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NEW ZEALAND PLANTS AND GARDENS

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SEEDS versus CLONES

Most horticulturists are aware of the difference between a seed and a clone. A seed from an annual or biennial and certain perennials can be relied upon to reproduce their parent's characteristics in every respect. Perennials, in the case of those of garden origin and the result of cross pollination, can be expected to show considerable variation from seed. Even species of perennials can show quite a deviation from their seed parents, because cross-pollination can take place in the wild state as well as under cultivation. There can also be a variation from seed among conifers, shrubs and trees of all kinds.

A clone is quite a different affair. It is a selected form of any plant that may be propagated vegetatively by division of the root, cuttings of various kinds, layering, budding, grafting, bulblets in the case of *Gladiolus* and scales of *Lilium* species or hybrids. Vegetative propagation has the inestimable advantage of producing progeny identical with the parent and mutations rarely occur. Roses, rhododendrons, dahlias, chrysanthemums, delphiniums, carnations are a few examples of genera that owe their present high standing to the work of the plant breeder, the selection of desirable clones and perpetuating these by vegetative propagation.

Although there is a big balance in favour of vegetative propagation, there are attendant dangers. Many plants raised from seed do not inherit disease from unhealthy parents. It is vitally important that only healthy stock is used for vegetative propagation, because disease can be transmitted to its offspring. Over propagation, especially with plants that produce cuttings freely, can cause degeneration. This has occurred from time to time with such free propagating genera as dahlias and chrysanthemums.

There are plant breeders who treat their work as a hobby. There are others who own businesses and undertake it as a commercial proposition. In Britain, certain European countries and in the U.S.A., a system has existed, for some generations, whereby a new plant may be recognised and, if it has attained to a certain standard, granted an Award of Merit or a First Class Certificate. This immediately gives a hallmark to a new plant and also the attendant publicity can greatly increase sales.

The Plant Patenting Scheme has been in force in the U.S.A. for many years. It is just being introduced to Britain. This scheme simply safeguards the raiser's rights. It is no guarantee of the excellence of a plant. It would appear to be logical that the merits of any patented plant will depend upon the awards it has received from a recognised authoritative source. It is only human for a raiser to tend to look upon his own productions with a prejudiced eye. Therein lies a risk of geese being regarded as swans. To control this a guarantee of excellence from an authoritative body would appear to be most important.

G. A. R. PHILLIPS,
Editor.

LODER CUP AWARD 1964

A large gathering of friends met at the Hastings City Council Chambers on 30th March, 1965, to witness the presentation of the Loder Cup to Dr D. A. Bathgate, by Mr Duncan MacIntyre, M.P., who deputised for Hon. B. E. Talboys, Minister of Agriculture, who was unable to attend.

The gathering was presided over by Mr R. Giorgi, Mayor of Hastings, who said that Dr Bathgate was a very worthy recipient of this trophy.

Dr Bathgate, a medical practitioner, has had a lifelong interest in New Zealand forests and has tramped and climbed in practically every part of New Zealand, studying and observing our forests and native plant life. Through these outdoor activities he became very interested in the preservation of the unspoilt parts of our country and in the need to provide areas where future generations of our people could see something of their country, its scenery and its native flora. For more than thirty years Dr Bathgate has been an exceedingly active member of the Royal New Zealand Forest and Bird Protection Society and has been chairman of the Hastings branch since its inception. He worked assiduously for the preservation of the Waipoua Kauri Forest and was a member of the deputation which presented a petition to Parliament for the setting aside of the Urewera National Park and also, later, for the extension of that Park, and the Opepe Reserve on the Napier-Taupo Road. For the preservation of New Zealand bush he has been fearless. He has been concerned with the administration of several reserves, and assisted with almost every reserve in Hawke's Bay. He was instrumental in having the Blowhard Bush, a quite historic and unique area of forest, donated as a reserve by Mr J. N. Lowry.

His personal research and interest resulted in the establishment of a sanctuary at Deep Stream Gorge, Te Pohue, which he discovered to be a natural habitat for our native kiwis. Through his initiative as a city councillor in Hastings, he caused Arbor Day to be re-instated at

Hastings with a native plant nursery at Frimley Park from which considerable quantities of native plants, trees and shrubs have been issued for plantings in local schools and showgrounds. Dr Bathgate's influence has been felt throughout the Dominion by his many articles appearing in daily and weekly publications, and by his many public and radio talks.

Among those present at the presentation were Mrs D. MacIntyre, Mrs R. Giorgi, Mr A. M. W. Greig, Chairman of the Loder Cup Committee and Director of Horticulture, Mrs Greig, Mr R. Nelson, President of the Royal Forest and Bird Protection Society of New Zealand, Rev. Father Callaghan, Chairman of the Napier Section, F. & B. Society, and Mr Bernard Teague, a former recipient of the Loder Cup.

Mr R. Gallen read the citation and Messrs Greig and Nelson spoke of the enthusiasm shown by Dr Bathgate. Mr J. N. Lowry, donor of Blowhard Bush, said that it was Dr Bathgate's interest and enthusiasm that prompted him to donate his bush to the Royal Forest and Bird Protection Society.

In presenting the Cup to Dr Bathgate, Mr MacIntyre reminded those present that the Cup had come to Hawke's Bay on two previous occasions — to Mr Norman Elder and to Mr Bernard Teague.

Dr Bathgate suitably replied stating that he felt very modest and yet at the same time honoured to be the 1964 recipient of such a coveted award.

A HORTICULTURAL JOURNEY TO WESTERN AUSTRALIA (VII)

W. R. STEVENS, (Wanganui)

The soils in the Soldiers' Settlement area of the Gairdner River district, in which we were now camped, have presented many problems to the farming community who have settled there. Of a light, gritty nature, when broken up, it yet packs hard when allowed to settle, thus providing plant life with a tight root run. Drainage is good, but this is country which has several basic mineral deficiencies, and a low organic content, and had until recent years been considered as useless for farming. It was only after much experimental and research work that the Department of Agriculture had found out how to treat it to bring it to fertility. The Grown's farm had been settled only two years. The Government had first cleared the land by bulldozing the thick, natural scrubby bush, and burning it. They made a clean sweep of it, and after seeding it with grasses and clovers, built the farm house and sheds etc., leaving them stark and bare on the denuded landscape, which stretched in a rolling plain to the horizon in every direction.

