction of economies in several directions. The Executive is arranging for a Dominion-wide membership campaign, which it is hoped will contribute to the raising of an income more in keeping with our needs. The Institute has been again indebted to the Government for the grant of £100 during the year under review, and it is hoped that, in spite of the difficult times, this very necessary and much appreciated assistance will be continued.

*Conclusion.*—Each year the work of the Institute is consolidating, and most of the District Councils are working earnestly for the furtherance of the Institute's aims. The passing of the financial depression and the strengthening of the membership will be material factors in aiding the Institute. The former is not altogether within our control, but each member can do something to increase the membership, and they are urged to assist in this direction.

(For annual accounts see pages 34-5.)

## REPORT OF THE EXAMINING BOARD FOR THE YEAR ENDED 31st MARCH, 1931.

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The educational work of the Institute is now settling down to a regular routine, and examinations are held in June and November of each year.

*Classes for Students.*—It is a matter for regret that the New Plymouth class in horticulture is not now in operation, owing to the original instructor having been transferred from New Plymouth. Efforts, so far unavailing, were made to secure a suitable successor. The class at Dunedin has not resumed this year (1931), but it is hoped that it may be possible to provide instruction there for a number of students who are keen for assistance. With these exceptions the classes mentioned in last year's report are continuing. The class at Hastings and Napier is being carried on in spite of the serious disorganisation caused by the recent disastrous earthquake in Hawke's Bay, and owes much to the initiative and enthusiasm of Mr. B. P. Mansfield, the honorary instructor. An unofficial class in horticulture, which should prove of much value to students, is being conducted in Wellington.

*Horticultural Diaries.*—The periodic submission of students' diaries is proving of considerable value, as the diaries now received for examination and criticism are reaching a higher standard than was formerly the case. There was too great a tendency on the part of the students to make the diary a record of routine work done. The object of the diaries is to stimulate observation and imagination, and to afford a training in the proper recording of the observations made. It is satisfactory to note that these results are, in some measure, being obtained. The comments sent to the students are of a helpful nature. Students have recently been supplied with a specimen diary extract illustrating the type of entries it is desired should be made. Students are required to submit their current diary, or a week's extract therefrom, each half-year until the Preliminary Examination has been passed. Thereafter, until the Intermediate Examination has been passed, an annual submission is sufficient. After the passing of the Intermediate Examination no submission is required.

*Publication of Examination Papers.*—It has been decided that the examination papers for the written tests shall be published in the Institute's Journal, and this course has been followed with all of the papers used at the examinations held in June and November, 1930. This arrangement should be of much value to students, as indicating the nature and standard of knowledge required. Applications from students for copies of the papers show that this arrangement is appreciated by those concerned.

*Chemistry and General Science.*—After consultation with the Education Department, it was decided that class passes in these subjects at any New Zealand Technical High or Technical School (provided attendance has been of not less duration than two years, and that the pass is from a class not lower than Form IV.) will be accepted as meeting the Institute's requirements in these subjects.

*Landscape Gardening.*—A candidate for the Intermediate and Diploma examinations who nominates Landscape Gardening as the special subject to form *part* of the examination, will be asked to submit to the oral examiners drawings of his work in this connection and bring drawing instruments with him.

*Thesis for Diploma.*—It has been decided that a candidate for the Diploma shall submit a thesis dealing concisely with the special subject, or with some portion of the special subject chosen by the candidate to form *part* of the examination. His choice of subject must be submitted for approval by the Examining Board not less than eight months before the date of the examination at which he proposes to sit. In the thesis the candidate shall describe some work actually carried out by him, and shall make reference to any features that he regards as original. He shall append to the thesis a bibliography of the subject. The thesis shall be submitted to the Examining Board not less than three months before the examination. (These thesis requirements shall not apply to any candidates examined before November, 1932.)

