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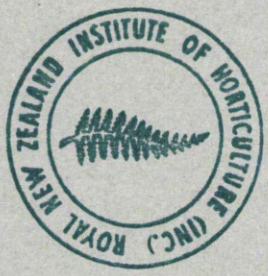
NEW ZEALAND PLANTS AND GARDENS



THE JOURNAL OF THE ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE

(INCORPORATED)

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NEW ZEALAND PLANTS AND GARDENS

The Official Journal of the Royal New Zealand Institute of Horticulture (Inc.)

Volume IV. *SEPTEMBER, 1962.* *No. VIII*

HARDINESS

Used in a horticultural sense, hardiness is a term that defines the resistance of any plant to severe weather conditions and cold temperatures. It is influenced by a number of factors.

The natural environment of a plant is important. In some tropical countries there are plants that have acclimatised themselves to much colder conditions than those existing in their native habitat. The *Kniphofia* provides an excellent example of this. Many of these are native to South Africa, where the summers are exceedingly hot and, although there is frost in winter of 10 or 12 degrees, it is not continuous. In Britain kniphofias, both species and varieties, are among the hardiest of plants and I have known them to survive, on many occasions, degrees below zero continuously for several weeks without suffering. The greatest cause of loss was due to long periods of rain while dormant. On the other hand, the *Gladiolus,* another South African genus will die, after the corms have been exposed to any severe frost, even although they may lie 9 inches below the earth's surface.

I am interested to hear that proteas are to be attempted in the southern counties of England, from Sussex to Cornwall. This South African genus already grows well in the Isles of Scilly and other favoured parts of the British Isles and there seems to be a very good chance of success, provided the summer rainfall is not too excessive. After all, up to 20 years ago the camellia was looked upon as being tender outdoors in Britain, until in the winter of 1944-45, some camellias growing in a Surrey garden came through it without harm, when the laurels were blackened by frost. Now it has taken its place with the *Rhododendron* and *Magnolia* as a hardy shrub.

Many a grower of alpine plants has been puzzled to know why certain high alpines have tended to die during winter, under conditions that are less severe than those they imagine exist at a high altitude. But conditions during winter on the mountain peaks are kind to plant life. They are covered from autumn until spring with a thick carpet of snow. Under this carpet lies a host of gentians. Edelweiss, *Eritrichium* and other 'children of the hills', lie snug and protected from

the blasts of winter. It is not until the warmer sun of spring melts the snow that they return to life. In a lowland garden there may be no snow at all, and the chances are that the ground will lie wet and muddy through the winter. It is this continual wetness around the roots, when they are dormant, that causes these plants to decay.

Many shrubs, particularly some evergreens, are quite tender in their early years. A pot-grown shrub, one year from the cutting stage, is composed of soft and immature growth that is very vulnerable. On the other hand, a shrub that has become well established over the years will have developed a protective bark on its mature stems and, although soft tips of new growth may suffer in severe weather, there is every likelihood of growth breaking afresh from the older wood. The pohutukawa is a good example of this. In its early years it is frost tender and it is not until it has reached its fourth or fifth year, when it has developed mature foliage, that it can be considered hardy.

Frost, during a period when a plant is dormant, is rarely dangerous. It is the late frost that comes suddenly, after a fine spell of weather in spring has induced early growth that is very vulnerable, which can cause immeasurable harm.

G. A. R. PHILLIPS, Editor.

CARNIVOROUS PLANTS

A. E. J. SMITH, N.D.H.(N.Z.), (Auckland).

Plants which trap insects and other small animals as a source of food form an interesting and diverse group. A number of genera have developed in this fashion in order to survive in an environment lacking or deficient in available nitrogenous compounds. It is proposed in this article to give a brief resume of the different genera employing insect trapping devices, to explain how these devices operate and to give some idea of the conditions under which these plants thrive.

Carnivorous plants may be divided into three groups for the purpose of this article.

(a) Those producing pitcher-like structures.

(b) Those having a sensitive leaf.

(c) The aquatic plants employing underwater devices.

(a) Pitcher Plants

Nepenthes (Nepenthaceae) is fairly common in stovehouses throughout New Zealand thriving in a temperature range of 50° - 75° F. *Nepenthes* forms a group of some seventy species from Malaya, Borneo, Australia, South China, Ceylon and the Philippines. Some of the species grow rather less than 1 ft. high while others may climb to a height of 70 ft. or more. The flowers are green, inconspicuous and the sexes are carried on separate plants.

The hollow pitcher is formed from an extension of the midrib of the leathery leaf and holds a digestive fluid containing pepsin. There are a few insects and one spider which can live in these pitchers and are unaffected by this fluid. It is thought by many that these secrete their own neutralizing fluid which prevents them from being digested. Between the pitcher and leaf blade the midrib takes the form of a tendril. Midway between, it will be noticed that the tendril is twisted to form a spring which apparently strengthens the attachment against the weight of the pitcher. When immature the pitcher is sealed with a lid which opens as it develops. This lid serves a definite purpose in the trapping of insects and is also a protection against rain which may otherwise dilute the digestive fluid contained inside the pitcher.

Under the leaf blade and along the tendril are numerous glands secreting a honey-like substance. These glands are also very numerous at the top of the pitcher and on the undersurface of the lid. Insects are attracted by this fluid and are ultimately lured to the rim of the pitcher below which and on the inside are comparatively large sunken glands. In attempting to reach the liquid secreted by these glands the insect slips into the pitcher the upper surface of which is extremely smooth. The insect falls to the bottom of the pitcher where glands are secreting digestive fluid. The soluble parts of the victim are then absorbed through the pitcher wall. Wasps seem to be greatly attracted by this plant and it becomes essential at times to empty the pitchers of their burden of decaying bodies.

In the writer's experience the production of pitchers appears to be affected by the amount of available nitrogen contained in the potting compost. When grown in a compost containing nitrogenous manures, pitcher production ceased although the plant remained in good health. When repotted into a mixture deficient in nitrogenous compounds pitcher production recommenced almost immediately. Removal of the tips of the shoots is recommended to increase the number of pitchers formed.

Nepenthes are more or less epiphytic in habit and may be grown in a compost of *Dicksonia* fibre, *Todea* fibre and a little sphagnum moss with sufficient broken brick, etc., to ensure good drainage.

Propagation is by cuttings having 4 - 5 leaves and being semi firm. The cutting medium (coarse river sand is satisfactory) should be saturated, allowed to drain and the cuttings firmly inserted. A shaded frame with a bottom temperature of around 80° F., is suitable and a high humidity should be maintained.

Rooting of cuttings in saturated air is an old method recommended for these subjects. The cutting is wedged through the drainage bole of an inverted flower pot which is then placed on damp moss. Roots form in the saturated air inside the pot, the base of the cutting being about one inch above the surface of the moss.

It is quite possible that *Nepenthes* could be grown out of doors in selected areas north of Auckland. There is no doubt, however, that the local bee population would suffer!

Darlingtonia, Sarracenia and *Heliamphora*

These three genera belonging to the *Sarraceniaceae* employ leaves modified to form pitchers the method of trapping being similar in all cases.

Darlingtonia consists of one species — *D. californica* from the U.S.A.

Sarracenia has nine species also from the U.S.A.

Heliamphora nutans, the only species of this genus, is a native of British Guiana.

All three genera require a reasonably high humidity and cool shady conditions except for *Sarracenia* which will stand fairly strong light. A moist to wet soil of a peaty nature is recommended.

In *Darlingtonia* each leaf is modified to form an upright hollow structure, a rosette of these leaves being formed from the rhizomes to a height of up to 2½ ft. These pitchers are slightly twisted, and hooded with a fishtail shaped lid or flap at the top. The colour is quite attractive, the lower half being green with the upper half mottled with white and the opening striped with reddish veins. The interior of the hood contains many secreting glands interspersed with fine hairs which point towards the bottom of the tube. The lower part of the pitcher also has these hairs and also a neutral liquid secreted from the pitcher wall.

The top half of the tube is extremely smooth. With this arrangement the fate of any insect attempting to feed on the honey-like liquid secreted by the glands inside the hood is obvious. No digestion takes place as in *Nepenthes* but the neutral liquid which has been secreted contains sufficient bacteria which no doubt act upon the dead insect after which the dissolved material is absorbed by the thin areas of the lower walls of the pitcher.

In *Sarracenia* the pitchers vary greatly according to the species. The colour of the pitcher may be green, red or blotched and striped with reds, purples and greens. The general shape of the pitcher is that of a long slender tube topped with an overlapping lid. Just inside the tube are numerous small hairs with liquid at the bottom of the tube. As in *Darlingtonia* this liquid is neutral.

Heliamphora nutans has pitchers with very wide funnel-shaped mouths and small rudimentary lids. The insect trapping method is again similar to *Darlingtonia.*

Cephalotus (Cephalotaceae).

C. follicularis, the only species, comes from Western Australia and is a dwarf plant with a creeping rhizome. Two types of leaves are formed. Some, forming a rosette are oval, short stalked and hairy. The other leaves are modified to form small coloured pitchers ½in. to 1½ inches long. These pitchers are covered on the exterior with honey glands which attract small insects. Digestive glands come into action

when the insects slip from the smooth rim of the pitcher into the interior. The pitchers are quite brightly coloured green, crimson and white.

Cephalotus may be grown in small pots or pans in a fine well-drained soil with a topping of sphagnum moss. The pots may be placed in ½in. of water in a position having plenty of light and a reasonably high humidity. A minimum winter temperature of 40° F. is recommended and little water should be given during this season.

(b) Plants Having Sensitive Leaves

Drosera (Droseraceae). These are the Sundews, so named from th drops of sticky liquid which glisten in the sun like dew. There are about 100 species of which New Zealand can claim six, one species *(D. stenopetala)* being endemic. The leaves of *Drosera* are remarkable for the tentacles which stand out from the leaf surface and secrete a sticky fluid. The edges of the leaves are involute i.e. turn in towards the upper surface, the tentacles being longer on the outside edges than those further in. Insects such as midges are attracted by this fluid which, once contact is made, prevents them from leaving. At the same time the tentacles are stimulated to movement, bending over the insect and effectively imprisoning it. The tentacles then secrete a fluid which is capable of digesting and making soluble proteins. The dissolved parts of the insect and the secreted digestive fluid are then absorbed by the plant the tentacles afterwards resuming their former position.

Drosera are commonly found on marshy ground and our native ones, especially *D. binata,* are sometimes introduced into glasshouses in the sphagnum moss used for potting. General growing conditions consist of a peaty soil mixture, plenty of light and water and a reasonably high humidity. *Drosera* may be propagated by cuttings of the rhizomes ½ inch. long placed into the above soil.

Drosophyllum (Droseraceae) is unusual in that it grows in dry areas being a native of Spain, Portugal and Morocco. The insect catching device is similar to *Drosera.* The leaves of *Drosophyllum* differ in that the leaf edges roll inwards towards the undersurface of the leaf. *D. lusitanicum* is the only known species.

Dionaea (Droseraceae). There is but one known species *D. muscipula* the well known Venus Fly Trap from the U.S.A. and in particular Carolina where it grows in peat bags. The leaves of this plant are two-lobed, each lobe having three long hairs jointed at their bases while the edges of the lobes have bristles which interlock when the two lobes come together. This occurs when any of the long hairs are touched by an insect, the midrib of the leaf acting as a hinge. After a few hours, glands on the leaf are stimulated and pour a digestive fluid over the imprisoned insect. The leaf remains closed up until digestion has been completed.

In cultivation *Dionaea* needs full light and a high humidity. They may be grown on sphagnum moss provided that the moss is not permitted to become sour.

Pinguicula (Lentibulariaceae) Butterwort. The origin of the common name Butterwort is interesting. The botanist John Lindley (1799-1865) gives the following explanation: '*Pinguicula vulgaris* (Common Butterwort) has the property of giving consistence to milk and of preventing its separation into whey or cream. Linnaeus says that the solid milk of the Laplanders is prepared by pouring it warm from the cow over a strainer on which fresh leaves of *Pinguicula* have been laid.' He goes on to mention that after standing for a few days the milk turns sour but 'throws up no cream and becomes compact and tenacious.'

There are approximately forty species from Mexico, West and South Europe and Asia. It prefers similar conditions to *Drosera* and is reported to be common in Britain especially in the northern hilly districts.

P. vulgaris has broad fleshy involute leaves forming a rosette and these are covered on their upper surface with sticky glands. Insects caught by these glands are held until washed by rain to the edge of the leaf which then curls inwards over the insect. Digestive fluid is then secreted, the soluble parts of the insect absorbed and the leaf unrolls to its former position.

Byblis (Droseraceae). There are two known species, *B. gigantea* and *B. liliflora* from Western Australia where they are found growing in full sun in marshy ground.

The leaves, stems and the backs of the sepals have very numerous purplish, gland tipped hairs together with sessile glands. Small insects are caught by the sticky substances on the gland hairs and it is thought that digestive enzymes are secreted by the sessile glands.

Roridula (Droseraceae) contains three species of woody plants from Australia and South Africa but are apparently not in cultivation. They grow to a height of 3 to 4 ft. and have at the tips of their branches tufts of sticky glandular leaves.

(c) Aquatic Plants

Utricularia (Lentibulariaceae) .The Bladderworts are a group containing 250 species, New Zealand being represented by six, all but one being endemic. *Utricularia* include aquatic and terrestrial species. A description of the common British *U. vulgaris* will serve to illustrate the remarkable method by which small animals are trapped underwater.

U. vulgaris grows completely submerged except for its flowering shoots. Each insect trap is a bladder-like structure, somewhat pear-shaped and is attached to the plant near its broad end. The narrow end has many small hair-like structures which apparently guide insects towards a trapdoor arrangement which is normally closed. Near the bottom half and towards the centre of this trapdoor are four stiff curved bristles. The pressure inside the bladder is less than that of the surrounding water and when an insect touches the curved bristles the

trapdoor opens. The sudden inrush of water carries the victim inside the bladder, the door closes and the insect is trapped and eventually dies. On the decay of the insect it is absorbed, a series of fine hairs inside the bladder carrying out this function. The bladder then exhausts its water content and the trap is reset.

The terrestrial members of this group often have small useless bladder-like parts. The decorative species are the tropical terrestrial types and may be grown in a stovehouse in a fibrous peat and sand mixture. They require plenty of water during the growing season, but during the winter should be given just enough water to prevent shrivelling of their tubers.

Polypompholyx, another member of the *Lentibulariaceae,* has a similar trapping device having whorls of bladders above its stiff bristly stems. There are four species from Guiana, Brazil and Australia.

Aldrovanda vesiculosa (Droseraceae) from Europe, Australia and Asia is a floating plant which as with *Utricularia* remains fully submerged except for its flowers. It prefers shady conditions and may be grown in an outdoor pond in shallow water amongst taller growing plants. The leaves grow in whorls, the end of each leaf stalk ending in a number of sharp bristles and a two-lobed leaf blade similar to *Dionaea.* The leaf blades have digestive glands and sensitive hairs which when touched by an insect immediately bring the leaf lobes together. The glands then exude a digestive liquid which dissolves the softer parts of the insect. It has been stated that the leaves are much more sensitive if the plant is grown under warm conditions.

Genlisea (Lentibulariaceae) is represented by about twelve species from Africa and tropical America. They are found in shallow waters the flower stems only appearing above the water surface.