Throughout this journey we had been in the habit of keeping early hours. This was due in the first place to the fact that by the end of

the day we were not only physically but also mentally, tired. In the second place, our lighting in the caravan was not of the brightest; quite good enough to see to do our cooking and meals, but not really adequate for reading or writing for very long. However, the Growsns invited us to spend our evenings with them, and so extremely interesting did we find the story of their struggle to bring the farm to fertility, to grow any kind of shelter, or to establish a garden, that we stayed up late in most interesting discussions.

Strong winds blow over the plains every month of the year, and the difficulty of establishing even the hardiest of the native *Eucalyptus* was depressing. It takes 10 years to bring the soil to produce wheat in a payable crop, yet clovers flourished rampantly from the first year of breaking in the soil. Both Mr and Mrs Growsns were intensely interested in the native wildflowers, and were trying to establish a house garden mainly devoted to these. Even the smallest shrub had to be individually sheltered from the strong, cold winds which blew up from over the Great Australian Bight. One of the gems we saw they had successfully transplanted from the neighbouring area was the Qualup Bell, *Pimelea physodes*, which, transplanted the previous year, had flourished, producing 86 blooms on a small plant no more than 18ins. in height.

Mr Growsns had agreed to come with us on the long day's trip to the Gairdner River, so next morning we made an early start, taking both the Landrover and our car. As it turned out, it was just as well we had the Landrover, as after about two hours driving, the road became too difficult for the car. They had apparently had heavy rain the day before, and as we drove on, the water across the road became deeper and deeper. Although Noel is an exceptionally good driver, there was a danger that we could easily get stuck where the water was deepest. So we left the car on the side of the road, and all of us transferred to the Landrover. The country through which we were driving was unfenced, with low, somewhat sparse scrubby vegetation, quite flat, and the soil a yellowish sandy grit. Away in the far distance to the south, we could see the sandy dunes bordering the Great Australian Bight, and ahead of us to the east towards which we were travelling, the faint blue outlines of the hills of the Western Mt. Barrens — just peaks on the horizon. Although this country, part of the vast penepplain of the Southwestern corner of Australia, appears so flat that the horizon in all directions shows the curve of the Earth's surface, it is broken in many places with dry gullies and depressions, slight rises, and old watercourses, along which grow taller eucalypts and acacias, showing dark against the drab foliage of the scrub.

Just before midday, we reached the Gairdner River. It was narrow and winding, and in New Zealand we would refer to it as a creek. At

this time of the year it was very low, and consisted of a succession of water holes, all joined by this slow moving creek. There was no question but that it could at times become a raging torrent, as we saw evidence of terrific erosion.

It was a relief to get out of the Landrover, and we immediately began a hunt around. On one side of the track was a large colony of *Kunzea pauciflora* in full flower. It was a sight for the gods, and we just stood and gazed at it. There must have been several hundred specimens, ranging from 4 to 6 feet — an incredible sight. The plants were well clothed with small fine ericoid leaves up to about two thirds of their height. The top part of every bush was a glorious mass of bright, lolly pink flowers. Individually the flowers are small — about $\frac{1}{2}$ in. in diameter — and somewhat resemble a round petalled *Calythrix* with masses of tiny stamens, but so densely packed are they on the branches that they completely hide the fine foliage. Both Harry and I had always been keen on this genus, and we had grown several kunzeas in our respective gardens, but none of them could approach this species for sheer beauty. We agreed we should both endeavour to make a large planting in Wanganui — just to gaze on and admire. To jump ahead a couple of years, I can say now that we *did* grow a lot of plants and that they have flowered. But the same old problem has cropped up again — too much foliage and too little flower. Age on our bushes could well overcome this fault to a certain degree, though I fear that the richer soils and the lack of dry air and greater summer heat, will prevent this lovely plant from ever developing the brilliant display it gives in its native country. The trouble is not entirely in our soils, for Harry's Wanganui garden is sandy, while mine is heavy clay, and the plants have behaved similarly in both gardens.

On both sides of the Gairdner River were steep sand banks. It took several attempts before the Landrover was able to climb up the other side. Once across we ran through low scrub. Alf said this is where we should find the Qualup Bell (*Pimelea physodes*). Sure enough it was there! Alf stopped, and we all scattered again. There were plenty of plants of it, but they were spread over a wide area. Most of the plants were small, from 1 to 2 feet and rather leggy. This was due to the fact that the area had been burned over two years previous to our visit. Many were in flower, and we found quite a variation in the colour. Some were almost purple, and some were a very pale lemon. While this was due in part to the fact that the bract surrounding the flower deepens with age, it was obvious that there were degrees in the colour depth that some clones developed. We were fortunate in finding quite a number with mature seed, and this we collected most carefully. I will mention here that despite the nice quantity of seed we obtained, we did not succeed in raising more than a dozen plants, but these have flowered well. The Qualup Bell is one of the most unique plants of

Western Australia, and occurs only in the Ravensthorpe and Gairdner River areas. Most species of *Pimelea* have their blossoms massed in heads surrounded by petal-like bracts. In the case of *P. physodes*, these bracts much exceed the length of the bloom, and form a large bell-like flower, which is always pendant (illustrated Vol. V. facing p. 194). The soil, if one could call it soil, was a hungry white sand, and looked incapable of growing anything. Mostly the vegetation consisted of low growing shrubs, not more than 2 to 3 feet in height.

It was here that we encountered our first snake, and we very promptly despatched it. Mr Gowns said it was a 'Dugite', a species which is every bit as venomous as the Tiger snake. Strangely enough, we came across two more snakes later in the day, and these were both Tiger snakes. I am tempted to say that by then we became quite blasé about snakes, but this would not be anywhere near the truth! At the start of our journey in Western Australia, we had been warned to keep a lookout for snakes, but as we had not seen any until this date, we had become a little careless. When one comes across an exciting plant in flower, all else is forgotten, and this is where the danger lies. Admittedly most snakes beat a retreat, but not when one inadvertently treads on it.