*Examinations.*—The following is a summary of the results of the June and November, 1930 examinations conducted by the Institute:—

<i>Examination.</i>	<i>Complete Pass.</i>	<i>Partial Pass.</i>	<i>Failure.</i>
Preliminary	6	4	1
Intermediate	—	—	1
Diploma	2	1	—
	—	—	—
	8	5	2

In addition to the above nine candidates presented themselves for the Diploma examination under "Group C," and of these six were successful.

*Diplomas and Certificates Issued.*—Appended to this report is a list of Diplomas and Certificates issued after examination, in addition to those shown in previous annual reports. The following is an analysis of these:—

	<i>Men.</i>	<i>Women.</i>	<i>Total.</i>
Diploma in Horticulture	9	—	9
Senior Certificate in Horticulture	—	—	—
Junior Certificate in Horticulture	5	1	6
	—	—	—
	14	1	15
	—	—	—



<i>Total Issued to Date.</i>				<i>Men.</i>	<i>Women.</i>	<i>Total.</i>
Diploma: Without Examination	....	....	167	3	170	
Group C Examination	....	....	26	—	26	
Group B Examination	....	....	4	1	5	
Equivalent	....	....	1	—	1	
Certificates: Junior	....	....	5	2	7	
Senior	....	....	2	1	3	
			205	7	212	

*Discretionary Powers of the Board.*—The examination regulations provided that the *right* to examination under Groups B or C should cease at the end of 1929, but a discretionary power of extension was granted to the Board. The Board surrendered its discretionary power in connection with Group C at the end of 1930, and will make similar surrender in connection with Group B at the end of 1931. Thereafter no application for examination under Group B will be considered, all new applicants being required to take the full course prescribed by the regulations for Group A candidates.

*Sectional Certificates.*—During 1930 the New Zealand Fruitgrowers' Federation requested that provision be made for the granting of certificates to orchardists as such. This gave rise to the following remit, which was passed at the annual Conference of the Institute in January, 1931:—

“That consideration be given to the granting of awards of competency in connection with special branches of horticulture and matters relating thereto, and, if approved, the form such awards should take.”

After the remit was passed a report indicating the certificates proposed to be issued, and the scope of the various tests for orchardists received general approval. These proposals are now being considered by the orchardists of the Dominion. If satisfactory to their governing body steps will then be taken to give effect to the proposals referred to. The question of similar certificates for florists and seedsmen was referred to the Executive.

*Regulations.*—The Board has under consideration some amendments to the existing examination regulations, also additional regulations to provide for sectional certificates for orchardists. It is anticipated that these will be finalised during the current year.

*Examining Board.*—Mr. A. H. Cockayne has been added to the Examining Board during the year. Mr. Geo. H. McIndoe has been appointed an examiner at Dunedin *vice* Mr. W. K. Dallas, transferred.

*Thanks.*—The Board desires to record its grateful appreciation of the services of the examiners in the four centres in carrying out the oral and practical tests in connection with the examination of candidates,

to District Councils for making the necessary arrangements, and especially to Messrs. A. H. Cockayne and P. Black, who have throughout set all papers for the written tests and thereafter marked the candidates' answers. The above services have been rendered gratuitously and have contributed very largely to the success of the examination scheme.

List of Diplomas and Certificates granted under the New Zealand Institute of Horticulture Act, 1927, since the issue of the 1929-30 annual report (all granted under Section 4 of the Act):—

*Diploma in Horticulture.*

Anderson, Alexander Walter Clark, Dunedin.  
 Barnett, Morris John, Christchurch.  
 Keetley, John Joseph, Christchurch.  
 Poole, Herbert James, Wellington  
 Reader, Charles Robert, Otahuhu.  
 Stearn, William Thomas, Christchurch.  
 Waugh, Thomas Salsbury, Wellington.  
 White, George, Wellington.  
 Wilson, George Donald, Hastings.