Both true leaves and trap leaves are produced. The trap leaves are in the form of a pitcher having a long narrow neck. Inside the pitcher are numerous downward-pointing hairs. Insects and other small aquatic animals are trapped but it is not clear whether digestive enzymes are exuded or whether the plant relies on bacterial action to help in the assimilation of food caught in this manner.

SIR JOSEPH BANKS.

A. W. ANDERSON, A.H.R.I.H. (N.Z.) (Timaru).

Sir Joseph Banks is one of the few 18th century men of science whose life and interests have any significant bearing on the botanical outlook of our own time. Although he took all phases of natural history in his stride his greatest interest was in plant life, and it was his botanical and horticultural interests which laid the real foundations of the Royal Botanic Gardens at Kew. For about half a century he was virutally Director of 'His Majesty's Garden at Kew', and

it was his inspiration that made it the greatest botanical institution of its time. He saw the possibilities of a central controlling point where scientific intercourse between the homeland and the colonies could be carried out, and he laid down a policy that has become traditional.

Thus he began to build up a collection of living plants, supplemented by a herbarium and library, where the botanical problems of the Empire could be co-ordinated. In order to build up the collection of plants he sent out young men as collectors to all parts of the world. Some of the more important were Francis Masson, who went to South Africa, West Indies and North America; David Nelson to Australia and South Africa; A. P. Hove to India; Peter Good to India and Australia; George Caley to Australia; William Ker to China; Allan Cunningham to Brazil, Australia and New Zealand; James Bowie to South Africa and Brazil and David Lockhart to the Congo. During the reign of George III some 7,000 new species are said to have been introduced into England, mainly to Kew, through the efforts of Sir Joseph Banks and his collectors.

Joseph Banks was born in London in 1743, the son of William Banks of Revesby Abbey in Lincolnshire, and was knighted in 1781. His interest in plants began early, and we are told that while still a schoolboy he used to pay the local 'cullers of simples,' the women who collected plants of medicinal value for the London druggists, sixpence for every specimen of a plant that was new to him. He went to Oxford at the age of 17, and there his interest in wild-flowers was widened to embrace a wide variety of subjects. During his first year there his father died and his mother went to live in Chelsea, near the famous Apothacaries' Garden and the young Banks soon came to know the great Philip Miller who was one of the famous gardeners of the age.

In 1764 he inherited his father's very considerable fortune, and left Oxford with an honorary M.A. His scientific interests continued, and two years later he was elected F.R.S. and showed himself as more than merely a rich dilettante by preferring to go planthunting in Labrador and Newfoundland instead of the usual 'Grand Tour'. Joining an Oxford friend, Lieut. Constantine Phipps, who had been placed in command of H.M.S. 'Niger', he reached the Equinox Islands off the coast of Labrador, and his list of Newfoundland plants is the earliest known for the area.

But his greatest opportunity for adventure came when the great South Seas Expedition was being prepared in 1768. He spent £10,000 of his own money on the venture which was the best equipped of its time. The story of Captain Cook's discovery of this country and his circum-navigation of the world is too well known for us to dwell on here, so let it suffice to say that the initial jubilation soon turned to bickering as the arm-chair geographers refused to believe that

Captain Cook could have done all he claimed, and failed to find the great southern continent, which everyone knew must exist to balance the great Eurasian landmass and keep the earth in position.

So a second expedition was put in hand, and Banks jumped at it with all his usual enthusiasm. With all the brashness of the young aristocrat who knew that money could talk, he rushed ahead and engaged a retinue of some fifteen persons and, determined that everything should be better and more comfortable than last time, set about making additions to the 'Resolution' to house his entourage. When Cook saw what had been done, he reported that the ship was no longer sea-worthy and that the whole superstructure must be removed. Mr Banks was most indignant and did all he could to fight the matter, until practically told by the Navy Board to mind his own business. Then he withdrew in a huff and began planning an expedition of his own to Iceland.

No expense was spared and forty persons were engaged. He sailed for Iceland on 12th July 1772, just three months and three days after the departure of the 'Resolution'. The expedition was a great success and, besides the usual botanical specimens, living and dried, brought back samples of lava and some rare Icelandic manuscripts.

Banks was a lively young man and in his *Random Records,* published in 1830, George Colman gives a spirited account of a visit to Mulgrage Castle in 1775. There were a 'heterogeneous half-dozen' in the coach consisting of Constantine, now Captain Phipps and later to become Lord Mulgrave, his youngest brother Augustus at that time about the same age as the author, around 13, Colman senior, Banks and Omai, or Omahi, a native of Raiatea brought to England by Captain Furneaux of H.M.S. 'Adventure' in 1774, and repatriated to Huaheine in 1777.

'The coach in which we rumbled from York was the ponderous property of Sir Joseph, and as huge and heavy as a broad-wheeled waggon; but, however ill-constructed for a quick conveyance over the rough roads and sharp declivities which we had to encounter, its size was by no means too large for its contents. It carried six inside passengers with much more than average luggage, for the packages of Captain Phipps who intended to make a stay at Mulgrave, and who was ardent in his professional studies, were laid in like stores for a long voyage: — he had boxes and cases crammed with nautical lore, books, maps, charts, quadrants, telescopes, etc., etc., but Sir Joseph's stowage was still more formidable; unwearied in botanical research he travelled with trunks containing voluminous specimens of his *hortus siccus* in whitey-brown paper; and large receptacles for further vegetable materials which he might accumulate in his locomotions. The vehicle had also, in addition to its contigent loads several fixed appertenancies, with which it was encumbered by its philosophical owner — in particular there was a remarkably heavy safety

chain, a drag-chain on a newly constructed principle to obviate the possibility of danger in going down a hill, — it snapped short, however, at our very first descent, whereby the carriage ran over the post-boy who drove the wheelers and very nearly crushed him to death

It boasted also an internal piece of machinery with a hard name, a hippopedometer, or some such Greek coinage, by which the travellers might ascertain the precise rate at which he was going in the moment of consulting it, this also broke in the first ten miles of our journey at which the philosopher to whom it belonged was the only person to lose his philosophy . . . . .

Our progress, under all its cumbrous circumstances, was still further retarded by Sir Joseph's indefatigable botany:—we never saw a tree with an unusual branch, or a strange weed, or anything singular in the vegetable world but a halt was immediately ordered; out jumped Sir Joseph, out jumped the two boys, Augustus and myself after him, and out jumped Omai after us all. Many articles, all a growing and a growing, which seemed to me no better than thistles, and which would not have sold for a farthing at Covent Garden Market, were pulled up by the roots and stowed carefully in the coach as rarities. Among all our jumpings the most amusing to me was the jump of a frog down the throat of the said Sir Joseph — he held it in the palm of his hand (having picked it up in the grass) till it performed this guttural somersault, to convince his three followers, the two boys and the savage, that there is nothing poisonous in this animal, as some very ignorant people imagine, — as far therefore, as enlightening the minds of a couple of lads belonging to the rising generation of England, the frog took his voluntary leap to self-destruction, like another Curtius, for the good of his country. History does not record whether Banks continued with his experiments in curbing carriages as they went down hill, but in 1783 he was injured in an accident, and lost the use of his limbs for 14 years. In the meantime he had married, been elected President of the Royal Society, and had lost his greatest friend in the death of Dr. Solander in 1782. He made his home at Spring Grove, Isleworth which acquired its name from a cool spring in the adjacent woods. Spring Grove became one of the famous gardens of the day and there *Rosa banksiae*, the Lady Banks Rose, was a special favourite. It had been sent to Kew by William Ker who found it in China. One of the special features of the Spring Grove garden was an artificial bog in which American cranberries were grown. So successful was this venture that no fewer than 140 bottles of cranberries were produced in 1813.

During his 42 years as President of the Royal Society Sir Joseph became something of an autocrat but, if he could not suffer fools, he was steadfast in his friendship, as the championing of such difficult characters as the prickly George Caley who made such a nuisance of himself in Sydney and the equally difficult William Bligh, testify.

It is doubtful if Bligh would have emerged so successfully from the mutiny on the Bounty, and his equally difficult time as Governor of New South Wales, had he not had the support of Banks.

Maiden in his address to the Australian Association of Science in 1911 summed up Banks as 'Not universally popular among men of his time. His nature was extremely autocratic, and when he came to wield the power of the President of the Royal Society he let this become apparent, indeed he became almost despotic. The verdict of his contemporaries was that with his overbearing attitude he was liberal and open in his behaviour to his acquaintances and very persevering in his friendships. Those who knew him most intimately continued their connection with him and maintained their esteem and regard.

PLANT HUNTING IN NEW CALEDONIA. Part II.

L. J. METCALF, N.D.H. (N.Z.), Assistant Curator, Botanic Gardens, Christchurch.

Before dawn we were roused from our beds by M. Bresil and after a quick breakfast we loaded the gear into his jeep and just as dawn was breaking started out for the Table Unio region at the head of the Boguen Valley. In the pale light we drove through the fresh and dewy morning air and along the narrow road of the Boguen valley. After about 9½ miles the road finished at a place called Camp Feillet and we started bumping along an extremely rough jeep track. For several miles the track wound its way along the hills above the Boguen river, mostly through rather open Niaouli country. In many places the hills were open and grassy and the common bracken *(Pteridium esculentum)* was quite abundant. Growing among the Niaouli trees was a semi-scandent shrub with scented white flowers and the bottom lip prettily fimbriated. It is an *Oxera* sp. L.M. 226, and a member of the *Verbenaceae*. On some of the Niaouli trees was a rather interesting fern which greatly resembled and formed bird's-nest-like clumps similar to a *Platycerium;* it is a *Drynaria* sp. L.M. 71 probably *D. rigidula*. On some of the rocks were several ferns, *Davallia* sp. L.M. 92, *Polypodium* sp. L.M. 85, and *Adiantum hispidulum,* while along some of the side streams *Blechnum gibbum* and another *Blecknum* sp. L.M. 68 (possibly *B. moorei)* were common.

A little further on we came to the start of the track that M. Bresil was making and travelling became a little less bumpy. On each side of the track there were native gardens where bananas, taro *(Colocasia esculenta, Alocasia macorhiza* and *Xanthosoma sagittifolium),* yams and manioc *(Manihot utilissima)* were being intensively cultivated. Climbing up the trees *Rhaphidophora* was very common and for the first time we saw *Hoya neo-caledonica* which trailed down from the tops of the trees and was the commonest liane. A mile or two further

on and we arrived at the village, where we were greeted by the chief, and taken into his dining hut for a cup of coffee.

The village consisted of a dozen or so huts, scattered on both sides of the river, in a most pleasant situation. The huts were contructed in the more modern style and were rectangular in shape, the walls being of rammed earth and the roofs thatched with grass. There were perhaps fifty or more people there and from conversation with the chief we gathered that about five different dialects were spoken there. The road to the village, which until then had been quite isolated, was being constructed under a government contract and was being made because these people were one of the few tribes who were willing to grow food for the market. Around the village wild orange trees abounded and groups of the tall columnar pines *(Araucaria cookii),* which characterise the native villages, made the whole scene very picturesque. Our guides were a couple of burly natives and after being introduced we set off through the village for the bush on the hills above. As we passed by the huts the natives came out to greet us and after photographing several we started on our way again.

A narrow foot track led up a spur behind the village and after 10 minutes climbing under a warm sun both Allan and I were beginning to wonder whether our efforts would be really appreciated back in New Zealand. Our guides kept saying 'doucement' which is supposed to mean 'softly' or 'gently'; however, from their pace we took it that they understood it to mean at a fast gallop. We were quite pleased when they stopped to admire the view and even more pleased to see that they were sweating every bit as much as we were. For a while we walked between Niaouli trees and then the track led down off the spur and into the forest.

Inside, the forest was not as dense as I had imagined, and while this may be due to the natives having cultivated much of the ground in the forest at various times, it still appeared that on the whole the conifer forest is not as dense as our typical Westland forests. The largest tree in this area was the kaori *(Agathis moorei* L.M. 114) and some of the specimens we saw were up to 100 feet high and 4-5 feet in diameter. A very elegant species of palm (L.M. 102) was common and at the time the large red fruits were ripe and attracting the native pigeon which is very similar to our New Zealand bush pigeon. The various species of the *Araliaceae* were a prominent feature, *Dizygotheca* and *Meryta* being the two most common. Plants of *Dizygotheca* spp. (L.M. 96 and L.M. 130) and a *Meryta* sp. (L.M. 97) were collected; all look as though they will make handsome pot plants. Climbing up the trees were various species of *Freycinetia,* all much smaller than the New Zealand *F. banksii* but quite attractive. Ferns were present in a bewildering variety and altogether 27 species were collected. Several species in the *Marattiaceae* (L.M. 91, L.M. 111, L.M. 116) were common, and 2 species of treeferns with very thin trunks were quite attractive.

On the ground in pockets where the leafmould lay thickly large clumps of *Calanthe* sp. L.M. 74 (possibly *C. veratrifolia* var. *angraeciflora)* grew and high up on the trees were numerous epiphytic orchids. Gathering these last was quite simple because it was only necessary to walk along until a clump which had been blown off by wind was found on the ground. All the time while we were going along our guides were imitating the call of the pigeon, in an endeavour to bring one into range. The call made by the pigeon is something like a cross between a gentle booming sound and a cooing and these natives were so expert at it that it was impossible to tell the difference between them and the pigeon. We were informed that a party of hunters had been through the previous week and consequently not many pigeons were heard. After penetrating into the forest for some distance we came to a small stream where we stopped and had lunch.

While we were having lunch one of the guides shot a corbeau *(Physocorax moneduloides),* which is a black bird about a foot long rather like a crow. In the vicinity of the stream I found a *Selaginella* sp. L.M. 115 which was most handsome. It grew a foot or more high and the top of the frond spread out umbrella-fashion. Growing perched on the branches of trees was *Astelia neo-caledonica* L.M. 84 which very much resembles the New Zealand *A. cunninghamii* and also as an epiphyte was a member of the *Urticaceae* L.M. 109 which appeared to have affinities with *Elatostema.*

After lunch we explored a little further up the stream and then started off down the opposite side of the gully towards the village. Presently one of the guides cautioned us to be still and after a minute or so managed to lure a pigeon within shooting distance. After the pigeon had been brought down we found that its crop was full of the large, red palm seeds, each one the size of a walnut. We followed a rather dry ridge down for some distance before coming to the river which flows through the village. Growing on some of the rocks by the river was *Arthropodium neo-caledonicum* which grows to about 4 inches in height. Our arrival back at the village was the signal for much talking and the number of plants collected rather amazed the villagers who had not imagined that so many of their plants could be of interest to me. Some oranges were produced to quench our thirst and after talking to the chief for a while we got into the jeep and set off for Bourail.

In the morning we went out to the beautifully situated New Zealand War Graves Cemetery and then drove out to the coast to have a look at the famous Roche Percee and la Baie des Tortues. However, at the latter our luck was out and we did not see any turtles. La Baie des Tortues is a very picturesque little bay set in between high cliffs and it contains a fine grove of *Araucaria cookii.* On the steep faces above the beach were *Pandanus* sp. and some large specimens of *Cycas circinalis.* A little beach further along looked most inviting,

so we bathed in the warm water for a while and then returned to the hotel for lunch, after which we departed for the east coast. Our destination for that night was Houailou and the road after following a tributary of the Boguen River crossed the Col des Roussettes and then followed Houailou River down to the coast. On the Col des Roussettes some fine humid cloud forest filled the valleys and gullies and for the first time tree ferns became a conspicuous feature of the bush. This was *Alsophila novae-caledoniae* and specimens frequently towered up 40 feet or more. Numerous members of the *Araliaceae* were common with *Hoya neo-caledonica* and *Rhaphidophora* being on almost every tree. Along the lower reaches of the Houailou River native villages became numerous, and the smiling faces of natives making their way home from work greeted us along every stretch of road. We arrived in Houailou just after dark, and put up for the night in what appeared to have once been a rather pretentious hotel.