After this excitement, we got back into the Landrover, and about half a mile further on came to the old Qualup homestead. It had been built over a hundred years ago, and although deserted, was still in a fair state of preservation. The only occupants were swallows, who returned to it annually and the old nests, which are built in corners and crevices made of mud plastered in amazing amounts and bulging out from the walls, were very much in evidence.

It was now past noon, and as Alf wanted to collect seed of various banksias, we set off back over the river. Our first stop was for *Banksia nutans*, of which there were many specimens. This is really not an exciting species from the floral point of view, but it does make quite an attractive shrub, generally about 4 feet. The flowers are comparatively small, about 2 inches long and as much wide, a fawny pink in colour. The seed cones are surprisingly large for such a small flower. Most of them were over 4 inches long, and almost as wide, and we collected a full sack of them. It was necessary to collect more than Alf wanted, as many of them were riddled with weevils and various other pests which devoured the seeds.

Also in this area, we found plants of *Banksia baueri*, one of the most interesting, and to my mind, beautiful species. This is also rather a low grower, seldom more than 4 to 5 feet, but the flower spikes are enormous. We measured some of them, and they were almost 11 inches long. In appearance they bear quite a resemblance to a Koala bear — in fact we heard that it is often referred to as the teddy bear *Banksia*. This species grows well in New Zealand, and the flower heads on some of my



Banksia baueri (see page 110)

(Photograph — E. G. Gibbs)

plants have been over 14 inches in length. This is far larger than any we saw that day. So another sack of seed cones were hefted into the Landrover. I have omitted to mention that Alf conducted a seed business, specializing in Western Australian plants.

Our next find was extremely exciting. This was a colony of *Anigozanthus rufa* growing in deep sand. This is one of the most beautiful of the genus. It has radical leaves up to a foot long, and from the centre arise the flowering stems. These may be from 2 to 4 feet high, and are closely branched. The flowers are on short pedicels. The whole of the inflorescence is covered with hairy wool of a rich burgundy red. We spent some time admiring these exotic flowers, and vowed to grow this species in New Zealand. We expected it to be difficult to cultivate, and were prepared for the worst. Surprisingly enough it has turned out to be quite amenable, and has flowered in Wanganui without any fuss or bother. The only difference is that it flowers here in summer and autumn, rather than in the spring. Seed has proved almost impossible either to obtain or to germinate, but Alf sent us over a number of plants, and with care, these were established. The rarer Kangaroo Paws set very little viable seed, and with such species as *A. rufa*, *A. bicolor*, *A. preissii*, and *A. pulcherrima*, as well as the closely related *Macropidia fuliginosa*, it has proved much easier to establish them from young plants collected in the wild, and sent air mail to this country. Division of old roots, while possible, is a tricky business, and the most favourable time to do this has yet to be proved. However, even the Black Kangaroo Paw, *Macropidia fuliginosa*, has a number of times been successfully divided, and re-established in New Zealand, though we were told in Western Australia that this was an impossibility.

We finished collecting seed late in the afternoon, and decided it was time to get back to base, merely stopping for any plants of outstanding interest.

In a depression, we found odd specimens of *Eucalyptus tetragona*. The striking flower heads are large, with angular, red seed cases, which much resemble hanging bells. This accounts for its common name of Cow Bell Gum.

Further on, lining the roadside, we saw the somewhat rare *Eucalyptus platypus*, little more than a large shrub with small, rounded leaves, and somewhat bushy growth habit.

Reaching the spot where we had left our car by the roadside, we were glad to make the transfer back to more comfortable travelling, as most of us had naturally to be cooped up in the back of the Landrover, where our vision had been restricted to that from the uncovered back of the vehicle. Incidentally, we had seen only one other vehicle on the roads since leaving our car in the morning — a very fair indication of the amount of traffic to be encountered on these back roads!

ORIGINS OF OUR GARDEN PLANTS (2)

W. R. SYKES, B.Sc.(Hons.)N.D.H.

There are two small areas of the Northern Hemisphere with climates similar to the Mediterranean type, except that the summers are tempered by the proximity of cool ocean currents. They include the Canary Islands and Madeira in the Atlantic and a small coastal strip of Central California with a few adjacent islands. Plants from these places grow singularly well in many parts of New Zealand and two examples from the latter area will show what I mean. They are our two commonest exotic conifers, *Pinus radiata* and *Cupressus macrocarpa*, both far more abundant here than in their very restricted native habitat. Turning to the other region, one cannot go to many coastal areas of this country without meeting with cultivars of *Chrysanthemum frutescens* (Marguerites). The ordinary white-flowered form is naturalised in such places as Canterbury's Port Hills. Here one may see it growing alongside other Canary Island species such as *Cytisus proliferus* (Tree lucerne), *Cytisus canariensis* and species of succulent *Aeonium*. The handsome blue Pride of Madeira, *Echium fastuosum*, yellow *Cytisus maderensis*, have their homeland self-evident in their common and specific names respectively. Less prone to naturalise, but still common, are *Clethra arborea* (Lily of the Valley tree) and the well-known palm, *Phoenix canariensis*. Many of these Macaronesian species seem to have been introduced to New Zealand quite early on, possibly due to the ships bringing immigrants 'stopping at the islands.'