*Junior Certificate in Horticulture.*

Allen, Herbert, Panmure.  
 Ewart, John Wilson, Dunedin.  
 McEwan, Alexander McKenzie, Dunedin.  
 MacKenzie, John Gretton Carr, Dunedin.  
 Marks, Gordon Frederick, Onehunga.  
 Thomas (Miss), Elizabeth Barnhill, Christchurch.

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**EXAMINATION PAPERS, JUNE, 1931.**

PRELIMINARY EXAMINATION (Syllabus No. 1).

HORTICULTURAL BOTANY.

1. Describe in detail the germination of a Broad Bean and an Onion, paying particular attention to the physiological processes involved.
2. What is cambium, where is it found, what are its functions, and what significance has it on propagation?
3. What types of reserve food supplies are stored up by plants? Give some examples of structures that are specially modified for this purpose.
4. What are the essential elements involved in plant nutrition, and how are they obtained by plants?
5. Compare the family Rosaceae with that of Leguminosae, giving the main distinguishing characteristics of each, and name six important genera belonging to each.
6. What is meant by sexual and asexual reproduction, and distinguish between the production of a seed and that of a spore?

7. What diseases are Roses most subject to, and detail the treatment that is necessary to control them?
8. What do you know of the segregation of characters involved in the self-crossing of hybrids, and illustrate how advantage is taken of this phenomenon in the raising of new varieties of Sweet Peas.
9. Describe in technical language the botanical specimen—*Viola*—(root, stem, leaf and flower) supplied by the Supervisor.

Note.—*Six only* of the above questions are to be answered, of which the last is compulsory.

PRELIMINARY EXAMINATION (Syllabus No. 1).

HORTICULTURAL ZOOLOGY.

1. Give the general characters, habits and life history of a snail, an eelworm and a mite.
2. What is meant by: (a) larva, (b) pupa, and (c) adult? Describe in detail these stages in (a) a fly, (b) a beetle, and (c) an ear-wig.
3. Give an account of the life history of the Praying Mantis.
4. Give an account of biological control of insects. Describe three insects that have proved valuable in New Zealand in this connection.
5. Give the symptoms indicating infestation by: (a) grass-grub, (b) red mite, (c) woolly aphis, (d) ear-wig, (e) codlin moth, (f) thrips, and (g) a scale insect.
6. What sprays are in main used as contact insecticides, how are they applied, and against what insects are they used?
7. What do you know about poison baits, and what are the main toxic agents employed?
8. What are the main principles involved in fumigation, what materials are in main used, and how are they applied?

Note.—*Any six only* of the above questions are to be answered.

INTERMEDIATE EXAMINATION (Syllabus No. 2).

PRINCIPLES OF HORTICULTURE.

1. What do you understand by a biological analysis of soils? How does it differ from a chemical analysis and what factors are likely to alter it?
2. Mention twelve kinds of seeds, selected by yourself, and give the time in days required for germination in each case.
3. Why is moisture essential for the growth of plants? Under what conditions is a high degree of moisture disadvantageous?
4. What are the main phosphatic fertilisers and under what conditions of soil and climate are each most advantageous?
5. What is meant by a complete fertiliser and what by an incomplete fertiliser, and under what conditions is one preferable to the other?
6. How would you set about the raising of a new variety of potato?
7. What are the general principles underlying (a) budding, (b) grafting, and (c) layering?
8. Name the main hardy perennials you would use in a mixed border to secure flowers suitable for cutting throughout the year, and the blossoming period of each.

Note.—*Any six only* of the above questions to be answered.