By this time the car was becoming rather full of plants and so I decided that while we went north to Hienghene I would leave them in a shady place at the hotel. Most of the morning was spent cleaning them and wrapping plants in plastic and then after lunch we started up the coast road. The prosperity of this coast is indicated by the numerous villages and the well kept plantations and gardens. In fact in some places the villages were so close together, it was difficult to see where one tribe ended and the next began.

A few miles north of Houailou the road climbed over the serpentine country in the vicinity of Cap Bocage and growing in the scrub a most beautiful shrub was seen. This turned out to be *Geissois magnifica* L.M. 173, a member of the *Cunoniaceae*. It is a shrub up to 10 feet high which has large ternate leaves and the flowers are produced on the old stems. The bright red inflorescence is like a bottlebrush and in general appearance very much resembles a member of the *Proteaceae*. *Dracophyllum* sp. L.M. 175 was common and lent a New Zealand touch to the scene. From Ponerihouen the road followed the coast taking us past some beautiful coastal scenery, and then just as it was getting dark we pulled into the hotel at Touho which is about 68 miles north of Houailou. This hotel is set amidst charming surroundings under the coconut palms along the beach. It is of the motel type and the very modern bungalows with thatched roofs had every convenience.

In the morning we started out for Heinghene some 27 miles up the coast. Several of the rivers in this part of the island are wide tidal rivers with no bridges and consequently distance is reckoned not in kilometres but in hours. Vehicles and passengers are taken across these rivers by barques which are pulled across on a cable by two natives and sometimes waiting and crossing time can be up to three quarters of an hour. We arrived at Hienghene at lunchtime and made our way up the river to the hotel. The hotel was situated above the road and looked out over a wide bend of the river on what was

a most tropical scene. Allan appeared to be suffering from some kind of fever and decided to go to bed, while I decided to explore the bush behind the hotel and followed a small stream up the hill to what looked like a suitable patch of bush.

The bush more closely resembled rain forest than did the bush of the west coast and mosses and hepatics were more noticable. Several unidentified epiphytic orchids grew on the trees and the great trailing stems of *Hoya* hung down from the tops. On some of the trees large masses of a *Lycopodium* sp. L.M. 171 (possibly *L. carinatum)* were conspicious while on the ground another large *Selaginella* sp. L.M. 166 grew up to about 1½ft high. The large bird's nest-like clumps of *Asplenium nidus* adorned many of the trees or some times grew on the ground where they had fallen off. Quite a few specimens were collected but generally speaking the bush was not as rich as I had expected.

The next morning Allan was feeling better so we had a look around Hienghene, photographed the famous Tours Notre-Dame and started on the road back to Houailou. The Tours Notre-Dame is a spectacular rock formation just off the coast and it bears a great resemblance to its namesake in Paris. Down the coast near Poindimie I found a beautiful pink-flowered orchid; *Spathoglottis vieillardii* (?) L.M. 162, growing in the grass along the road banks. It grew about 2½ft high and the flowers were ¾-1 inch across. We arrived back in Houailou in good time and after checking the plants I had left behind we got cleaned up for dinner. The next morning packing the plants took quite a while, and then we started on the road back to Noumea where we arrived late in the afternoon.

Just out of Houailou we stopped to examine the maquis scrub of that locality. One of the prominent shrubs was *Grevillea rubiginosa.* This *Grevillea* has rather broad leaves, rather rusty-coloured underneath and short inflorescences of white flowers. It was quite attractive but not so much as some of the other species.

By now I had so many plants, some of which had been out of the ground for two weeks, that my main concern was to get them packed up and off to New Zealand as soon as possible. I arranged to have the plants fumigated and ready for dispatch the following Friday, but I didn't allow for the unpredictable timetable of T.A.I., and so the plants had to wait over the weekend until Monday. In the meantime I had been in contact with M. Corbasson and final arrangements were made to take me on several trips into the southern portion of the island. Botanically it is the most interesting part of the island and the greatest number of endemics and interesting forms are found there. At the same time I arranged a three-day trip to the Ile des Pins just before I was due to depart to New Zealand.

On the Wednesday (April 26th) of the week we arrived back in Noumea M. Luc Chevalier called for me at 7.30 a.m. in a Forestry Department jeep and we set off for the Plaine des Lacs about 45

miles from Noumea. Once past Mont Dore the road headed into the hills which were mostly clothed with serpentine maquis. What was probably a pink-flowered form of *Grevillea gillivrayii* was common and another *Geissois,* probably *G. racemosa,* was in flower. With this species the racemes were smaller and not so brilliant as with *Geissois magnifica,* however, it is very attractive and I am hoping that it can be acclimatised in New Zealand gardens. The serpentine marquis was most fascinating and there were quite a number of plants that interested me. The plants were mostly of low stature, 3-4 feet high, and were always scattered so that liberal quantities of the heavily mineralised red earth showed in between. *Dracophyllum verticillatum* and a *Leucopogon* sp. were common, the latter having leaves up to 3 inches long and ½ inch wide. Plants of *Cordyline terminalis* were scattered throughout and a *Hibbertia* sp. was conspicuous by its taller habit and dark green foliage. In places *Joinvillea elegans* appeared, the small, shiny black fruits just beginning to ripen, and a smaller species of *Flagellaria, F. indica,* became fairly common.

As the road wound up around the face of Mont Ouenarou it became very twisty and it was necessary to hold on to the jeep with both hands as it was thrown around the bends at quite a fair speed. By now we were fairly high and in gullies there appeared patches of forest which in general appearance resembled New Zealand bush. This illusion was largely created by tree ferns, numerous other ferns and clumps of *Astelia* which could be seen from the road. A short distance down from M. Ouenarou and we arrived in the valley of the Yate River.

As with New Zealand the hydro-electric engineers take no heed of rare plants or scenic attractions, the construction recently of a barrage on the Yate River has flooded much of the Yate valley and the Plaine des Lacs along with the interesting plants that grow there. It was on account of this flooding, which due to the season was higher than usual, that I was unable to visit one of the most interesting localities but had to be content with second best. From where we came down into the Yate valley near the 27 kilometre peg the whole valley was flooded and in places the road had been diverted up onto higher ground. When just a few miles from the barrage we swung off to the right on a little used and very rough track and headed up the Riviere des Lacs. On the skyline of the hills above the distinctive silhouettes of the kaori trees *(Agathis ovata)* were pointed out to me. A very bad cyclone last January had played havoc in this area and the track became even rougher. Eventually we came to the Goulet de Madeleine and as the track had been very badly gullied out we decided to leave the jeep and have lunch.

Just a few yards away from where we stopped was the Riviere Madeleine and growing along its banks, generally right in the water, was *Podocarpus palustris* L.M. 141. It rarely grows more than 6-8 feet high and has a short and very thick trunk which has been likened

to that of a baobab tree in miniature. The foliage greatly reminded me of our *P. nivalis* but the large, dark-red plum-like fruit was more like that of a miro. These trees were excessively gnarled and stunted and some although so small could conceivibly be up to 100 years old. A diligent search produced a few seeds and some seedlings and as an extra measure some cuttings were also taken including a form with glaucous foliage L.M. 142.

After lunch we followed the road on foot and going up a gully collected plants of *Dacrydium araucarioides* L.M. 185 and *Agathis ovata* L.M. 180. *Dacrydium araucarioides* is a straggly tree rarely growing to 30 feet and usually less, the leaves are scale-like and the stems do quite resemble a species of *Araucaria*. *Agathis ovata* is variable in its habit but where I saw it the trunk was short and thick and the branches wide spreading forming a rather flat topped tree. The foliage is olive green and more ovate than the New Zealand species. From the head of the gully the country was flat plain-land covered with various shrubs and dotted here and there with clumps of *Casuarina*. Growing beside the track I came across a bush of *Gardenia aubreyii* L.M. 183 which was in flower. It is a bush up to 6 feet high with large hard-looking leaves and the flowers are about 2 inches across and star-like.

A side track branched off to the left and brought us to another part of the Rivere Madeleine which at that point flowed over a lovely waterfall. The soil here was more in the nature of a rotten rock and I was informed that it contains up to about 60 per cent iron. Growing commonly in this impoverished looking iron soil was one of the plants I was especially seeking, *Callitropsis araucarioides* L.M. 146. It is a low spreading tree up to 30 feet high, but in this locality only about 12 feet, and of very open habit. It has a very limited distribution in the southern part of the island where it is found in five localities and always on the iron plateaux. Plenty of seedlings were to be found around the trees and in the loose rubbly soil it was easy to lift them with a good root system.

Growing along the banks of the river and, as with *Podocarpus palustris,* often growing in the water, was *Dacrydium guillauminii* L.M. 145 which was another plant I had been especially requested to collect. *Dacrydium guillauminii* is a straggly shrub up to 6 feet although sometimes more, the leaves are about $\frac{5}{8}$ inches long, light green and, in the juvenile stage, differ by being smaller and finer than the adults. As the river was in flood most of the bank where seedlings might be found was under water; however, a thorough search produced a few. Even quite small seedlings had a tap root which went straight down to a great depth and which made them difficult to lift. This species is apparently notoriously hard to grow and so a liberal quantity of cuttings was also secured. Also amongst the rather tangled mass of stems along the bank was *Podocarpus novae-caledoniae* L.M. 143, which is a small shrub growing from 3 to 6 feet in height. The lanceolate

leaves are up to $2\frac{3}{4}$ inches long by a $\frac{1}{4}$ inch wide, dark green on top and somewhat glaucous underneath. It is found growing along the banks of rivers in the south and is characteristic of the sepentine areas. Several orchids were common in the scrub but as they were not in flower it has not been possible to identify them. About 3 o'clock we returned to the jeep and started on the road back to Noumea where we arrived an hour and a half later. Luc Chevalier arranged to meet me in the morning at 8 o'clock to take me up Mont Dzumac which is just north of Noumea and in the Chaine Centrale.

Just after 8 o'clock the next morning we set out of Noumea, past the white cross which marks the site where the guillotine stood, and on to the Route Coloniale No. 1. At La Dumbea which is just 8 miles north of Noumea we turned off into the Dumbea Valley and then, after going a short distance up a side road, we started climbing up a rough dirt road on to Monts Kouleve and Dzumac. We were very lucky because this road had only been formed recently to investigate a new chromium deposit and it saved us quite a long walk. At first the road passed through Niaouli country many of the trees showing evidence of the frequent fires which often occur during the summer in that type of country. Fortunately the numerous layers of thick papery bark protect the trees from serious injury.

At about 500 feet the Niaouli trees thinned out and were replaced by serpentine maquis. The shrub which attracted my attention most in the lower serpentine maquis was *Grevillea exul*. It is an upright bush to 6 feet or so in height, with grey-green, lanceolate leaves 3-4 inches long and erect racemes 4-5 inches long. The flowers are white and altogether it is a very attractive shrub but unfortunately I could find no seed of it that had not been spoilt by insects. *Leucopogon septentrionalis* was quite common throughout the scrub and a little higher up we came across *L. albicans*. While I had been able to recognise the other species quite easily *L. albicans* was quite distinct and not so easily recognised as a *Leucopogon*. It makes a bush 3-4 feet high with greyish, ovate leaves and a white pubescence underneath. Between Mont Kouleve and Mont Dzumac at about 3000 feet the road started passing through patches of humid cloud forest and we started to keep a watch for *Dacrydium balansae*, the object of our visit to the locality. A short distance further on Luc stopped the jeep by a large tree of it which grew by the roadside, and we climbed out to search for seedlings. *Dacrydium balansae* L.M. 188 somewhat resembles a scraggy rimu in general appearance, but the foliage is heavier and of a darker green. It will grow to about 60 feet in height, and is confined to the southern regions where it is found in rather humid localities. A search in some scrub about the road rewarded me with about half a dozen seedlings, which were duly transferred to a plastic bag.

The road came out of the forest and into scrub country again and after a series of very steep zig-zags we arrived on La Premier

Col near the top of Mont Dzumac. From the Col there was a magnificent view on one side, down the length of the Dumbea valley and over to Noumea and on the other side into the upper reaches of the Tontouta valley. Unfortunately the view was soon spoilt by rapidly lowering cloud which frequently clothes the mountain tops and maintains the humidity in the humid cloud-forest.

In the scrub on the Col were several species of orchids, *Dracophyllum* a small shrub with attractive pink lantern-shaped flowers, *Beauprea paniculata* (?) *(Proteaceae)* and an unidentified iris-like plant (L.M. 211) which has spikes of yellow flowers. Across in the head of the Tontouta valley was a patch of forest from which could be seen protuding the tall columnar silhouettes of an *Araucaria* species. From a distance the forest appeared just like any New Zealand bush but the tall columnar shapes of the *Araucaria* towering far above the other trees lent it a very strange appearance quite different from anything we have in New Zealand.

Rain was threatening to fall so we hastened back down the road which tested not only the jeep but also its occupants, and in one of the patches of forest we stopped for some more collecting, which proved quite fruitful. Six species of epiphytic orchids were found, three species of *Selaginella*, a *Freycinetia* sp. L.M. 196, with attractive purplish foliage, and several ferns. The collecting finished we bounced and jolted down the road and returned to Noumea where I spent most of the afternoon sorting and packing the last day's collections. By this time I had enough to fill three large cartons tightly packed and I was becoming increasingly concerned as to how the plants would fare packed in the warm conditions in Noumea. However, most of them lasted surprisingly well.

TREES ON STREETS AND ROADSIDES

DR. J. S. YEATES, Ph.D. (Cantab.), Ph.D. (N.Z.), A.H.R.I.H. (N.Z.)

We New Zealanders rightly take a great pride in our country. We enjoy its beauty — unspoiled as compared with the man-made structures which dominate the landscape of more densely populated countries; most of us are quite certain that 'God's own Country' is one of the world's most beautiful — a view reinforced by the tactful praise which many tourists give so generously.

But is our smug satisfaction well founded? Are we as a nation preserving the beauty of our towns and our country? Many of us have serious misgivings about this.

The most important factor, that can make or mar the beauty of our roads and streets, is the growing of trees. Look at pictures of any of the world's most beautiful cities and you will find the trees are plentiful there. A recent news picture near the centre of Buenos Aires for example, showed eight—yes, eight rows of trees in the wide street.

The beauty of London, of Paris, and of many other great cities is largely the beauty of tree-lined streets.

Nor are the great cities alone in using and carefully tending trees, to enhance their glories. The smaller cities and the towns and villages, of many old-world countries, take great pride and joy in their street trees, while the roadsides are known for their abundance of trees also.

What are we doing in this country? Our fathers and grandfathers had vision enough to plan wide streets, when laying out most of our towns and cities. These streets must have seemed ludicrously wide when they were laid out — in a period when transport was by railway for most, by horseback or horse-drawn carriage for the few. They not only made wide streets in those days, but they planted them with good trees — oaks, and planes and chestnuts and the like. Many of the streets in Palmerston North were good examples of this foresight — Fitzherbert Avenue, leading from the city towards Massey College is one example.

How are we carrying on the task started by these early city fathers? Mainly by removing trees in these avenues, because we consider our towns too large and busy to put up with them.