Warm temperate climates with warm, wet summers and sunny, dry winters often tend to be monsoonal in character and the plants found under such conditions are usually more frost-tender than those from a Mediterranean climate. Such climatic regions often merge gradually into sub-tropical regions with the same climatic pattern. The monsoonal climate is typified by such regions as South China, South Japan and low altitudes in the Himalayas. To take the Chinese area first again, we find that familiar names of ornamental plants include *Campsis grandiflora* (syn. *Bignonia grandiflora*), *Idesia polycarpa*, *Photinia* species, *Nandina domestica* (Heavenly bamboo), *Primula malacoides* and *P. obconica*, *Trachycarpus fortunei*, also in Japan, *Rhododendron indicum* (the parent of some evergreen azaleas) and *Lagerstroemia indica*. The last two named show that some unsuspected species come from China, although the botanists who first described them thought that they came from India. Similarly, other species bearing the specific epithet *japonicus(a)* are really Chinese, e.g. *Kerria japonica*. However, *Euonymus japonicus*, *Pittosporum tobira*, *Cinnamomum camphora*, *Rhododendron yakusimanum*, etc., are Japanese. From these two areas of East Asia come such fruits as *Actinidia chinensis* (Chinese Gooseberry), *Diospyros kaki* (Persimmon), *Eriobotrya japonica* (Loquat) and the parents of some of our cultivated citrus. Before leaving this region a species from sub-tropical China deserves special

mention. *Hibiscus rosa-sinensis* is now cultivated in all tropical and sub-tropical lands, down to nothern New Zealand. The Himalayan region has given us such diverse plants as *Buddleia colvilei*, *Dendrobenthamia capitata* (syn. *Cornus capitata*), the beautiful *Magnolia campbellii* and the related *Michelia fuscata* (Port Wine Magnolia), *Luculia* species, and two plants which have become weeds in warmer parts of the country, *Hedychium gardnerianum* (False Ginger) and *Polygonum capitatum*. Some fairly hardy epiphytic orchids are from here, e.g. *Coclogyne cristata*.

In North America the corresponding regions are to be found in the south-eastern tip of the U.S.A. and some of the moderately elevated parts of southern Mexico. The latter region has given us a large number of frost-tender annuals and perennials such as *Dahlia*, *Tagetes*, *Tigridia*, *Tithonia* and *Zinnia* species. The popular poinsettia of northern North Island gardens is a Mexican sub-tropical plant, but the shrubby, scarlet *Salvia* species, *Choisya ternata* (Mexican Orange), *Abelia floribunda*, *Cestrum* species, *Beloperone guttata* (Shrimp plant) and some of the large-flowered fuchsias, are hardier. Relatively few species come from the above-mentioned area of the U.S.A., two of very different habit being *Taxodium distichum* and *Gelsemium sempervirens*. The South American regions of this type mainly consist of South Brazil and the adjacent areas of Argentina, Paraguay and Uruguay. It is in the elevated country of much of this region that many of the following species have their home, and the rich flora forms a southern extension of the great South American tropical rain forest. Thus, when we see that Brazil is the home of a species which we have in the garden, it is almost certain that it comes from the highlands of south Brazil. Many of the species mentioned below are common in European glasshouses and probably came to New Zealand via Europe. Some of the best-known are the hybrid abutilons, whose parents come from this region, *Caesalpinia gilliesii*, *Cassia corymbosa*, *Erythrina crista-galli*, *Feijoa sellowiana*, *Jacobinia* species, *Tibouchina semidecandra* and *Tweedia coerulea*. The forests mentioned above are rich in lianes, as one would expect from its nature, so perhaps it is no coincidence that several showy climbers from there are seen in New Zealand, e.g. the two bignoniaceous species *Pyrostegia venusta* (Golden Shower) and *Clytostoma callistegioides*. *Bougainvillea glabra* and the useful *Passiflora edulis*, as well as other species of the genus, also belong to this part of South America.

Moving across the South Atlantic it is in the south-eastern areas of South Africa, from the East Cape, northwards through Natal, that there are equivalent climatic regions to those just mentioned in Brazil, etc. A number of ornamental, mostly frost-tender, plants are cultivated from here. Although the family *Bignoniaceae* is not especially well represented in the South African flora, there are two members which are very commonly grown in North Island coastal districts. They are the useful and attractive Cape Honeysuckle, *Tecomaria capensis*, and

the climbing *Podranea ricasoliana* (syn. *Bignonia mackenii*). Other families are represented by such plants as *Gardenia jasminoides*, the common gardenias are derived from this species, *Acokanthera spectabilis*, *Clerodendron ugandense*, *Ochna serrulata*, *Thunbergia alata*, one of the Black-Eyed Susans, several *Coleus* and *Plectranthus* species, and *Clivia miniata*. In the *Iris* family we find that the hardy *Dierama pendula* (Wand Flower) and the parent species of many of our modern *Gladiolus* cultivars originate here, but from the more elevated parts of the region.

When we continue eastwards to Australia again, it is the eastern areas from Queensland southwards that can be considered as having this type of warm temperate to sub-tropical climate. Many of the plants from this Australian region will tolerate more drought than some from the other regions with this climatic type. Again, most representatives are less hardy than those from the winter rainfall areas which lie to the west and south-west. I am thinking of such plants as some of the *Proteaceae* (e.g. *Grevillea banksii* and *G. robusta*, *Stenocarpus sinuatus* (Firewheel Tree) and *Macadamia ternifolia*). From other families come *Brachychiton acerifolium* (syn. *Sterculia acerifolia*), *Acacia podalyriaefolia*, *Acmena smithii* and *Eugenia paniculata* var. *australis* (syn. *Eugenia myrtifolia*), *Crotalaria laburnifolia*, *Ficus macrophylla* (Moreton Bay Fig) and *Ceratopetalum gummiferum* (the Christmas Bush or Tree of New South Wales). The last-named is rather hardier, as are also the coniferous *Araucaria cunninghamii* and *A. bidwillii*. It will be thus seen that many of the above-named plants from the summer rainfall warm temperate or sub-tropical areas are not hardy in cold districts such as most of Canterbury, Otago and Southland. Conversely, the majority will be perfectly familiar to people living in North Island coastal areas, especially from Taranaki northwards.