## INTERMEDIATE EXAMINATION (Syllabus No. 2).

## THE PRACTICE OF HORTICULTURE.

1. Describe the method of pruning (a) Standard Roses, (b) Gooseberries, (c) Cherries, (d) Red Currants, and (e) Raspberries.
  2. Show by a vertical diagram your idea of how drains should be laid, and indicate by measurements—in figures—depth and spacings of drains; also by dotted line the contour of water tables on drained and undrained land.
  3. Explain how Bordeaux mixture, lime sulphur solution, and kerosene emulsion are prepared, and for what purpose respectively are they used?
  4. What are the main tools that are essential for a large garden, and what can be dispensed with when the garden is a small one?
  5. Describe the various types of digging, and under what soil conditions they should be adopted?
  6. Write any essay on the cultivation of *one* of the following crops: (a) Potato, (b) Strawberry, (c) Tomato, (d) Leeks.
- Note.—*Any three only* of the above questions to be answered. Also. *any three only* of the questions on the special subject nominated.

## INTERMEDIATE EXAMINATION (Syllabus No. 2).

## Special Subject: VEGETABLE GARDENING.

1. What do you understand by rotational cropping, and what are the principles governing the practice?
2. Write a short essay on the cultivation of potatoes under the following headings: (a) Soil preparation, (b) Manuring, (c) Planting, (d) Subsequent treatment, and (e) Spraying.
3. Take *one only* of the following and state fully your method of producing the crop: (a) Onions, (b) Celery, (c) Broccoli.
4. Give a year's calendar of dates of sowing different kinds of vegetable seeds, and indicate when the separate crops would be fit for use.
5. What are the several advantages of trenching, and how would you proceed with the work on land that had not been previously so treated?
6. What are the advantages of green manuring? Give the names of four crops suitable for this purpose, and state the special advantages of each.

Note.—*Any three only* of the above questions to be answered, in addition to *any three* from the paper on the "Practice of Horticulture."

## INTERMEDIATE EXAMINATION (Syllabus No. 2).

## Special Subject:

## A KNOWLEDGE OF TREES AND SHRUBS, TOGETHER WITH THEIR PROPAGATION AND USE IN HORTICULTURE.

1. Give brief notes on six ornamental conifers, to be selected by you.
2. Name six flowering shrubs that are pruned during the winter months, and six that are pruned immediately after flowering. Give reasons.

3. Name deciduous trees suitable for Avenue planting: (a) in a windy position, and (b) in a sheltered position.
4. Discuss climbing plants suitable for pergola covering.
5. Give the names of plants—either exotic or native—you prefer for hedges, and mention the special uses to which you would put each.
6. Give a list of twelve flowering shrubs that can be propagated from cuttings during the dormant period of growth.

Note.—*Any three only* of the above questions to be answered, *in addition to any three only* from the paper on the "Practice of Horticulture."

PROFESSIONAL (DIPLOMA) EXAMINATION (Syllabus No. 3).

THE PRINCIPLES AND PRACTICE OF HORTICULTURE.

1. What do you understand by a biological analysis of soils? How does it differ from a chemical analysis, and what factors are likely to alter it?
2. What are the general principles underlying (a) budding, (b) grafting, and (c) layering?
3. Name the main hardy perennials you would use in a mixed border to secure flowers suitable for cutting throughout the year, and the blossoming period of each.
4. Describe the method of pruning (a) Standard Roses, (b) Gooseberries, (c) Cherries, (d) Red Currants, and (e) Raspberries.
5. Show by a vertical diagram your idea of how drains should be laid, and indicate by measurements—in figures—depth and spacings of drains; also, by dotted line, the contour of water tables on drained and undrained land.
6. Write an essay on the cultivation of *one* of the following crops: (a) Potato, (b) Strawberry, (c) Tomato, (d) Leeks.

Note.—All of the above questions are to be answered.

PROFESSIONAL (DIPLOMA) EXAMINATION (Syllabus No. 3).

Special Subject: GLASSHOUSE MANAGEMENT.

1. Explain in detail your method of grafting under glass: (a) Rhododendron, (b) Clematis, (c) Camellias.
2. What do you understand by the term "ventilation" as applied to glasshouses? Describe two important factors connected with it.
3. Why is it so important to have freshly prepared soil for each year's operations under glass? *Or*, explain what you understand by "sour soil; its cause and prevention?"
4. Write a short essay on the cultivation of *one* of the following crops: Tomatoes, Cucumbers, Grapes.
5. Explain your method of propagating: (a) Chrysanthemums, (b) Dahlias, (c) Cyclamen, (d) Tuberous Begonias, and (e) Calceolarias.
6. Sand is used extensively for plant propagating. Why is this so?