Over the last 30 years, there has been remarkable progress in our cities, if we may quote Palmerston North as an example. A few at a time, these trees have been removed from the central parts of the town — the very place where they are most appreciated. Strong protests have been made, but 'progress' is inexorable. Only this winter, an avenue of fine old trees has been removed from the street aptly called 'Broadway', merely to make more room. The fact that these avenue trees are all in the marginal strip of pavement used for parking seems to make no difference. Other avenue trees have been removed in past years, because of a fear that the local authority might be sued if a motorist were to collide with one.

The excuses are many, the result is always the same — destruction of the tree.

All this destruction of old trees — to which the much lamented pohutukawas in Wellington's Courtenay Place are now added — is one matter. Perhaps we are atoning for this sacrilige by planting in the new suburbs of our rapidly expanding towns and cities. In fact, we are failing most miserably. The town planners and engineers who plan our suburbs seem to have one main idea, viz., to provide as many ratepaying building sections as possible to each chain of sewer that is laid. This is efficiency.

The result is narrow streets with no room for full-sized trees, and sections so small that the home-owners rarely have room to grow trees either. The overhead wires usually restrict tree planting, and where they do not, the narrow grass berm in the street must carry five underground services — electricity, telephone, water, gas, and sewer. No self-respecting tree could ever grow above that lot! Many of these new streets will develop into slums in the next 30 years.

Last year the writer spent a month on the Pacific coast of the U.S.A. from Vancouver down to Los Angeles, and had a close look at how street trees are treated in towns and cities there. This part of the U.S.A. has been settled and developed over about the same length of time as New Zealand has, and the people there have much in common with us.

They have treated trees very differently. Vancouver — a good British town — was notable for the almost universal use of trees in the streets. Electric wires and services were at the back of the sections — in many cases along a narrow service lane. In other cases in the U.S.A., the overhead wires were above the back boundary, allowing for good street trees. Some 30 years ago a subdivision in Palmerston North was reticulated in that way — the result is one of that city's most attractive and exclusive streets. The engineers responsible for giving permits do not like this scheme in New Zealand, so we must have our streets bare of trees and festooned with wires, and with poles which lean at varying angles to the vertical.

Right from Vancouver to Los Angeles we found the same care of street trees. In the small Californian town of Davis (population 10,000), where we spent some days, most, if not all, of the streets had fine avenues of shade trees right to the centre of the town.

In Los Angeles we could not claim to see the whole of the 50-mile wide city. What we did see around the Beverley Hills and Westwood Village area, impressed us deeply. The elms on the streets sometimes made a complete canopy right across the street. Los Angeles has a strong and active Tree Society which has the one aim of making sure that the city streets are planted with trees and, even more important, that the trees are properly cared for. One memorable sight was the avenues of *Jacaranda* in full bloom there in May.

One small example is typical of the care of trees, even by building contractors. In a busy part of Los Angeles, bulldozers were clearing an old building and excavating the soil for a new multi-storey block. Over a period of days we noticed a fine 15 feet high tree which was in the way. Finally it was moved with a very large block of soil, to a back corner of the area, ready for re-siting when the building was ready.

Unless the few tree-lovers in this country can give more support, we are going to have a very dull and uninteresting landscape in the future. The parks and superintendents in the various cities do their best, but they are in a minority, and the majority are generally men whose training emphases efficiency rather than beauty.

There is a real need for some person with ability and a persuasive pen, to rouse the public conscience about our street trees.

One final point; compare the values of similar houses in tree-lined streets and in efficient bare streets, and you will find an answer as to whether street trees are considered worth while by the buyer.

CYCADS OF SOUTH AFRICA.

F. R. LONG, A.H.R.H.S. (South Africa).

The oldest forms of botanical flowering plants are classed under Gymosperms, or the naked seed bearers. These include some of the oldest and the fossilized remains of plants. In this class is placed the family *Cycadaceae,* consisting of some nine genera with approximately 90 species.

The cycads embrace the following genera:

Macrozamia of Australia
Cycas of China, East Indies, Malabar
Ceratozamia of Mexico
Dioon of Mexico
Microcycas of Cuba
Zamia of Central America
Encephalartos of South and Central America
Stangeria of South Africa

The total number of species in the world is about 90 and, of these, South Africa is responsible for about 24.

These groups are, to me, fascinating, lovely and majestic plants. They are palm-like, but with stiff and sometimes prickly leaves; they grow to an immense age, some into the 500 year and more periods. Some species are dwarf, but others grow to 50 feet in height, such as the Mexican *Dioon spinulosum,* and the South African *Encephalartos transvenosus* (1). It is of the South African genera *Encephalartos* and *Stangeria* that I now wish to set out what I know of the various species growing in their natural habitats, as some of the illustrations will show.

Encephalartos (artos — food or bread: cephal — head; en — in) embraces some 24 species. They are known as 'Kaffir Bread Fruit', as the pith of the trunk is occasionally used as a food by the natives. It is rich in starch. Some of the other genera mentioned above such as *Cycas* and *Dioon,* supply sago, starch and arrowroot.

As I have indicated, many of the *Encephalartos* grow to a very old age, when they form trunks which are solid, often 30 feet or so high, and some 2 to 3 feet in diameter, and are very heavy. These trunks are easily transplanted. In fact, if they are dug up and left around for days, they will survive when transplanted to a fresh locality. They are very slow growing. From seed you will obtain only a very small plant after 5 years from planting.

Some years ago I came across two dozen sprouting seedlings of *E. lehmanii* (2) at the base of a female trunk growing near to Jansenville, 50 miles north of Port Elizabeth. I took them up carefully, potted them, and, after 3 years, I sent them to all the chief botanical gardens of the world, in Europe, U.S.A. and Japan. They were delighted to have them, and I was able to ask for almost any rare plant in exchange.

It will be gathered that *Encephalartos* is not a practical garden plant. It is quite impossible to raise the species from seed, and expect a specimen in a year or two. The rate of growth is too slow for the average garden. But, eventually, they make grand specimen plants for the rockery, border or even for street planting. The head, or growing point sends out a whorl of leaves every year. Some are rigid, some are shiny green, others a beautiful grey-blue *(E. horridus)*, and then the graceful, curving leaves that fall down away from the stem.

They are all dioecious, and the female produces a large cone the size of a bread fruit, pineapple, or durian. These, when ripe, split open, exposing the seeds that surround the central core. The seeds, usually the size of Brazil nuts, have an attractive red skin (3), and germination is slow. The male flower is similar but not so robust. The scales open up, send out the pollen, and then shrivel up.

This truly African genus, comprising some 24 species, is found in many parts of the country, from the south coast of the Republic to Central Africa. The species are very local and, as far as I know, no hybrids have ever been reported. Those that are found in the west of the Eastern Province are not found in the eastern side.

To lead off with the species that is found west of Port Elizabeth, this is found only as far as Grahamstown and a few miles inland, viz, *E. longifolius* (4). This species was first recorded by the botanist Thunberg, and was known as *E. caffer*. Another local rarity is *E. horridus* (5), which has a restricted habitat round Port Elizabeth, inland for some 30 miles, and nowhere else. Where this species leaves off, one finds *E. lehmannii* (2), but one never finds them together. E. *longifolius* (4) I have found a few miles from hundreds of groups of *E. lehmannii,* one on the south and the other on the north slope of a mountain range, but never together.

E. horridus (5) and *E. lehmanni* (2) are two lovely plants with leaves of grey-blue, the former rigid and prickly, and the latter more graceful, without prickles. The members of our local wild flower society recently came across *E. horridus* within the building zone of our town and, according to Dr. Dyer, this may be the type area of Thunberg, the early Cape botanist.

Moving further east along the coast, one comes to the town of East London but, before this, only some 40 miles from Port Elizabeth, there is found a comparatively rare species viz. *E. latifrons* (6), and, as far as I know, this is growing only in two areas, namely De Kohl and Trappes Valley. I was instrumental in moving a limited number of this rare species to the Government Botanical Headquarters in Pretoria, and two to the parks at Port Elizabeth.

Then, in the East London area, there is the beautiful *E. altensteinii,* a graceful plant running into the 6 feet class. The central garden strip in one of the main roads of this city is a line of *E. altensteinii,* which must be unique in the world. Another species, quite dwarf and practically stemless, is *E. villosus* (7) which has long graceful leaves rising more or less from ground level.

Turning inland and going north, one comes across quite a distinct species. This is *E. cycadifolius* (8), which is found in the hills round about Queenstown and Cathcart, and certainly not more than within a radius of 50 miles. Some of these plants are 20 feet high, standing out conspicuously on the steep hillsides. Many miles north, into the Transvaal, there is a place called Duivelskloof, and here in the rain forest are found 'Modjaji Palms' viz. *E. transvenosus* (1), now preserved as a national monument, and protected by the Provincial Administration Nature Conservation Department. One illustration will give the reader some idea as to the quantity one can find growing in one area. Another picture will show the height of this magnificent 'palm' (?), also some idea may be formed of the nature of the habitat, namely steep, hilly, rocky country.

Another Transvaal species viz. *E. eugene-maraisii* (9), which was only discovered in 1944, is a very rare one from the Waterburg district near to Naboomspruit. This goes to show that there are many new plants yet to be discovered in this vast country of ours, with so many varied climates. *E. eugene-maraisii* has a distinct curve at the end of each leaf, and altogether is most attractive.

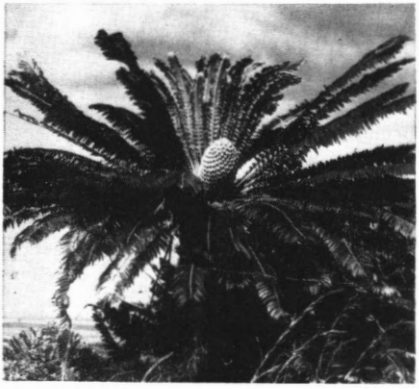
Travelling still further along the coast, past Zululand and almost into Portuguese East Africa, I have found another species, namely *E. kosiensis*. Here, on a small hillock, I saw a group within a mile or two of Kosi Bay. I believe that General Smuts was the first botanist to discover this species. It is also found in Southern Rhodesia, where it is known as *E. ferox*.

I have no personal knowledge of the cycads found further north in Central Africa, Nyasaland, Congo etc. such as *E. gratus, E. manikensis, E. poggei, E. lanatus, E. paucidendatus* and others.

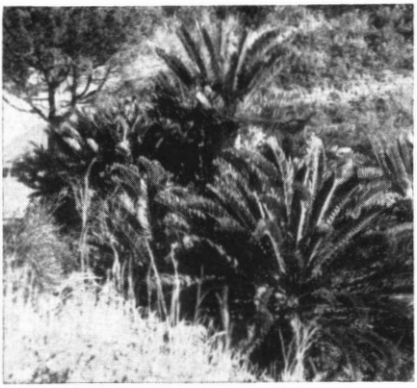
I would like to mention another genus viz. *Stangeria,* found near to East London, and parts of the Eastern Province. *S. paradoxa* is the only species and it is a low growing plant of botanical interest.

As an old parks official, I should like to emphasise the desirability of using *Encephalartos* to embellish roadside lay-outs, such as rockeries on the sides of a road cutting. Here, where soil is not too good, and perhaps the water supply is non-existent, I like to plant cycads and aloes for a permanent show. One is assured that they will withstand strenuous conditions and give of their best. In fact, if anyone were to return in 50 or even 100 years, they would still be looking as charming as ever, especially if a clump or two of *Strelitzia reginae* were added to the lay-out to give added colour to the landscape. Cycads are most effective in factory gardens (10), calling for little upkeep.

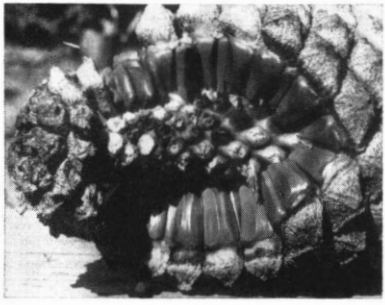
It will be gathered that cycads like a well drained slope, and they are never found in marshy ground. They are very local and each species is confined to its own area. In other words, they are not found mixed with one another.



Encephalartos transvenosus (female).
(See Page 368).

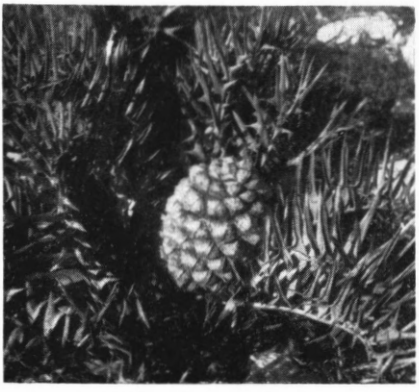


Encephalartos lehmannii.
(See Page 368).



Part of ripe cone; scales are yellow, seeds red.
(See Page 369).

Encephalartos longifolius (female).
(See Page 369).



Encephalartos horridus.
(See Page 369).

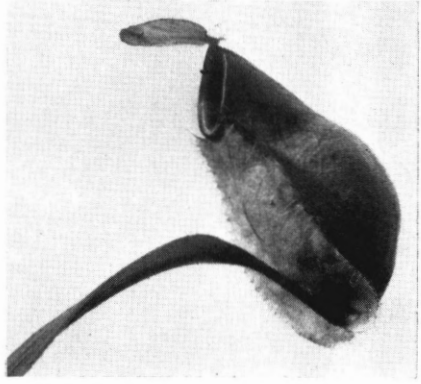
Encephalartos latifrons.
(See Page 369).

Encephalartos horridus (large) and E. lehmannii to the right.
(See Page 370).

Encephalartos villosus.
(See Page 369).

Encephalartos cycadifolius.
(See Page 370).

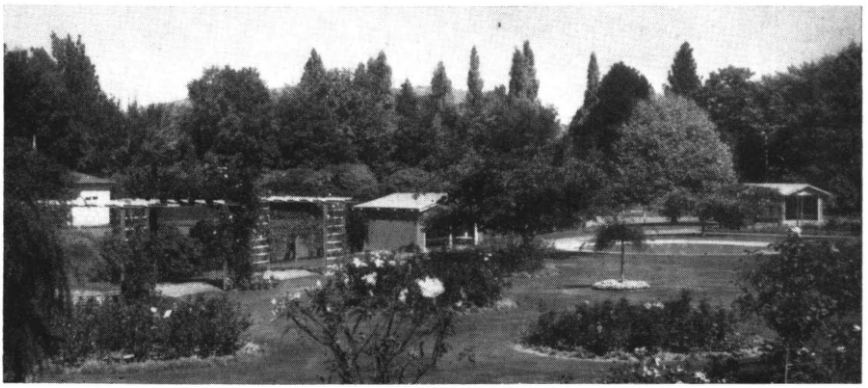
Encephalartos eugene-maraisii.
(See Page 370).



Pitcher of Nepenthes ampullaria, a Malayan species. (See Page 348).

Hypericum leschenaultii
(See Page 373).

(Photo. Douglas Elliott).

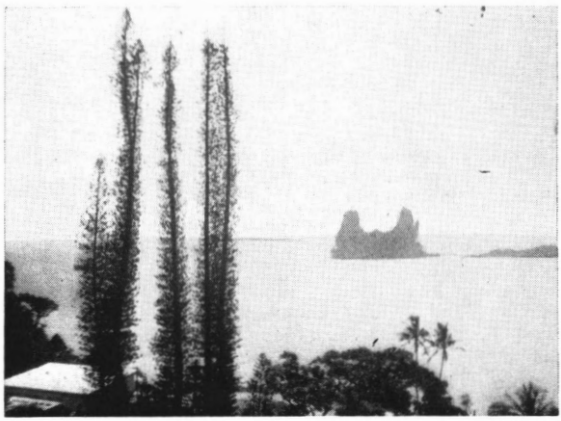


(Photo N. S. Seaward's Studio.)