Although New Zealand has no real desert climates, a surprising number of cacti and succulents from the drier areas of the world can be cultivated outside, especially if protected from excess winter rain. Since they largely come from warm regions of America and South Africa they are often not very frost tolerant, thus precluding them from being extensively cultivated outside in our driest areas in the east and centre of the South Island. Various species of *Opuntia* and the *Cereus* group of genera are among the commonest cacti grown. Like almost all cacti, they originate in the drier regions of America from the south-west U.S.A. southwards. Some of the succulent *Sedum* species come from this continent, especially Mexico, but the small rock garden species are usually European natives and not desert plants at all. Similarly, the mesembryanthemums (using the name in the old wide sense) seen in abundance on the cliffs of the Port Hills amongst other places, are not desert plants, but come from the coastal areas of the South-West Cape already referred to. However, such plants as that brilliant red pair of succulents *Rochea coccinea* and *Crasula falcata*, as well as some of the monocotyledonous *Gasteria* and *Haworthia* species,

do come from dry inland parts of South Africa. The two species of *Washingtonia* palms are native to inland South California and have been grown in this country for many years, not always having been introduced directly from America I suspect. From this region some of the little ephemeral desert annuals such as phacelias, may also be found.

Having dealt with dry areas very briefly, I feel that in all fairness I should mention our aquatic or water plants. I have not met with the enthusiasm for these in New Zealand that seems to occur in some other countries, but there are some obvious well-known ones. *Nymphaea alba*, the common white European water lily, must have been introduced well before the turn of the century, whilst the two species of *Nasturtium* or Water Cress certainly were. Very different plants are *Aponogeton distachyus* (Cape Hawthorn). *Vallisneria spiralis* from the Mediterranean, and the fern *Salvinia natans*. These are all naturalised here like the much more notorious water hyacinth, *Eichornia crassipes*. The latter plant is South American in origin, whereas *Pontederia cordata* from the same family is North American, so it is obvious that there is little geographical correlation amongst our water plants. The aquatic habitat is more uniform and moderate in its temperature fluctuations, and aquatic species also often tend to have wide natural ranges, so the lack of a geographical pattern is understandable.

The number of really tropical plants that are cultivated outside in New Zealand is obviously limited. The majority are either annuals, e.g. *Quamoclit* species, *Cleome spinosa*, *Impatiens balsamina*, *Torenia founneri*, *Hibiscus esculentus* (Okra), etc. or herbaceous plants which can die down for the winter, e.g. *Canna* and probably *Polianthes tuberosa* (Tuberose). I would also include the edible *Ipomoea batatas* (Kumera) and *Colocasia esculenta* (Taro) here, although a long sojourn outside the tropics in the service of man has resulted in the selection of hardier forms. The above-named tropical plants include some from the Old and New Worlds, but the exact areas of origin are not always very well known, especially in the case of edible plants.

The areas of the world which I have been sketchily outlining have most of our cultivated plants, or the parent species, included in their native floras. There is not time to mention here every possible region from which plants have been introduced to our gardens. Sometimes small islands have endemics which have become important to us. Two obvious examples lie in the sub-tropical waters of the South Pacific not far north of New Zealand. Lord Howe and Norfolk Islands may not be very large, but from the latter comes *Araucaria excelsa* (Norfolk Island Pine) and from the former the two species of *Howea* (syn. *Kentia*) palms; both genera thriving in moist mild North Island coastal areas.

Thus, it can be seen that we have received our cultivated exotic plants from a wide area of the world, although certain regions have obviously been much more important than others. As I hope to have shown, some of this is from historical reasons, some from the dictates of what I choose to call the 'horticultural fashions' of different periods, but in any case climate has governed these other factors. Records of acclimatisation societies, etc., show that by no means all the introductions were able to survive the climate in any particular district. Horticulturists generally are never satisfied. New arrivals are coming in every year, but I think it safe to say that the majority will be from the areas which I have outlined in this article. Therefore knowledge of the climates experienced in the homelands of these new immigrants should be of great assistance in enabling their successful cultivation here. However, in view of the great diversity from one part of New Zealand to another, the ordinary home gardener particularly, needs some guidance upon his choice of plants. It is hoped to remedy this need in the not too distant future by dividing the country into zones of relative plant hardiness, as an indication of what to grow in any particular part of the country.

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EREMURUS SPECIES AND HYBRIDS

G. A. R. PHILLIPS (*Paraparauamu*).

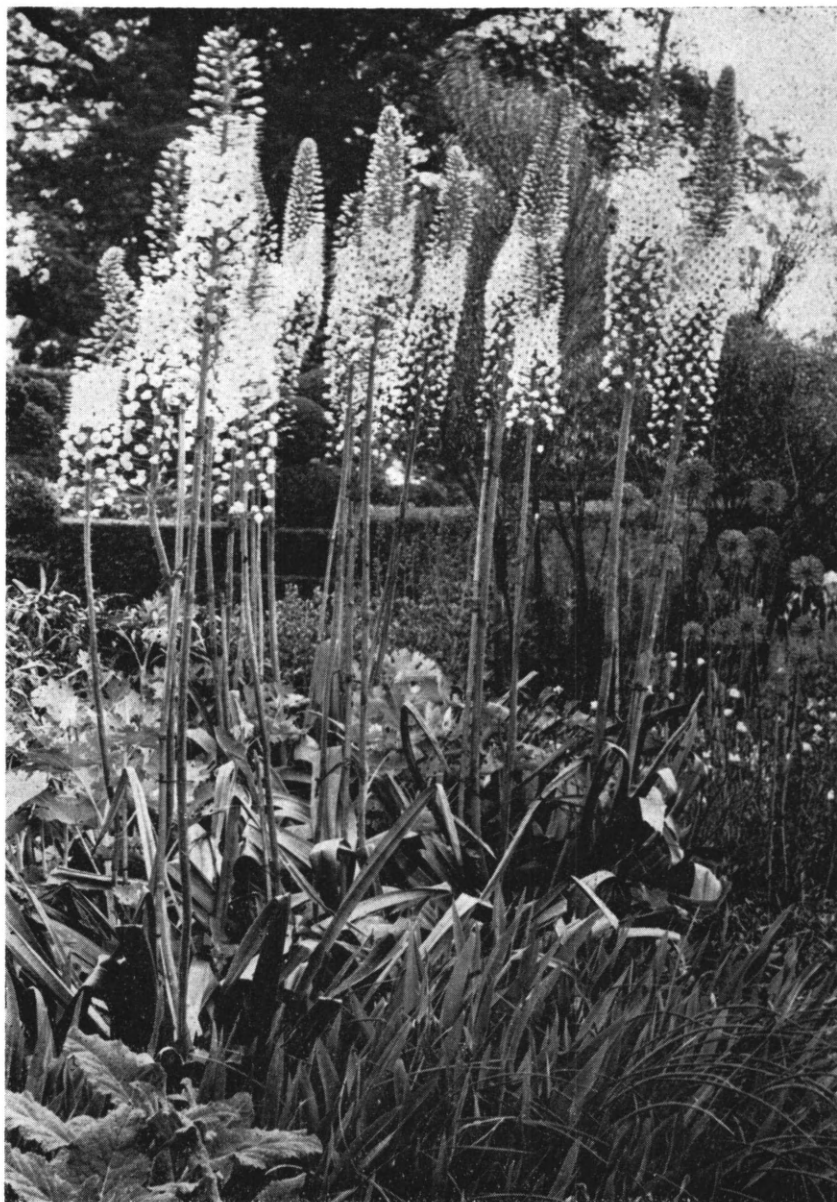
The *Eremuri* are among the most spectacular of all tuberous rooted perennials. They are of Asiatic origin, while some have been used in cross-breeding and have been the source of some most attractive hybrids. They have long been known in some of the larger gardens of Britain, and visitors to the Chelsea flower shows of pre-war days may well remember the exhibits of this noble flower staged by the late John Artindale of Sheffield.