Note.—All of the above questions are to be answered.



	11 11 0
Office Expenses:	
Allowance to Dominion Secretary for rent and equipment	50 0 0
Printing	9 6 8
Stationery	15 9 6
Stamps	26 0 10
Sundries	3 18 9
	104 15 9
National Flower Show: Quarter share of deficit	5 7 8
Balances at 31st March, 1931—	
Post Office Savings Bank	211 6 9
Bank of New Zealand	9 3 6
In hand (Dominion Organiser)	5 0 0
	225 10 3
£741 12 11	£741 12 11

**Statement of Affairs as at 31st March, 1931.**

LIABILITIES.		ASSETS.	
Endowment Fund	£ s. d.	Office furniture	£7 5 0
Subscriptions received in advance	63 0 0	Balances:	
Diploma and Examination Fees in suspense	21 5 6	Post Office Savings Bank	211 6 9
Sundry Creditors	11 11 0	Bank of New Zealand	9 3 6
Balance	1 8 6	Cash (Dominion Organiser)	5 0 0
	135 10 3		225 10 3
	£232 15 3		£232 15 3

Outstanding subscriptions are excluded from the Statement.

A. R. STONE, A.P.A.(N.Z.),  
Treasurer.

I have examined the books of account of the N.Z. Institute of Horticulture. The Statement of Receipts and Payments and Statements of Affairs herein recorded, in my opinion, show the true position of the accounts.

10/7/1931.

LESLIE C. GIBBINS,  
Auditor.

## INSTITUTE NOTES.

*National Conference on Horticulture.*—This will be held at Christchurch during the last week in January next. Further information will be issued later. During this horticultural week a National Flower Show will be held, a feature of the show being the Loder Cup competition (native plants).

*Preservation of Native Forests.*—Effective representations were made to the Government relative to the deer menace at Lake Waikaremoana, and steps have been taken to secure the destruction of the deer. Additional persons suitable for appointment as Honorary Inspectors of Scenic Reserves have been recommended to the Government. The Institute has entered a strong protest against the proposal to merge the State Forest Service with any other Government Department.

*Narcissus Committee.*—This is now located at Wellington, the convener being Mr. Thomas Waugh.

*Rules for Judging at Horticultural Shows.*—A draft set of rules has been prepared and circulated to the principal Horticultural Societies for consideration by such societies in conjunction with local judges on the Register and local District Councils of the Institute. It is hoped that a set of rules suitable for New Zealand conditions and acceptable to horticultural interests in the Dominion will be available.

*Plant Registration.*—With a view to securing protection for the discoverers of new varieties of plants the Institute has submitted a scheme to the Government and has invited other "national" bodies to support the movement.

*Education.*—Proposals for amending the existing examination regulations have been submitted to the Government. A scheme of examination for orchardists is at present under consideration by the fruit growing organisations, and florists and seedsmen are suggesting the advisability of securing examinations dealing with their particular sections of horticulture.

Diplomas in Horticulture, by examination, have been granted to Thomas Salsbury Waugh and Herbert James Poole (Lower Hutt), and John Joseph Keetley and William Thomas Stearn (Christchurch). Five candidates sat at the June examinations, but the results are not yet quite finalised.

*Citrus Research.*—It is expected that next season the proposed test area will be planted with trees now being grown at Onehunga. Arrangements are being made for a small overseas shipment of citrus fruit this season for the purpose of testing the market as well as transport conditions.

*Journal Issues.*—It is regretted that financial considerations have made it necessary to limit the Journal to half-yearly issues for the present.