Part of Victoria Park, Waimate, showing fine specimen trees.
(See Page 371).

Plant Hunting in New Caledonia: Dracophyllum verticillatum growing in maquis near Oune. (See Page 362).

Plant Hunting in New Caledonia: The Roche Percee near Bourail.
(See Page 359).



Plant Hunting in New Caledonia: The tall columnar pines (Araucaria cookii) with the Tours Notre - Dame at Heinghene.
(See Page 358).

Plant Hunting in New Caledonia: Grevillea exul growing in the maquis on Mont Dzumac.
(See Page 364).

PARKS AND GARDENS IN WAIMATE

R. G. LAPLANCHE (Superintendent Parks and Reserves).

Situated midway between Christchurch and Dunedin, stretching from the shores of the Pacific to the Hunter Hills, is the main portion of the Waimate district. Within this area a considerable variety of horticultural interest may be found. A large proportion of this country was originally covered with indigenous bush and forest, predominantly *Podocarpus totara.*

According to stories of some old identities, some of the largest totara in the country grew in this area. One man can remember his father 'turning a dray' on the sawn stump of one. A disastrous fire, in November, 1878, lasting eight days, destroyed large areas of bush and spelt finis to the growing timber industry in the district. Parks and reserves in Waimate itself are of an amazingly high standard, embracing many features of the larger city and botanical gardens. Victoria Park, the main gardens of the town has, among the various attractions to be seen, rose gardens, *Laburnum* 'Summer House', and a 5 feet high rock wall constructed around a banked cycle track. Planted in sunny borders on top of the wall is a collection of shrubs, and among those of special interest is *Kalmia latifolia,* planted nearly 30 years ago. Although stunted, it is amazing to see how well this specimen flowers each November. The rock wall itself provides a happy home for such plants as *Alyssum saxatile, Lithospermum prostratum* and *L. rosmarinifolium, Helianthemum* spp., *Gazania* spp., *Aubrieta, Cerastium tomentosum,* also trailing plants such as *Cotoneaster horizontalis* provide winter colour on the wall.

This Park is noted for the seasonal bedding displays set out in long sweeping beds and borders, which are ideal for massed or ribbon effect. In selected borders massed displays of *Begonia multiflora* 'Flamboyant' and 'Frau Helene Harmes' have proved most effective, while such useful plants as *Iresine herbstii, Alternanthera, Cuphea ignea* and *Celosia* are used for formal effect. All plantsmen appreciate the value of geraniums, especially in Canterbury, for bedding. We consider the well known 'Soldier's Tunic' still one of the best for this purpose. With good natural drainage in the flower borders, modern hybrid cannas are being used successfully in bedding out. Winter flowering pansies are also featured in massed displays. Visitors to Victoria Park are surprised to find, in addition to all other horticultural aspects a display house where the public may view seasonal shows of begonias, gloxinias, hydrangeas, *Streptocarpus, Primula malacoides, P. obconica, P. stellata,* cyclamen, poinsettias, cinerarias, and orchids such as *Cymbidium, Cypripedium,* and *Epidendrum.* Tropical and subtropical foliage plants are displayed in groups. This display house was made possible by the generosity of the late Dr. V. E. Galway.

Tree planting in Waimate Parks in the past has been well carried out. In Victoria Park nearly 100 *Quercus robur* (English Oak) were planted over 10 years ago; today they provide a green canopy over a large area of the 18 acres comprising this park. A few trees of special interest are *Cupressus macrocarpa,* a perfect form with branches sweeping to the ground all round. *Pinus ponderosa* (yellow pine), a lovely group of *Acer palmatum, Cercidiphyllum japonicum,* 'Katsura Tree', *Paulownia imperialis* and *Cedrus deodora* and *C. libani.*

In Knottingly Park within 80 acres may be found large specimen *Pseudotsuga douglasii* (Douglas Tree), *Sequoia gigantea* (Big Wood), *S. sempervirens* (Redwood), *Pinus austriaca,* while plantings during the past 30 years include group planting of *Betula alba* 'Pendula' (weeping silver birch), *Quercus coccinea* (scarlet oak), *Liriodendron tulipifera* (tulip tree), *Castanea sativa* (sweet chestnut), an attractive and useful collection of *Chamaecyparis lawsoniana* (Lawson's cyprus), which have, up till now, been free from the troublesome fungus disease prevalent among this species. Some very fine specimens of *Larix europaea* (common larch), are nearly 100 feet high. In the lily ponds, *Taxodium distichum* (swamp cyprus) is performing well, although planted in 3 feet of water.

Various bush reserves, providing seclusion and interesting native flora, are within five minutes' drive of Waimate. Most popular of these is Kelly's Bush.

Besides parks and reserves activities in Waimate many aspects of horticulture are to the fore. Tulip growing on a large scale has been, and is still being carried out by a number of people. A few years ago one farm alone had 10 acres of tulips under cultivation. Other species of bulbous plants are grown *en masse* as well. *Hyacinthus* and *Fritillaria* spp. are being propagated in various ways by growers in the district. The efforts of Mr. J. McClintock are worthy of mention. This man propagates an amazing variety of plants, mainly by cuttings. He attributes the success of his efforts largely to the extensive use of rotted pine needles. The evidence is certainly there for all to see.

Few active private gardens in New Zealand are up to the standard of 'Centrewood', the home of Mrs. and the late Mr. J. W. Hayes. This lovely garden was originally laid out in 1892 when rose gardens, specimen trees, and a large aquatic feature were introduced. Over the years, new and interesting specimens of *Agathis australis* (kauri), *Metasequoia glyptostroboides* (dawn redwood), *Ginkgo biloba* (maidenhair tree), *Davidia involucrata* (dove tree), *Parrotia persica* (Persian witch hazel), have been established. The planting of good shrubs has not been neglected. A lovely 25 year old *Camellia reticulata,* judiciously pruned each year, is one of the best plants in the garden. Extensions to recent plantings at 'Centrewood' have seen the introduction of a good number of very choice rhododendrons and azaleas. Mrs. Hayes, who speaks with authority on this subject, visited England a few years ago and

spent a considerable time at the well known gardens of 'Bodnant', 'Exbury' and 'Leonardslee'.

Among established plants at 'Centrewood' may be found the following species and hybrids:—

From 'Bodnant', famous for blood red and scarlet: *Rhododendron* 'Elizabeth', *Rhododendron* 'Ethel', *Rhododendron* 'Dainty', *Rhododendron* 'Dorinthia'.

From 'Leonardslee', home of the Loder family: *R.* x *loderi* 'Venus', *R.* x *loderi* 'Pink Diamond', *R.* x *loderi* 'King George'.

From 'Exbury': *Rhododendron* 'Grenadier', *Rhododendron* 'Fusilier'.

Also on this visit to England, plants of the 'Exbury' (Ghent type) strain of azaleas were sent home to Waimate. Such named varieties as 'Sun Chariot', 'Gibraltar', 'Eisenhower' and 'Golden Sunset' being included. These plants now flower side by side with selected specimens of the well known 'Ilam hybrids' from the garden of the late Edgar Stead. It is the considered opinion of many authorative people that the best of the 'Ilam hybrids' such as 'Irene Stead', 'Scarlet Knight' and 'Ilam Canary' compare favourably with any other strain in cultivation.

This garden of Mrs. Hayes is a revelation to visit, for its design has more in common with the spacious days of the past than with the small scale ideas forced on us by today's economic necessities.

A noted long-term contributor to horticultural beauty in Waimate is Mrs. J. C. McKenzie, who has a vast knowledge of trees and shrubs, their needs and environments, and methods of propagation. Plants of special interest in Mrs. McKenzie's garden are *Magnolia campbellii,* 20 feet high and one of the best of this species in the district, *Rhododendron* species such as *R. nuttallii, R. griffithianum, R. williamsianum,* while selected forms of *R. augustinii,* raised by layering and cuttings, are gems of the garden when in bloom.

Two 20-year-old *Eucalyptus ficifolia* (scarlet flowered gums), planted in a sheltered position, bear evidence each flowering season of the careful covering and protection given during their first few winters.

It appears significant that the two outstanding personalities of horticulture mentioned are both women. There is no doubt, I am sure, that the woman folk of New Zealand have made a wonderful contribution towards furthering the interests of Horticulture, and beautifying the countryside.

TWO GOOD HYPERICUMS.

DOUGLAS ELLIOTT (New Plymouth).

Hypericums are not new to New Zealand gardens but they have staged a revival of interest through two good forms being made available during the past few years. These are *H.* var. 'Hidcote Gold' and *H. leschenaultii.*

It seems that what is sold here as 'Hidcote Gold' is usually called 'Hidcote' in England where it is very highly thought of, as evidenced by its being given the R.H.S. Award of Merit on July 27th, 1954, and the Award of Garden Merit on November 2nd of the same year. 'Hidcote Gold' is considered to be a variety of *H. patulum,* which is a native of China and Japan; but there is some doubt about its actual origin. It is even said it was raised from seeds sent to England from Kenya. In any case it may be a hybrid between *H. patulum* and *H. leschenaultii.* A round compact bush, it is usually 3 to 4 feet high, but according to the R.H.S. *Journal,* it is capable of reaching 6 feet and as much across. The branches are graceful and the evergreen leaves are touched with bronze on the young shoots. Suckers are freely formed, providing a ready means of propagation. The clear yellow flowers are about 2 inches across but in my experience are too sparse to make this a good garden plant in mild districts. I have seen photographs which indicate that it is much more floriferous in England.

H. leschenaultii appears to be a very much better shrub for mild climates. The flowers have more substance and though they may not be quite so golden are larger (up to 3 inches across) and bloom in an almost non-stop supply through the year. Even in mid-winter quite a number are open to brighten the garden, and to provide cut flowers for indoors. *H. leschenaultii* is not new, although it seems to be a recent offering in this country. A native of Java and other parts of Malay, it was discovered in the Javan mountains by Leschenault about 1805. When it was introduced to the British Isles is not known definitely, but it was flowering in Ireland in 1882. W. J. Bean, in his *Trees and Shrubs Hardy in the British Isles,* says that it is in combined size and richness of flowering, the finest flowered of all hypericums. It will grow up to 12 feet, but in gardens is normally 4 to 5 feet with upright branches. It is certainly a good plant for New Zealand gardens. It is sometimes listed as a variety of *H. hookerianum.*

THE *LEPTOSPERMUM* AND *HEBE* CULTIVAR COLLECTIONS IN THE CHRISTCHURCH BOTANIC GARDENS.

In 1961, when the redesigning of the Cockayne Memorial Garden was in progress, the Royal New Zealand Institute of Horticulture arranged with the Director of Botanic Gardens for provision to be made to include a collection of all the available cultivars of *Leptospermum.* This was essential for the work of the Nomenclature Committee of the R.N.Z.I.H. as, until then, there had been nowhere where a collection of these plants could be grown together, and be readily available to members of the committee and the public.

Requests for plants were made to members of the trade by the R.N.Z.I.H. and the Horticultural Trades' Association, and in October of 1961 the first plantings were made. Most of these plants grew remarkably well, and within another year or two this bed should be

quite a feature. Again this year, through the generosity of one or two members of the nursery trade, some more varieties were added to the collection, including one new one which was scheduled for release this season. Most of the readily available cultivars of *Leptospermum* are now here although some of the older ones such as *L.* 'Walkeri', 'Boscawenii' and 'Chapmanii' are missing and may even be impossible to obtain. As well as the cultivars, a selection of forms of *L. scoparium* will be grown for purposes of comparison.

Although the Nomenclature Committee is not yet working on cultivars of the genus *Hebe,* it was decided to start gathering together a collection of them, so that when the time came there would be at least a representative collection awaiting. Most of the readily available cultivars have now been gathered together, and also about 18 English raised varieties were sent out by the Royal Botanic Gardens, Kew.

These two groups of plants are a considerable improvement to the Cockayne Memorial Garden and as well as having a definite value to the R.N.Z.I.H. they are also very colourful and interesting to the public.

L. J. METCALF, N.D.H. (N.Z.).

NOTES FROM THE CHRISTCHURCH BOTANIC GARDENS

L. J. METCALF N.D.H. (N.Z.) (Assistant Curator)

In common with many other parts of the country, the winter in Christchurch has been very mild and, while most plants do not appear to have been unduly influenced by the mild weather, some, notably the blossom trees, have flowered up to two months earlier than usual. This year plants such as *Acacia baileyana* and *Prunus mume* commenced flowering in May and Australian plants in particular have responded wonderfully well to the season. One problem associated with these conditions was the phenomenal growth of grass which was very difficult to mow with the prevailing wet conditions.

May this year was the warmest on record in Christchurch and the mean temperature for the month was 6°F. above normal. In June both air and soil temperatures were considerably above normal, while this July was the warmest since 1928, the mean temperature being 45.2°F. Sunshine has been just slightly below average, with rainfall about average, and frosts generally have been not quite so severe.

While favouring the outside work, the weather which has prevailed over the past few months has also favoured some pests and diseases and created extra work with spraying. Even in the best run botanic garden or public park a certain number of pests and diseases is always present; although taking into consideration the quantity and variety of plants grown the number of pests and diseases is surprisingly small. Perhaps this is due to the fact that the balance of nature is less disturbed in a botanic garden, than it would be in an area where intensive spraying may take place. There is no doubt that where there is an abundance of birds and other natural predators many pests are kept at a minimum.

However, there are always some pests and diseases which require artificial controlling and to do this properly it is necessary that there be a definite schedule of work. Accordingly, in early 1961, a spray schedule covering the Botanic Gardens for a complete year was made out. It is still largely in the experimental stage, but already it is proving to be of considerable value. This schedule will need altering in the light of further experience, and probably 2 or 3 years will be necessary before its true value can be assessed.

The schedule is made out in 5 columns. The first gives spraying dates, the second the pest or disease, the third lists possible hosts in the Gardens, the fourth the spray and quantity to be used, and the last column is for notes relating to the number of applications or other relevant information. At present some 22 pests and diseases are listed although not all of these are widespread in the Gardens and some do not require regular spraying but only at the odd times when they may appear. The schedule will enable a check to be kept on these. April is the month when the least spraying is required, and so the spraying

year has been commenced at this month. There is a gradual increase until the peak months of from September till January are reached, and then spraying tails off rapidly until April comes around again.

The disease which claims the most attention throughout the year is mildew. Powdery mildew of roses *(Sphaerotheca pannosa)* being the worst, and there is no doubt that the very dry conditions which generally prevail in the Gardens during the latter part of the summer greatly favour the spread of this disease. At present a mixture of Karathane and colloidal sulphur is being used to control this disease and providing nothing interrupts the spraying programme a good control is usually obtained. Other powdery mildews, which are sometimes present, are powdery mildew of apples *(Podosphaera leucotricha)* which is occasionally found on some of the varieties of *Malus,* and powdery mildew of *Euonymus (Oidium* sp.) which often infects the varieties of *Euonymus japonicus,* certain varieties being more susceptible than others. Of the downy mildews the only troublesome species is *Perenospora grisea* which attacks several species of *Hebe* and in the *Paniculatae* group containing *Hebe hulkeana,* its attacks can be so severe that the plant is killed. This mildew may be troublesome at any time of the year and, with the mild conditions experienced last winter, it was evident on some plants throughout the season.