The larger species have the common name of foxtail lilies. So many plants have, without any justification, been called 'lilies' but, in this instance the long broad inflorescence of such species as *E. robustus* certainly has some resemblance to a fox's brush. *E. robustus* is one of the most imposing of its race with 10 feet tall flower spikes rising from a mass of foliage rather reminiscent of that of the kniphofias. Each individual flower is star shaped, not so large as a delphinium floret, and of a warm pink shade. The flowers start to open at the base of the spike and the greater portion develops before the lower flowers start to fade. Rather stronger in colour and exceeding *E. robustus* in size of spike *E. robustus* var. *elwesianus* is the largest in cultivation. In a sheltered place, in sandy loam well dressed with fertilizer, I have grown this form to grow to double the height of a man. Obviously such plants are vulnerable to wind and this particular one was well protected on three sides with a hornbeam (*Carpinus*) hedge.

E. himalaicus is a white flowered species, similar to *E. robustus* but not so tall, rarely exceeding 8 feet. These species flower in late spring but, as they start growth early in the year it is necessary, in districts where the winters are cold, to cover with bracken or some similar material.

Eremuri are so rarely seen in New Zealand that it is not possible to quote from experience, but it is probable that the later flowering species will be found the easiest to acclimatise. One of the best known of these is *E. bungei* (syn. *aurantiacus*), more dwarf than those described with a slender spike of bright yellow flowers up to 4 or 5 feet. This flowers about a month later than *E. robustus* and *E. himalaicus*. Two others I have grown. These include *E. warei*, similar to *E. bungei* in size and height of spike with a 3 feet inflorescence of rich pink heavily shaded with coppery bronze. Probably the finest of the later flowering ones is *E. shelfordii*, growing to 7 or 8 feet with a yard-long flower spike of coppery yellow tinted reddish bronze. Both of these are probably of hybrid origin, but this is not conclusive.

A degree of cross-breeding has been carried out with *Eremuri* of the *warei* and *shelfordii* groups and a number of hybrids of remarkably attractive colours have resulted.



Eremurus robustum (see page 118)

(Photograph — Reginald A. Malby & Co.)

The plant of an *Eremurus* comprises a crown of variable size, according to the species, from which radiate fleshy roots, giving the effect of a small cart wheel, minus the rim, and the crown being the hub. To grow them satisfactorily a well drained, light soil is the best and it is a good plan to work in plenty of grit for porosity. Dig out a hole wide enough to allow for the full spread of the roots. Mound up the centre so that the crown can rest on this and be level with the surface of the soil. Let the roots radiate downwards and then fill in and make firm. The roots need to be handled very carefully, as they are particularly brittle. The taller species will probably need support and stakes should be placed in position when planting. The fertiliser most suitable would be Keratin, the equivalent of hoof and horn manure we found so suitable in England.

The time of planting is important because the dormant season is brief, and disturbance when the roots are active can be disastrous. In England *Eremuri* were dormant in late September and October. So it would appear that March or April would be the appropriate seasons in New Zealand. Only by testing them can the actual dormant season be ascertained here. Propagation can be carried out by lifting established clumps when dormant, dividing the crowns and replanting. All can be raised from seed and this is not difficult, although considerable patience is needed as it requires some time for flowering size roots to form.

Whether *Eremuri* are most suited to North or to South Island conditions it is difficult to estimate. Species like *E. bungei*, which is from Persia, suggest the warmer climates while *E. robustus*, from central Asia would appear to be suited to colder conditions. Very wet weather conditions during winter are definitely not favoured. A combination of wet and cold has often proved to be disastrous.

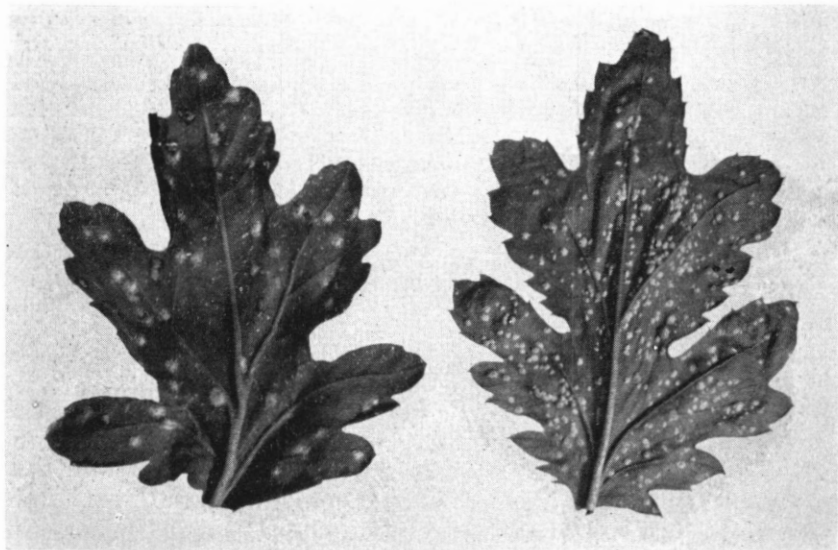
A NEW THREAT TO CHRYSANTHEMUMS WHITE RUST DISEASE

This year the disease White Rust (*Puccinia horiana*) has been found or reported on a few properties in New Zealand. White Rust which attacks only chrysanthemums is extremely damaging to susceptible varieties in humid weather or when these are grown in glass-houses or under polythene sheeting.