*Membership.*—The Executive Council is preparing a circular for a membership drive, and hopes that it will result in a largely increased membership and a stronger finance.



## HORTICULTURAL SHOWS

### AUCKLAND HORTICULTURAL SOCIETY.

President: Sir Edwin Mitchelson, K.C.M.G.  
Secretary: N. C. Pearce, c/o. Box 168, Auckland.

Daffodil Show: 10-11 September, 1931.  
Rose Show: 13 November, 1931.  
Summer Show: 17-18 December, 1931.  
Dahlia Show: 3-4 March, 1932.  
Chrysanthemum Show: 21-22 April, 1932.

Rose Show held in Reception Hall of Milne & Choyce Ltd. All others at  
Scots Hall, Symonds Street.

### HAMILTON HORTICULTURAL SOCIETY.

President: H. M. Hammond, Esq.  
Secretary: Miss P. C. von Sturmer, 101 Collingwood Street.

Spring Show: 15-16 September, 1931.  
Summer Show: 17 November, 1931.  
Autumn Show: 8 March, 1932.  
Chrysanthemum Show: About 20 April, 1932.

### WELLINGTON HORTICULTURAL SOCIETY.

President: Dr. Arnold Izard.  
Secretary: A. R. Stone, G.P.O. Box 1237.

Spring Show: 17 September, 1931.  
Summer Show: 24 November, 1931.  
Autumn Show: 22-23 April, 1932.

All Shows held in Town Hall, Wellington.

### HUTT VALLEY HORTICULTURAL SOCIETY.

President: N. B. Gibbons, Esq.  
Secretary: A. J. Nicholls, P.O. Box 19, Lower Hutt.

Spring Show: 17-18 September, 1931.  
Summer Show: 25 November, 1931.  
Mid-Summer Show: 10 February, 1932.  
Autumn Show: 20-21 April, 1932.

All Shows held in King George Theatre, Lower Hutt.

### MATAURA HORTICULTURAL AND INDUSTRIAL EXHIBIT SOCIETY.

President: J. L. Mitchell, Esq.  
Secretary: James Ingram.

Spring Show: 7 October, 1931.  
Annual Show: 17 February, 1932.

All Shows held in Society's Hall, Mataura.

**NEW ZEALAND  
INSTITUTE OF HORTICULTURE  
(INCORPORATED)**

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*Patrons:* Their Excellencies LORD BLEDISLOE, Governor General, and  
LADY BLEDISLOE.

*Vice-Patron:* The Hon. the Minister of Agriculture.

*President:* F. J. NATHAN, Esq., Palmerston North.

*Dominion Secretary:* A. R. STONE, G.P.O. Box 1237, Wellington.

*Dominion Organiser:* GEO. A. GREEN, 16 Aratonga Avenue, One Tree  
Hill, Auckland.

*Hon. Secretaries of Local District Councils.*

Auckland: N. R. W. Thomas, 54 Campbell's Bldgs., High Street.

Hastings: W. H. M. Diamond, 611 Nelson Street.

Palmerston North: J. J. Stevenson, Boys' High School.

Nelson: E. R. Neale, P.O. Box 114.

Christchurch: H. Firman, 89 Western Terrace, Beckenham.

Dunedin: Geo. H. McIndoe, P.O. Box 445.

Invercargill: G. M. Broughton, Solicitor.

*Membership:*

Individuals: 12/6 per annum.

Societies, firms, etc.: 21/- per annum.

*Journal (half-yearly):*

To Members: Free.

To Non-members: 5/- per annum (in advance).

Single copies: 2/6.

Hon. Editor: W. R. B. Oliver, M.Sc., Dominion Museum,  
Wellington.

*Advertising Rates:*

These will be supplied on application.

*Examinations:*

Examinations will be held half-yearly (June and November).

Students desiring examination should make early appli-  
cation to

DOMINION SECRETARY,  
N.Z. Institute of Horticulture,  
G.P.O. Box 1237, Wellington.