The red mites are next in importance and, in addition to the plants usually infected, e.g., roses, *Malus,* and one or two species of conifer, seasonal conditions may cause other plants to be temporarily infected. Here, as with the powdery mildew, the prevailing dry summer conditions greatly encourage the spread of this pest and with seasons, such as last summer, the amount of spraying necessary is greatly increased. This year in addition to the usual sprays Tedion is being tried. However, as it does not kill but sterilizes the females and their eggs, it will be some time before the efficiency of this product will be noticed.

Oyster shell scale *(Lepidosaphes ulmi)* used to be troublesome on *Malus* but systematic spraying with winter oil over the past few seasons has brought it under control. Most other scale insects appear to cause little trouble and are not frequently seen. Probably the only other one that causes any real trouble is the *Euonymus* scale which sometimes becomes prevalent on the evergreen *Euonymus.*

One or two species of rust fungi have proved themselves troublesome, and at the appropriate times of the year preventive sprays are applied. The worst offender is *Puccinia distincta* which attacks plants of *Bellis perennis* used for bedding. This rust is liable to appear on the plants soon after they have been pricked out, and the attack reaches its peak during the warm, dry nor'-westery weather of September, often resulting in the complete collapse of the plants. Normally three preventive sprays, one just after pricking out, another at bedding out time, the last in August, will keep the *Bellis* free of rust. This winter very wet and mild conditions favoured the rust and much extra spraying

has been necessary. *Pelargonium* rust *(Puccinia pelargonii-zonalis)* is usually only troublesome on bedding geraniums late in the season, but under glass occurs all the year round.

In the New Zealand alpine garden certain species of *Celmisia (C. coriacea, C gracilenta* and *C. monroi)* are attacked by *Celmisia* rust *(Puccinia celmisiae)* which forms characteristic orange pustules on the leaves and gradually the plants become so weakened that they die. With all of these rusts the standard mixture of lime sulphur and colloidal sulphur is used as a spray.

The juniper cluster moth or juniper web-worm as it is known in the U.S.A. is becoming somewhat prevalent on some of the conifers such as *Juniperus communis* 'Compressa', *Juniperus squamata* var. *meyeri* and *Thuja occidentalis* 'Rheingold'. The larvae live in colonies of interwoven small pieces of dead foliage, etc., and consequently it is difficult to reach them with a spray. Where small bushes are involved the colonies may be pruned out but in larger bushes spraying is necessary. A D.D.T. spray appears to be the best but the time of spraying is still subject to experiment. In the Gardens the larvae are known to be active in July and, at present, spraying is based on the assumption that it should start then and continue at intervals until October, when the adults will probably be on the wing.

Two fungus diseases which cause some trouble are silver leaf *(Stereum purpureum)* and coral spot *(Nectria cinnabarina),* this latter affecting a wide range of hosts. The first indication of its presence being the death of a branch and the appearance of the bright orange fructifications on the bark of the dead wood. As soon as it appears the infected parts must be cut off and destroyed and the wounds sealed over to prevent reinfection. Silver leaf is well enough known and in the Botanic Gardens it occasionally causes some trouble with the flowering cherries. A close watch is kept for this disease and, at the first signs of trouble, the affected parts are removed. A check is kept for wounds and dead branches which must be treated to prevent the entry of this fungus, although where such a large number of trees are being grown, a complete check of this nature is not possible.

As with the juniper cluster moth, mentioned above, the control of some pests is still in the experimental stage, and a little more will need to be known of their life histories before they can be incorporated into the spraying schedule.

NOTES FROM THE DUNEDIN BOTANIC GARDENS

R. W. BALCH, N.D.H. (N.Z.)

Botanic Gardens, Parks and Reserves in New Zealand towns and cities have an important role to play, quite apart from their primary purposes of providing plant life in all its many forms, whether it be

to please the eye, for botanical education, to preserve the native flora, or to provide turf for recreation. This purpose is to form sanctuaries for birds.

Although by no means perfect, the control of predatory animals such as cats, dogs and stoats and the protection afforded from attacks by boys and sportsmen, is greater in these public areas than anywhere else. Places for nesting and breeding, an abundant supply of such foods as nectar, seeds, berries, fruits and breadcrumbs, clear water for drinking and for swimming in, and space in which to fly, are all provided here.

Such introduced birds as sparrows, blackbirds, starlings, thrushes, wax-eyes, ducks, swans and geese are of course everywhere throughout the country. Here in Dunedin, however, we are particularly fortunate in having, almost in the heart of the city, quite a variety of native birds which, in recent years, seem to be present in increasing numbers. Native pigeons, bellbirds, tuis, fantails and grey warblers are most often seen, while a number of others are also present. Although kowhai and fuchsia trees are the main attraction, the pigeon is also particularly fond of *Laburnum* foliage, while last spring six tuis at the one time were seen on *Magnolia campbellii* when in bloom.

In order to increase the range of birdlife for the enjoyment and education of visitors to parks and botanic gardens, it is necessary to keep birds in captivity. An extensive, well-kept and well stocked aviary is always a great source of interest, particularly for visiting school teachers, with their classes taking nature study. Where the rarer native birds can be displayed, in addition to the exotic ones, it is doubly so. Providing space and facilities are of the required standard, it is possible to obtain permission from the Department of Internal Affairs to keep native birds in aviaries. This has been done in the Dunedin Botanic Gardens.

In 1948, the year of Otago's Centenary, some of the profits from the Centennial Horticultural Show were devoted to erecting an aviary in the Lower Gardens. At the same time a pheasantry, combined with the aviary, was presented by Mrs. I. M. Sedgley to comemorate the 100th anniversary of the birth of her father, Christian Eugene Remshardt. Since that date, an area for native birds has been enclosed and added, so that at the present time it comprises one of the largest displays of birds in captivity in New Zealand. Vermin-proof flights, with constant running water, have been constructed as naturally as possible with the use of split larch rails and manuka scrub to screen the galvanised pipes used as the framework for wire and cyclone netting. Specimen tree trunks have been built round, so that their canopy of foliage is retained above the roof netting. Where this is done it is essential to protect the bark of the tree trunks inside the flights with netting, otherwise the larger birds will destroy the bark and kill the trees.

Contrary to a general belief that aviaries require to be in the sunniest place possible, it is essential to provide coolness, shade and moisture, as well as sunshine. Shelter from rain, cold winds and heavy frost, is required. It is also necessary to renew living plants at frequent intervals, especially grass, tussocks, flax and freshly cut branches. Each flight has a roofed and enclosed area for shelter, which also provides space for feeding appliances and nest-boxes out of sight of the public. Slate and thatched roofs have been used here with good effect. To prevent the birds being fed by the public with unsuitable substances such as cigarette butts—which has happened, believe it or not—double netting, with a space of several inches between, is often used. It is necessary to restrict the use of netting to the minimum that safety demands, so that vision is as unrestricted as possible.

This year 24 different species of birds are on display, with a total of over 400 individual birds, ranging from tiny finches to peacocks. Among the exotic birds are also to be seen Golden and Amherst pheasants, Sulphur-crested and Galah cockatoos, cockatiels, Rosella and Red-rumped parrakeets, Barraband parrots, Peach-faced lovebirds, Chinese and Californian quail, canaries and quite a bewildering collection of budgerigars. The native birds include kiwis, keas, kakas, pigeon, wekas and parrakeets. The kiwis have all been injured birds caught in rabbit traps or by dogs, which have been nursed back to health. The pigeon with a broken wing became too tame to be liberated. The kiwi, being a completely nocturnal bird, is difficult to display, as it resents being placed in daylight.

The feeding of this host can prove quite expensive, as sunflower, millet and canary seed are purchased by the half ton. Wheat, hulled oats, peanuts, apples, green vegetables and ox heart (for the kiwis) are also used in quantity. Built-in public collection boxes, and the sale of surplus birds, help to meet some of this expense. Many of the birds on display have been privately owned caged ones, which have been donated by their owners so that they may live in happier conditions, where they can still be seen and recognised.

Some species breed well in captivity, in particular budgerigars, quail, peafowl, pheasants, native parrakeets and lovebirds. A weka was hatched several months ago and is now a sturdy young bird. The kiwis lay an occasional egg, which is said to be the largest egg, in proportion to the size of the parent, that is known. Although both natural means and the incubator have been tried, no success in hatching a chick has yet been attained. At the moment another egg has been laid, which has been left for the birds to incubate. As approximately 80 days are required to hatch the 16oz. egg, which is 7 to 8 inches long, some time has yet to elapse before the result will be known.

Constant vigilance, devoted attention, and strict cleanliness, are essentials in aviary maintenance. The reward is in the interest taken by the visiting public, the delight of children, and the evident happiness of the birds themselves.

NOTES FROM THE WELLINGTON BOTANIC GARDENS

I. McGREGOR.

Visitors to botanic and major public gardens should always be able to find oases of colour, for at no time of the year need gardens be without it. In fact, such oases are frequently intensified and made all the more attractive by surrounding deciduous and flowerless plants. There are many beautiful and often long-flowering trees and shrubs and a wide choice of them, possessing attractive foliage characteristics, is available during autumn and winter.

Most of the plants mentioned below are relatively hardy and adaptable to varying soil conditions, desirable features for Wellington and coastal districts. Many are suitable for decorative purposes in the home and vases need not be without colour during winter months.

Hypericum leschenaultii continued to flower most profusely late into autumn and is even now carrying a good crop of its rich golden cup-shaped flowers. *Magnolia campbellii* produced its first blooms in mid-June, somewhat earlier than is usual in the gardens, due to the mild weather which has prevailed. This tree is always a magnificent sight throughout late winter.

Thryptomene calycina and *T. saxicola* 'Rosea' are most prominent South Australian shrubs producing prolific crops of flowers and requiring little attention when once established. *Adenandra fragrans,* with its soft pink flowers, and *A. uniflora,* the more prolific white-flowered species, possess similar characteristics to the thryptomenes and, in conjunction with them, are a focal point on the bank to the east of the Lady Norwood Rose Garden.

Some of the leptospermums are flowering well, notably *L. scoparium* 'Martinii' and *L. scoparium* 'Flora Plena Roseum'. *L. scoparium* 'Martinii', if propagated from good stock, is still one of the best of the manukas.

Among the *Grevillea* species are several deserving more attention from home gardeners. *Grevillea rosmarinifolia* is a well known vigorous grower. *G. asplenifolia, G. lavandulacea* 'Black Range', are rarely seen outside public reserves. *G. asplenifolia* is a spreading shrub up to 8 feet in height whose foliage, when young, is a delicate russet and attractive in itself. The flowers are plentiful in long spikes of rich red or rusty shades. The brilliant red flowers of *G. lavandulacea* 'Black Range', are prominent over a long season. The shrub is semi-prostrate and useful for rock gardens and banks.

Another *Grevillea* tentatively identified as *G. linearis,* is unusual, for the foliage is narrowly linear, light green above, downy beneath, and the habit open. Flowers are borne on short lateral shoots during winter and spring.

Some hybrid *Grevillea* varieties are becoming available and promise to be attractive, hardy plants.

In late June the Wellington Rose Society, in conjunction with the Parks Department, organised another successful rose pruning demonstration attended by between 30 and 40 enthusiasts on a glorious sunny winter's day. Such activities do much to increase fellowship among horticulturists, and impart knowledge to members of the public who come along to learn.

During their training the apprentices of the Department receive widely diversified experience and instruction in all appropriate fields and are also given responsibilities which promote zeal and interest commensurate with their experience. During recent years the replanting of rock gardens has been carried out and many interesting species and genera added. Miss Adrienne Carter, a senior trainee, has been largely responsible for recent work and is preparing notes about plants she has propagated and cared for, the first of which appears below.

In shady pockets of the upper rock garden are groups of *Cyclamen neapolitanum*. During late summer and autumn the pale pink flowers with corolla-lobes ovate and eared at the base, are freely displayed. The ivy-shaped, marbled grey and green foliage is attractive at all times. These *Cyclamen* are easily grown from seed and with the assistance of hand pollination, a simple process done with a small paint brush or with a thumbnail, a good crop of seed may be harvested from established plants. The pollination should be carried out in the heat of the day. Seed capsules are coiled in a watch spring of stem which unwinds to the ground when ripe. For young plants, protection against slugs is desirable. Established corms, which should remain undisturbed as far as possible, will produce good crops of flowers for many years.

PUBLICATIONS RECEIVED.

RHODODENDRONS OF THE WORLD by DAVID G. LEACH
(Allen and Unwin, London; N.Z. Price £6/11/0).

Since Millais wrote his two famous and now rare volumes on rhododendrons, there have been many excellent books written on the genus, but in general they have been somewhat limited in their treatment of the subject. Some have obviously been written by enthusiasts who knew parts of the subject from practical experience and who wisely wrote on those parts; others have covered a wider field and have been necessarily a result of experience that was partly at second hand. *Rhododendrons of the World* is obviously written by a man who is not only an enthusiast, but one who has had the leisure (perhaps 'opportunity' would be a better word; there seems little time for leisure in Mr. Leach's nature) to allow of a knowledge that is both first hand and extremely wide.

This is a large volume of 544 pages each 11 inch x 8 inch, made up of 13 chapters, 5 appendices covering more than 100 pages, bibliography, and index.

As some indication of the contents, the chapter and appendix headings may be quoted: *Rhododendrons in the Wild; Rhododendrons in the Garden; The Plant and the site; Planting and Caring for Rhododendrons; Rhododendron Species* (138 pp.); *Rhododendron Hybrids; Rhododendron Hardiness; Rhododendron Troubles and their Remedies; Propagation of Rhododendrons; Rhododendrons for less Favourable Climates; Rhododendrons for the Cool Greenhouse; Forcing Rhododendrons; Breeding Rhododendrons; Appendices: Complete List of Rhododendron Hybrids with their Parentage and Rating* (77 pp.); *Rhododendron Hybridists and Introducers; American and European Nurseries Specialising in Rhododendrons; Alphabetical Listing of all Rhododendon species with their Series and Subseries; Listing of obsolete and invalid species names with their correct names in current usage.*

One deliberate omission from the book is the deciduous azaleas. It is certainly not because Mr. Leach is not interested in them — he is very active in breeding them. Perhaps we can hope for a sister volume dealing only with azaleas!

In a review such as this, one can deal only with the general nature of the book. Perhaps the author's personality is the best guide. Mr. Leach is a man in his forties, with a college training in genetics, and lives in a small town in Pennsylvania, where he has business interests. In the words of his wife, he spends half of each year breeding and growing six acres of rhododendrons; much of the remaining six months is spent in travelling. That his travelling is not idle can readily be perceived from the first-hand knowledge he has given in this book.

What is more important than the vast amount of information he has put together, is the critical judgment he has applied to it, and the excellent un-ambiguous English in which it is written. In discussing topics such as soil acidity and *Rhododendron* growing, for instance, he gives all the facts and views which the practical gardener needs (and much more than any other book gives), but in addition he quotes the results of recent research, which have not previously appeared in horticultural publications.

Identification and treatment of *Rhododendron* pests and diseases is better dealt with than we have found in any other publication; propagation too is clearly and thoroughly described, with various practical hints that are the results of Mr. Leach's own experience.