Typical symptoms are oatmeal coloured pustules about one-eighth to one-quarter inch in diameter on the underside of the leaves, later they may become pale brown, but not as dark as the more usual chrysanthemum rust (*Puccinia chrysanthemi*). Sunken pale yellow spots show on the upper side of the leaves.

This disease which attacks only chrysanthemums is reported as endemic to Japan and has occurred in South Africa, United States of America and Europe. So far it cannot be controlled by spraying. A few varieties fortunately appear to be resistant.

As the chrysanthemum crop is particularly valuable for cut flower growers and for garden decoration the Department of Agriculture intends to eradicate all known sources of infection this year.



White Rust (Puccinia horiana) on Chrysanthemum leaves

Growers and gardeners are recommended to look carefully at their chrysanthemums, especially varieties new to their properties this year, and pull out and burn any plants found infected. If they are in doubt about the presence of this disease, they should contact the nearest Office of the Horticulture Division of the Department of Agriculture.

PLANTS THAT BLAZE AND SMOKE

DOUGLAS ELLIOTT (*New Plymouth*).

Quite a lot of plants have names that tell of fire and smoke; but, fortunately, with one exception, they burn in name only.

The hottest of them all is the Flame Tree (*Sterculia acerifolia*). This Australian grows 50 to 100 feet high and so is not for the average

garden and the average gardener wouldn't put up with its flowering habit; for it doesn't flower until it's a veteran of 30 to 40 years. Even then it is spasmodic except in really hot climates. Here in New Plymouth I know of two trees that have reached the age of flowering; but they still go for several seasons without producing a single bloom. When they do intend to flower, they herald the event by dropping the leaves from the branches that will bear the buds—like the kowhai. Every seven years or so the trees put on a really good show, and then they do look as though they had burst into flame. The flowers are not big or spectacular, but small and bell-shaped. The stems of the flower cluster, as well as the flowers, are brilliant red.

The other famous Flame Tree, more commonly called the Flamboyant, is too tender for this country, but it is well known to travellers who have passed through the tropics. This umbrella-topped tree grows 30 to 50 feet high and is almost unbelievably beautiful when it covers itself with crimson or scarlet flowers in the summer. A native of Madagascar, it is known to botanists as *Delonix regia*. Its old name is *Poinciana regia*.

The Chilean Firebush is well known to New Zealand gardeners, especially in its better form, *Embothrium coccineum* 'Longifolium'. In October and November its branches become fiery with brilliant orange-scarlet flowers shaped like honeysuckle and borne in plentiful small clusters. It is a quick grower and soon reaches a height of 15 to 20 feet, thereby showing that it is more of a tree than a bush. Because it grows quickly and is liable to be broken off at the roots while young, it should be pruned fairly hard during the first few years.

From Queensland comes the Firewheel Tree (*Stenocarpus sinuatus*) with flowers very like those of the *Embothrium* except that they are arranged in circular clusters; in the bud they do, indeed, look like wheels. This is another tree that needs a hot climate to make it flower well. Here, in New Plymouth, it bears only a few flowers at a time and those few are hidden amongst the leaves which are big and glossy and shaped like oak leaves. The plant grows 12 to 15 feet high.

The Firethorn (*Pyracantha*) is a close relative of the Hawthorn or May. It bears in spring myriads of small creamy-white flowers in round clusters, and in autumn has masses of red, yellow or orange fruits. It does best in cold climates. Unlike the Hawthorn it is ever-green.

During the war a minor mystery was the way the Fireweed (*Epilobium angustifolium*) came up in the bomb sites in London where there had been no plant growth for hundreds of years. Some people claimed that the seed had lain dormant in the ground all that time; but it seems more likely that it blew in from the surrounding countryside. It is built to fly, for it has silken wings like thistles. The flowers are a bright pink on tall slender stems. Fireweed is a common weed beside streams in England where it is more often known as Rose-bay or Willow-herb.



Physalis alkekengi — Chinese Lantern (see page 124)

(Photograph — Douglas Elliott)

I think most of you know the Smoke Bush, *Cotinus coggygria* or *Rhus cotinus*. It gets its name from the fluffy flower-heads that come in the summer. The 'smoke' is much less showy on the deep purple variety. This is one of the outstanding purple-leafed plants both for its rich colour and the way this colour remains till the end of the season. The leaves last well in arrangements. Hard winter pruning keeps the plant bushy and vigorous.

Burning Bush is the name of two very distinct plants. The best known is the popular annual, *Kochia*. Because of its fine foliage and neat shape it is also called Summer Cypress. The colour changes from green to rich red in the autumn. The other Burning Bush, also called Gas Plant, is a perennial that's popular in England and the U.S.A. but which doesn't seem to be grown here at all. It is *Dictamnus albus*. It has long slender racemes of white or pale purple flowers. The leaves give off a pleasant aroma when bruised. If, on a still warm summer day, you hold a lighted match under the flowers or near the main stem the gas from the plant will flare up.

The Cigar Flower is a small old-fashioned shrub with an almost continuous supply of tubular red flowers tipped with black and white. Its botanical name is *Cuphea ignea*.

The Candle Plant is a popular succulent in cactus gardens and rockeries. The fleshy stems are blue-green. Called *Kleinia articulata* by the botanists, it is a native of South Africa.