As the largest chapter in the book, No. 5, *Rhododendron Species* merits some extra consideration. Leafing through the book, the reviewer was at first rather unimpressed by the line-drawings of leaf, flower, and seed capsule given with the description of the 150 species chosen for detailed description. The reader will soon find their value. They are not mere impressions of the species, but accurate and detailed drawings to scale, the result of thousands of measurements made by Mr. Leach. The drawings themselves are done by Edmond Amateis, an artist and also a *Rhododendron* enthusiast. A very experienced and

critical New Zealand *Rhododendron* grower considers these descriptions the best means available so far, for identification of *Rhododendron* species.

This is certainly the outstanding book on rhododendrons today, and is likely to remain so for many years. At the price of three or four good rhododendrons, the gardener has available a most absorbing book of reference which might well save its value in the advice it gives in choosing and caring for his plants.

J.S.Y.

GETTING STARTED WITH RHODODENDRONS AND AZALEAS, by Dr. J. Harold Clarke, Doubleday (New York), 1960. 268 pp. Price 4 dollars 95 cents.

Dr. J. H. Clarke is well qualified to write a book on rhododendrons and azaleas. As a former university professor of horticulture, now a commercial rhododendron and azalea grower and President of the American Rhododendron Society, he has had a great deal of experience of his plant material, and also of expressing himself most lucidly.

Although the title of the book suggests that it is for beginners, the subject matter is very well covered, within the limitations imposed by the size of the volume. The approach to the subject is cautious and critical, as would be expected of such a writer. The whole matter is treated in a thoroughly modern way, with little regard for outmoded ideas, and full emphasis on newer, logical methods. Readers will find much that is of value, even to those who consider themselves knowledgeable on the subject. Chapters include:—'How Rhododendrons differ from Other Plants'; 'Garden use of Rhododendrons and Azaleas'; 'Climate as affecting Rhododendrons and Azaleas'; 'Soil Requirements'; 'How to Care for the Plants'; 'Propagation'; 'Pests and their Control'; 'Rhododendron Species and their Place in the Garden'; 'Varieties for many Purposes'; 'Azalea Varieties'; 'Rhododendrons and the Plant Breeder'; 'Planting Beds for Many Places and Purposes'.

Altogether this is an excellent book, marred only by poorly printed illustrations in our particular copy.

J.S.Y.

CURTIS'S BOTANICAL MAGAZINE, Vol. CLXXIII, Part 3, edited by W. B. Turrell, O.B.E., D.Sc., V.M.H., F.R.S., F.L.S., published by the Royal Horticultural Society, London.

This and Part IV were particularly late in being published, but the quality of contents in no way suffered in the course of this delay. After the change-over, in 1948, to a new series, the coloured illustrations of the various subjects described appeared to pass through various phases. First there was the common art paper used for this purpose, which seriously affected the high quality of the magazine. This lasted for only a short period and the present form of reproduction seems to be the nearest we shall get to the highly finished reproductions of the old series. It is highly satisfactory and does justice to the artist's originals. In this issue *Greyia sutherlandii* is a colourful shrub from Natal that should be worth trying in New Zealand; *Hypericum elatum* in its Elstead Form was a familiar plant to me in England, more renowned for its brilliant red berries that appeared in summer, than for its clusters of small yellow flowers; *Primula whitei*, an attractive blue flowered species introduced by Ludlow and Sherriff from S.E. Tibet; *Kalanchoe miniata*, a colourful and attractive member of the *Crassulaceae*; *Rhododendron amagianum*, no doubt an attractive native of the Japanese island of Hondo, rose flushed crimson flowers

in small trusses; *Agapanthus patens,* an unfamiliar species from the Orange Free State; *Thymus doerfleri,* from the boundaries of Albania and North Macedonia, with a distinct appeal for alpinists; *Alnus viridis* subsp. *crispa,* a birch species with attractive catkins of brown and green; *Thunbergia battiscombei,* an unusual blue flowered perennial from the Nyanza basin; *Lathyras rotundifolius* x *L. tuberosus,* a hybrid perennial hardy at Kew, with clusters of bright red, pea-shaped flowers; *Epidendrum oerstedii,* an orchid from Costa Rica and Panama.

CURTIS'S BOTANICAL MAGAZINE, Vol. CLXXIII, Part 4, edited by W. B. Turrell, O.B.E., D.Sc., V.M.H., F.R.S., F.L.S., published by the Royal Horticultural Society, London.

Subscribers to this magazine and botanists generally will mourn the passing of its able Editor, the late W. B. Turrell, to whose memory the volume, this part completes, is dedicated. In this issue is illustrated *Rhododendron laxiflorum,* with a truss of pale pink flowers and considered by the late Mr. Lionel de Rothschild as perhaps the most attractive of the *irroratum* subseries; *Allium tuberosum,* of botanical interest but inferior to many other more colourful species as a garden plant; *Acer nikoense,* a maple from Nagasaki, with bright red foliage in autumn; *Kalanchoe jongmansi,* from Madagascar, is of spreading habit with small yellow flowers; *Dendrobium bracteosum,* an attractive orchid from New Guinea; *Gentiana makinoi,* from the main island of Japan, Honshu, with leafy stems and clusters of rich blue flowers; *Corylus jacquemontii,* a hazel nut from western Himalaya, with attractive catkins and, presumably, edible nuts; *Othonnopsis cheirifolia,* a leafy composite from North Africa with yellow flowers; *Antirrhinum majus* subsp. *litigiosum,* a pink flowered snapdragon from the Iberian Peninsula; *Moltkia suffruticosa,* a rich blue flowered borage from rocky places in northern Italy; *Selliera radicans,* one of our attractive alpines, with white flowers suffused pink and growing in marshy places.

PLANT PROTECTION IN GARDENS AND ORCHARDS, by H. Jacks, Senior Lecturer in Soil Science, Massey College, Palmerston North, published by the New Zealand Department of Agriculture, Bulletin 390 (1/6).

Experienced gardeners and fruitgrowers know only too well that they must continually watch their crops to ensure that they are not attacked by the diseases and pests which are a constant threat. They know too that modern science has made available a big range of chemicals (plant therapeutants) which if properly applied will protect their crops.

Efficiency of these therapeutants, classified as fungicides, bactericides, and insecticides, may be seriously affected by mixing two or more of them which may be incompatible and may, indeed, injure the plants they are meant to protect. On the other hand many of these chemicals are compatible and will make very effective mixtures to control a number of pests or diseases.

Their efficiency can also be improved by use of spreading agents and of adhesives to prevent their removal from the plants by wind and rain.

Basically, successful protection of ornamental plants, vegetable crops, and fruit trees depends on — Correct identification of the disease or pest; choice of the most effective therepeutant; correct preparation and application of the chemical, and protection of the plants when they are most susceptible.

Comprehensive advice on all these points is given in Department of Agriculture, Bulletin No. 390, *Plant Protection in Gardens and Orchards,* which is now available.

This bulletin should be invaluable to gardeners and fruitgrowers because of its ready-reference tables which give treatments for protecting ornamental plants, vegetable crops, fruit trees, and small fruits from most diseases and pests.

The bulletin was previously issued under the title *Disease and Pest Control in Gardens and Orchards*, but it has been considerably enlarged and revised and the new edition includes many illustrations that are an invaluable guide to identification of gardeners' troubles.

It is available for 1s. 6d. a copy at all main offices of the Department of Agriculture.

VINES UNDER GLASS, by F. Berrysmith, Horticultural Advisory Officer (Viticulture), New Zealand Department of Agriculture, Auckland. Published by the New Zealand Department of Agriculture. Bulletin 102 (2/6).

Most of the large, juicy, and delicious grapes which have been available in shops recently are the product of a thriving glasshouse industry mainly concentrated in Auckland, Canterbury, Manawatu, and round Oamaru. For the last two years the annual average production of these vineries has been about 200 tons of grapes, for which there is a keen demand.

Grapes are grown successfully in many kinds of glasshouses, but this success is the result of close attention to certain basic principles covering siting, ventilation, and heating of the glasshouse and proper training of the vines from the start.

Advice on these basic principles is given in a revised issue of Department of Agriculture, Bulletin No. 102, *Vines under Glass*, which is now available. The bulletin describes the best methods for ensuring a good crop from the design and building of the glasshouse through the planting, training, and culture of the vines. The section on disease and pest control is completely new.

The publication is well illustrated and is recommended as a handy-sized reference book for beginners in this type of viticulture. It can be bought for 2s. 6d. a copy at all main offices of the Department of Agriculture.

AUCKLAND DISTRICT CARNATION AND GERBERA SOCIETY — Bulletin 18, August, 1962.

A bulletin issued periodically containing much useful information designed to assist carnation and gerbera growers. The bulletin under notice contains useful information concerning fertilisers, pests and diseases, classification of gerberas and a note about the old garden pinks. Altogether a most useful service to members of the Society and specialists in these plants.

DISTRICT COUNCIL REPORTS

NORTH TARANAKI.

Our May meeting was held amongst friends and members in Stratford, and an enjoyable and instructive evening was experienced by those in attendance. Mr. B. A. Norman, President, was in the chair, with an attendance of approximately 60. Mrs. C. M. Macalister, F.R.I.H. (N.Z.), entertained the gathering by displaying and describing many flowering specimens of shrubs gathered from her garden in Kaponga. Mr. Percy Thomson, A.H.R.I.H. (N.Z.), of Stratford, also displayed ten varieties of fruit grown in his garden—apple, cape gooseberry, lemons, feijoa, walnut, passionfruit, grapefruit, medlar, persimmon and Chinese gooseberry. The guest speaker for the evening was Mr. Jack Blyth, of Hawera, ably supported by Mrs. Blyth, who spoke on South Africa—through New Zealand eyes, illustrated by slides, and a movie film. The close-ups of animals in the big game reserves they visited, had to be seen to be believed, they were so natural on the movie film. Amongst the many fine slides and movie shots were some really excellent views of Victoria Falls.

Mr. V. C. Davies thanked Mr. and Mrs. Blyth for making their collection of photographic records available to us. He referred to Mr. and Mrs. Blyth being well known in South Taranaki for their horticultural activities, and mountaineering background and it was his pleasure to convey to them both the audience's appreciation for the enjoyable evening they had provided.

The June meeting was a great success educationally, and there was an attendance of 90 members and friends.

Mrs. L. E. Cocker, Ararata, Hawera and her associates (Mr. J. A. Gamblin Inaha; B. P. Clare, R. M. Barry B. Raynor, G. Williams and Mrs. Imla, Hawera, and Mr. L. Jury, of New Plymouth) combined to make this a very full evening devoted to the 'Camellias—the Aristocrat of Flowers'. Four large tables were covered with beautiful *Camellia* blooms of all types and colours, supplied mainly by the visitors, as well as local enthusiasts.

Mr. Les Jury firstly entertained those present with a wonderful selection of coloured slides, showing the results of his hybridising of liliums, camellias, and Japanese iris. He has raised some very fine hybrids of liliums from pure white, greenish tinge to cream; also pink to crimson, with and without the original spotting and central markings of the petals. Many were early flowering, and in the main very large blooms. We are indebted to Mr. Jury for sharing these photographs of his gems and the audience showed their appreciation in no uncertain manner.

Mr. Ron Barry then spoke on the history of the *Camellia*—very informally, from the early days of the species which were incidentally all single, to the present day varieties which had a large percentage of beautiful doubles, semi-doubles as well as large singles (such as were on display). Mr. Barry concluded his talk, by answering questions on aspects he had not dealt with.

Mrs. Imla then made a shoulder spray from two *Camellia* blooms, some buds and leaves. This was done expertly and in a very short time much to the admiration of the audience.

Mrs. W. J. Messenger suitably thanked all the folk who had contributed to the very full programme, particularly as many had journeyed a considerable distance to make the evening such a success.

Mrs. Cocker and her associates were accorded a hearty round of applause.

Mrs. H. Fairbrother, of the North Taranaki Branch of the N.Z. Camellia Society, thanked our committee for allocating an evening for the sole purpose of extolling the merits of the *Camellia*.

Our speaker for the July meeting was Mr. T. French, one of our own members, who took for his subject, 'Orchids Recommended for Parks and Gardens', illustrated with some exceptionally fine slides, of orchids in colour. Mr. French prefaced his talk with the statement that if the *Camellia* was considered the aristocrat of flowers, then orchids could well be termed the 'Royal Family of the Plant World'. He dealt mainly with the epiphytic types which favour the cooler climates have rather compact growth but surprisingly large sprays of flowers. Although many of the slides had been taken in Australia, Mr. French showed some taken in his garden in New Plymouth. He said they are easy to grow, moisture, plus a foliage food spray occasionally, being their main requirements once they had become attached to suitable positions in trees. If trees were not available, pieces of ponga could be used as a base, for them to grow on, and then fix these to suitable walls, or fences, preferably with a northerly aspect. It was the speaker's opinion that the Taranaki climate is very suitable for their culture, and he very much favours their use in our parks as well as gardens, and made particular reference to the Pukeiti Rhododendron Trust grounds which should be an ideal habitat.

Mr. Newton Allan conveyed the vote of thanks to Mr. French and said all present must have enjoyed his most instructive talk and his unique slides or orchids—a relatively new subject for our members.

The remainder of the evening was devoted to a quizz session on garden topics, which proved popular. Mr. B. A. Norman was quizz master, with H. P. Thomas, V. C. Davies, O. T. Wilson, and J. Edwards on the panel.

The opportunity was taken to present to Mr. A. D. Jellyman, the book prize which was the David Tannock Special Award for the student gaining the highest marks, practical and theory, in Stage 3 of the Diploma Examination.

Mr. V. C. Davies (a former employer) spoke of Mr. Jellyman's good character and ability, and wished him further succession in the future, and congratulations from all present.

WHANGAREI

MAY

Mr. Ralph Jordan, of Panmure, Auckland, delighted a large attendance at our May meeting with his lecture and his colour slides of Australian garden plants. The first introductions of Australian plants were almost all from the Eastern States, especially New South Wales and Victoria. In parts of these States conditions were dryer than in Northland, but such plants as the banksias and some acacias were excellent in dry and well-drained conditions. *Acacia longifolia* had proved itself an excellent shelter tree in dry coastal areas.

From the Grampian Ranges in Victoria, where the rainfall was more plentiful—between 40 and 50 inches, came a host of ornamental shrubs such as the white *Thryptomene, Lhotzkya* and *Callistemon* (bottle brushes). These were generally suited to our climate, provided drainage was adequate. With plants from West Australia, a very large State many times the size of New Zealand, and with many types of climate, it was necessary to exercise more care. Rainfall varied from the very dry to moderate, and to one that almost reached the level of that in Northland. Plants from the Sand Plain north of Perth grew in loose, gritty soil under arid conditions of between 12 to 14 inches of rain, most of which fell in winter, and were subject to an average temperature of 95 degrees Fahrenheit, though summer days could register up to 115 degrees. Consequently plants from this area should be given special care as to warmth and drainage. Leschenaultias, dampieras, brunonias, banksias and chorizemas were plentiful on the Sand Plains, and had root systems adapted to its type of soil and climate. East of Perth the Darling and Stirling Ranges provided a moister and cooler home for plants, so that we could expect to grow their inhabitants more easily than those from the hotter, drier areas. A wide variety of plants came from these hills, which seldom exceeded 2,000 feet. In the South the climate conditions more nearly approximated those in Northland. The rainfall was up to 60 inches per year and there was a large choice of plant material. These included a number well-known in Northland gardens—several pimelias, some kennedyas, *Banksia littoralis,* hoveas, *Agonis* and *Hypocalymma robustum,* and also the commonest Kangaroo Paw, *Anigozanthus manglesii.*

After giving these general directions as to the kinds of climate from which Australian plants come to us, Mr. Jordan showed a wonderful variety of coloured slides of the plants growing in their native habitats, and also some taken of those growing in New Zealand gardens, with helpful comments as to their soil and site requirements. From Eastern Australia came little *Crowea exalata,* a small spreading bush 2ft. high with a long flowering period. This was a good subject for the rockery. *Hakea laurina* (the pin-cushion flower) a tallish shrub, does well in Northland in sunny, well-drained positions. *Agonis parviceps* from W. Australia was an attractive shrub, smaller than *flexuosa* or *juniperina* and useful as a breakwind. A striking picture taken in the higher rainfall area of W. Australia showed *Kennedya coccinea,* a brilliant scarlet, pea-flowered creeper covering a large area. This plant clambers over low scrub and small bushes to present a glorious sight in October. The scarlet *Banksia coccinea,* the most brilliantly coloured of all banksias, was a more difficult plant

to grow. Many other plants were shown in flower and should tempt gardeners to try their skill. Mr. Jordan said they provided a challenge to the gardener to find or produce the conditions under which they would flourish.

Martynia fragrans: At the April meeting a ripe and dry seed head was brought for identification by Miss Maddren, who subsequently found in a magazine a very good illustration of it. The seed was of a plant from Mexico, with fragrant crimson-purple flowers somewhat like a *Gloxinia,* and with fruits which are edible and used for pickling. It is sometimes called unicorn plant or elephant's trunk, because of the shape o fthe seedpod, which, when it was shown, had split into two parts. It is a good annual, growing to 2ft. with showy flowers.

In honour of Mr. Jordan's visit a number of Australian plants were shown on the table. Among these were two grevilleas, *G. banksii* with white flowers, and its red form *G. banksii* 'Forsteri'. Both come from Queensland and need protection from more than 5 degrees of frost. Very good drainage is most essential. *Grevillea thelemanniana* was described by Mr. Jordan as an adaptable plant, good on banks. Its very finely-cut foliage and pink flowers are most attractive. The upright form of *Persoonia pinifolia* was shown, but was not as good as the genuine form which was weeping. All the way from Kaikohe came Mr. Blumhardt, who brought a very pleasing form of *Baeckea linifolia.* Among other flowers shown were camellias, 'Lady St. Clare', 'Preston Rose' and 'Spencer's Pink', all desirable plants. *Gordonia axillaris,* a good plant for a moist situation and a good winter bloomer, a showy *Billbergia;* good sprays of our native Kohekohe, that amazing tree which sends its flower stems straight out of the trunk from almost ground level upwards, and the really gorgeous fruits of the Titoki.

JUNE

Our June programme drew a record attendance of members, many coming from a distance to do honour to our distinguished lecturer, Mr. W. Sykes, B.sc., of the D.S.I.R. Botany Division, Lincoln College. Mr. Sykes, with several others, made two expeditions to the Himalayas, the first in 1952, and the second in 1954. These were sponsored by the British Museum, for which dried material was collected, and by the Royal Horticultural Society, to which seeds and living plants were dispatched. Mr. Sykes said that the areas chosen were in Nepal — the western area in 1952, and the central region in 1954. These areas had not previously been collected over, and he was the first white man seen by the native people.

Besides the actual collecting of plants, they studied their distribution, noting that species increased as they travelled eastwards. Rhododendrons in particular trebled their numbers. In addition to seeking new species, new forms of known species were sought, and in one instance a striking scarlet form was found of an ordinarily yellow *Geum.* Hardiness was an important consideration in choosing plants for England, and, generally speaking, those from the higher altitudes best served their purpose. Each collector had with him two native collectors and a cook. These were Sikkims and were very good at their work, even though unable to name their finds. Their first trip took place in April and May before the monsoon, and was largely exploratory, and to get to know the terrain. The monsoon began in June and lasted until October, with some rain almost every day. Drying specimens under such conditions was a difficult task. Seeds were collected after the monsoon was over, and dormant plants were packed in moss and sent to Wisley, the R.H.S. Gardens. Thus the climate was the chief difficulty, though crossing rivers often flooded, and with little in the way of substantial bridges, could be hair-raising. Nepal itself, right in the centre of the Himalaya, was a bad area for plant material. It rose in range after range up till Everest, with dry, cold steppe country carrying a semi-desert flora.

Mr. Sykes then showed colour pictures of the areas visited. On the lower levels the vegetation was of a tropical nature and *Reinwardtia* and *Luculia* were common. Plants which grew in the 3,000 to 4,000 ft. zone should be likely to flourish in Northland's conditions. Between 5,000 and 6,000 ft. *Albizzia julibrissin* was plentiful, but Mr. Sykes thought it might have been introduced. The Nepal lily was shown in great quantity, and a number of good pink-coloured viburnums were in the same area, among them *V. grandiflorum* which looked a better thing than those cultivated in New Zealand.

Rhodendron arboreum was seen in its usual blood-rd form at lower levels, but at greater elevations a pink form occurred. Large stretches of *Trollius pumilus,* anemones in white, pink and purple excited our admiration and vast beds of primulas arose in spring to cover barren places previously grazed by stock. Numbers of other herbaceous plants were shown, generally in extensive colours. These included *Cremanthodium* (a daisy), *Corydalis, Primula, Polygonum,* and *Pedunculoris,* most of which would be hardy and suitable for English conditions. *Meconopsis regia,* a plant of the poppy family, grew to 7ft. with yellow flowers and magnificent winter foliage adorned with golden hairs.

Pictures of Katmandu, the headquarters of many mountaineering expeditions (including that of our own Sir Edmund Hilary) brought a stimulating and unusual lecture to a close. Some general discussion followed, in which the possibility of an expedition to bring back plants suitable for our climate was queried. Mr. Sykes said that if plants could be obtained he thought there was every likelihood of them being grown but they would be quite different from those chosen for the British climate.

DISPLAY TABLE

A special effort was made to give Mr. Sykes some idea of the wide range of plant material grown in Northland and flowering in winter so there was a galaxy of flowers fruits and foliage from many different countries, from tropical and sub-tropical regions as well as from the temperate zones. Poinsettias, *Hibiscus, Luculia, Acalypha* and *Iresine* in gorgeous array, beside *Chamaelaucium, Grevillea* and *Hakea* from Western Australia, our own remarkable Kohe-kohe *(Dysoxylum spectabile)* and leptospermums, Himalayan *Magnolia campbelli,* and from Japan and China, Camellias in variety.

Mr. Arcus made a special display of citrus fruits which included two of the decorative species—the Usu with small yellow fruits, and the Cumquat *(Fortunella japonica),* which, besides being a most ornamental tub plant, produced useful fruit. A mandarin was 'Clementine', known in England as Tangerine. It was best on *trifoliata* stock. 'Thorney' was the true Chinese Manarin, but rather seedy, whilst the 'Satsuma' was not true but a good early variety. Persian limes were shown and though small, held as much juice as a lemon. They were seedless and aromatic. A number of oranges were shown, among them a 'Washington Navel' and an unnamed variety of excellent flavour.

A LITTLE GEM

This is *Crowea exalata,* an 18-inch shrub from Australia, with pinky-mauve starry flowers almost all the year. It likes sun and good drainage, in a dryish spot.

QUESTION SESSION

Plants for identification: Small, silvery-leaved, semi-postrate shrub with pink-centred 'daisy' flowers, is the African *Eriocephalus africanus.* Mauve-flowered herbaceous perennial with square, reddish stems, *Heterocentron roseum. Salvia* with woolly violet down on calyx and stem, *Salvia leucantha.* Large-leafed plant with yellow-bronze inflorescence, *Senecio, Petasites.* Small plant in pot, grown from seed, *Bignonia unguis-cati,* formerly known as *B. tweediana,* a lovely yellow-flowered climbing plant from S. America.

Can *Luculia gratissima* be grown from cuttings? Tip cuttings taken in spring and early summer may be rooted in fine scoria, after dipping in a suitable hormone, tamped down very firmly and covered with polythene. A place in part sun and part shade is best. Hardwood cuttings taken in July, with a heel, were easily rooted in sand. In this way plants of a good and desired colour could be obtained.

Cyclamen: A discussion arising from blooms on the Display Table provided useful hints on growing *Cyclamen* outdoors. The first requisite was a position giving morning sun only. The next was adequate drainage, and the third was good feeding. Liquid manure made from Keratin was used when cow manure was not available. *Idesia polycarpa:* A beautiful panicle of the scarlet fruits of this tree was shown and the question was asked "How can one be sure of getting a female tree, since the sexes are separate in Idesia?" This led to an interesting discussion, when various theories were advanced. It seems likely, in some cases at least, the trees are not unisexual, in which case berries are produced.

JULY.

Mr. J. A. McPherson, Director of Parks and Reserves, Auckland, was our guest speaker at the July meeting, and gave us some very useful and necessary reminders about our duties in regard to the planting of trees, as well as the care of those already planted. He mentioned particularly the old, and often historic trees in our countryside many of which were neglected and unsightly because of lack of attenion. Tree surgery had reached an advanced stage, and many trees which once were doomed could now, with suitable treatment be restored to health. A great deal of enthusiasm was often displayed on Arbor Day and many trees planted regardless of their suitability to the climate and site. Expert advice should be sought on the selection of trees to be put in a particular place and proper preparation made to ensure their growth. An example given of bad planting was that of a man who used a post-hole borer for the purpose. Too often trees were planted but no after-care given, with the result that many died of neglect, or were damaged by children or animals. Insufficient preparation of the soil, especially on clay, was a cause of failure. Good drainage was essential and more necessary on clay. There were many causes for diseases in trees especially in cities, such as dust, petrol, bitumen, sewage and gas poisoning. Sun scorch, especially by reflection from bitumen surfaces, was a frequent cause of damage. Drought caused the condition known as 'Stag-headed', in which the topmost branches died from want of moisture to that part. Lightning was another destructive agent. Roots which had insufficient room to spread outwards grew in circles and often strangled the tree. Vandals were also responsible for much damage. Planting was therefore only the first job; protection and after-care must follow.

Mr. McPherson advocated quite tall framework of wooden slats around young trees to prevent breaking by storms animals or vandals. Pruning of trees and shrubs was another necessary care for maintenance of growth and shape. The rule for pruning hardy trees was such as to allow for the maximum amount of growth before next flowering season. This meant that pruning should be done as soon as the flowering was over. Certain plants should be pruned very lightly, only the short tips of ericas and brooms needing to be taken off. Roses and buddleas should be pruned in winter, rhododendrons should not be pruned unless moving them. Old camellias could be cut hard back but normally only very lightly. A series of colour slides was shown illustrating various tree diseases and the methods used to combat them and restore the tree to health. Wounds caused by rot were cleaned out with a blow-lamp to keep them dry, and then given a coat of mercuric chloride paint. Holes were cleaned back to sound wood and filled in, while bad fissures were

braced with metal to prevent trunks splitting. Heavy branches were removed in two stages, the first cut taking the major part, and the second finishing neatly at the desired point. Wounds should not be sealed with ordinary paints or tar. Stockholm tar was preferable.

For street planting Mr. McPherson made several recommendations. First treat each street as a separate entity. He liked *Melia azerderach* and *Prunus* varieties as street trees. If the street itself was not suitable for planting, householders could be encouraged to plant a tree inside their properties and thereby beautify the whole neighbourhood. Where underground pipes and mains might be disturbed such shrubs as camellias and *Hibiscus* would be safe and attractive.

Though there were not as many flowers on display as usual there were some of extreme interest. A fine pot of orchids attracted much attention—an *Odontoglossum* hybrid from Mr. Waterhouse's collection. Among flowers *Magnolia denudata* from the late Mrs. Given's garden was outstanding and would tempt any gardener to buy it. A number of camellias were shown, including 'Great Eastern', now known as 'Emperor of Russia Variegata', 'The Czar', a semi-double of almost the same shade of red, 'La Graciola', a red paeony form which probably has another name now), 'Gauntlettii', single white with prominent golden stamens and 'Aspasia McArthur', an old-fashioned paeony-form white with occasional flecks or petals of pink.

Natives of special interest were two species of *Alseuosmia*, both sweetly scented, the dainty little orchid *Pterostylis trullifolia*, and *Hebe diosmaefolia*, a valuable front-of-the-border plant coming with either white or mauve flowers. The handsome leaves and large seed pods of the Australian flame tree *Sterculia acerifolia* were much admired and seed was eagerly sought.

QUESTION SESSION.

Northern Spy Cutting: This was put in last year and is rooted. Could it be transplanted now?—Yes.

Camellia shows white spots on a bloom that should be entirely red. This is evidently a 'sport'. Many camellias are prone to sporting and some of the forms thus arising are propagated. On the display table there was a sample of this showing three distinct forms which occurred on the same tree.

Azalea buds rotting: This was probably due to over-wet conditions following dry weather. Plants should be kept moist by mulching and watering in summer, and well-drained in winter.

Moss on Azaleas: White Oil spray was recommended. Wood ashes, though good on fruit trees, should not be used on azaleas as the lime content would be harmful to these acid-loving plants.

Apple disfigured by mould: Honey dew excreted by insects provided the basis for the mould. Spray to kill insects and so prevent deposits.

Plant for identification: This was a *Cerinthe*, belonging to the Forget-me-not family, said to provide bees with wax. Oleanders from seed: These may be grown, and on sandy beaches about Mangonui seedlings are common.

1963 ANNUAL DOMINION CONFERENCE
of the
Royal New Zealand Institute of Horticulture (Inc.)

FORTIETH ANNUAL MEETING AND
CONFERENCE OF DELEGATES

NOTICE IS HEREBY GIVEN that the Fortieth Annual Meeting and Conference of Delegates of the Royal New Zealand Institute of Horticulture (Inc.), will be held in the GIRL GUIDES' HALL, 217 ARMAGH STREET, CHRISTCHURCH, on WEDNESDAY, FEBRUARY 20, 1963, commencing at 8.45 a.m.

The 1963 Banks Lecture will be delivered at 8 p.m. on that day.

Members of the Institute and delegates from affiliated organisations are specially invited to attend the Dominion Conference and the Banks Lecture. Other activities are being planned by the Canterbury District Council for the benefit of visitors.

It is recommended that those attending the Conference make early hotel reservations.

K. J. LEMMON,
Dominion Secretary.

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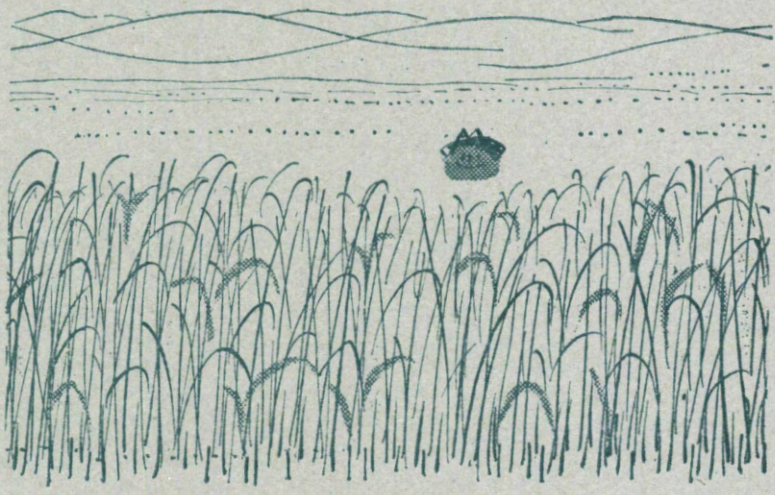

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