Chinese Lantern is a common name for two entirely different plants. The one we all know is *Abutilon*, a very quick grower easily propagated from cuttings. The hanging flowers come in a wide range of colours including a brilliant orange with crimson veins. The Americans call it Flowering Maple from its leaves. Less well known as a Chinese Lantern in this country is *Physalis alkekengi*. This relative of the Cape Gooseberry has big pods that turn a brilliant orange, which makes them favourites for dried arrangements. The roots spread so quickly that in some gardens they are a nuisance.

TAUPO NURSERY HELPS RESTORE SCENIC BEAUTY

The Taupo native plant nursery of the Lands and Survey Department continued during 1964-65 to contribute greatly towards restoring the Waikato River's scenic beauty at Huka Falls and Aratiatia.

'At a time when it is often claimed hydro-electric schemes destroy the native habitat, the Lands and Survey Department is doing all it can to beautify areas affected by public works,' said the Director-General of Lands, Mr. R. J. MacLachlan, today.

Completed four years ago, the Taupo nursery had eradicated nearly all scars from hydro-electric schemes in the Taupo-Wairakei area, he said.

At Aratiatia last year, many temporary buildings erected for construction work were removed and 14,597 plants of 10 different species had been planted out near the power station, at the high-level lookout and along river banks.

In the Huka Falls reserve, work was concentrated on poisoning unwanted pine trees and killing weeds. The track to Aratiatia was considerably improved, giving a better view of the falls, and 7,900 plants were laid out in the area.

During 1964, 49,100 plants were lined out in the nursery, 24,000 left for the reserve and 34,000 were available for planting this winter. General development work in the nursery included cultivation and sowing down in blue lupins of a further 17 acres, of which four acres were now ready for lining out in nursery rows.

Mr. MacLachlan said it was pleasing to note a considerable increase in the number of visitors to the nursery and reserves during the year, and more requests for advice from schools, local bodies and various organisations and associations on the propagation and care of native plants and landscaping.

The one disturbing factor of the year, he said, was damage done at Aratiatia and Huka Falls by vandals. At Aratiatia, newly laid out plants were removed at the Huka Falls scenic reserve, vandals had damaged public toilets and taken a litter container especially designed and built for the area.

NOTES FROM THE CHRISTCHURCH BOTANIC GARDENS

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

The end of one of our longest and driest periods of weather finally came in March which, with a total of 6.7 inches of rain (average 2.02ins.), turned out to be the wettest March in almost a hundred years. From the way the weather is heading now it would appear that it is trying to compensate for last year's lack of rain. Sunshine has generally been below average, and there has been quite a lot of mild, humid weather which has stimulated a great deal of plant growth. The severe southerly storm which lashed all of the country on 26th April caused surprisingly little damage in the Botanic Gardens. The worst sufferers were three tall *Pinus pinaster*, on the Pine Mound, which were snapped off about half way up their trunks. A fourth was so loosened in the soil that it was considered dangerous and has been removed.

With the coming of winter the display houses in the Gardens become even more popular with visitors than during the summer months. There, for a short time, people may escape from the chill of a winter's day, and spend an hour or so admiring the many beautiful and interesting plants displayed. However, the display houses are more than a place

where people go to rhapsodise over beautiful flowers; they perform quite an important educational function. A certain amount of descriptive, and informative labelling, together with special displays, ensures that as visitors wander around they will unconsciously learn something. Even more important from an educational point of view are the conducted tours which take place on various occasions throughout the year. Applications are being continually received, from various groups and garden clubs, for conducted tours through the glasshouses, and also from a certain number of school parties. For these people a whole new world is opened. Under the instruction of their guide they are shown the sources of various common everyday products, and also learn something of their preparation. The mode of growth and culture of some tropical fruits and vegetables is explained, and they learn that many plants have much more of interest than just a beautiful flower, or handsome leaf. They are, according to the season, shown such things as the pollination of stapeloids, the interesting mimicry plants from South Africa, the pollination mechanisms of certain orchids, the insect catching pitchers of *Nepenthes*, and many other interesting things.

Some groups come with the intention of being merely entertained with a pleasant walk through the display houses, but usually all go away with the feeling that they have learnt something and that their time was well spent. However, without doubt the most rewarding groups to take through are school parties, especially those from the higher primary school classes. The way these children respond, when being shown a specimen of coffee laden with fruit, and having its cultivation explained to them, or the wonderful mode of life of the bromeliads unfolded to them, is most gratifying. It is a great pity that circumstances beyond our control do not permit an extension of these facilities.

It is several years since the glasshouse plants in the Botanic Gardens were reviewed in these notes, and since then the range of plants grown has increased considerably. At present the collection of plants grown under glass numbers more than 1,500, and only lack of further accommodation prevents it from expanding still further. With such a large collection there are always large numbers of plants which are not on display, which means that it is possible to have a series of everchanging displays. This is a great advantage because instead of having static displays, which soon cease to interest the regular visitor, every week produces something different. Then there is always a certain number of new introductions being raised and with some of these, several years may elapse before they are ready to go on show.

In the Gardens at present there are four display houses, with another under construction, and yet another planned for construction in the near future. Cuningham House, which is the largest, is devoted to tropical and sub-tropical plants. Townend House is a conservatory for flowering displays, Garrick House is for the display of cacti and succulents, and lastly there is the fern house. The new house under construction will ultimately be used for growing a collection of carnivorous

plants, and it is intended to construct an alpine house shortly. When all of this is completed it will enable the Gardens to display a wide and interesting range of glasshouse plants, although it will still be short of the ideal.

In Cuninghame House the most prominent feature is the large central bed which is generally referred to as the 'jungle'. It is quite an important part of the house because not only are the plants grown and displayed in a more natural manner but it enables the public to see large, and sometimes, mature specimens of plants which normally they would only see as small pot grown specimens. This means that, particularly with some plants, they get a far better idea of their true nature.

Palms feature prominently in the 'jungle' and the most prominent at the present is *Howea forsteriana*. Other large palms have had to be removed over the years as they have pushed through the roof. A number of smaller palms are grown and they include, the elegant lady palm (*Rhapis excelsa*), *Chamaedorea elegans*, and *C. erumpens*. A fine specimen of *Rhopalostylis baueri* is already growing in the 'jungle', a specimen of the nikau (*R. sapida*) was planted several years ago, and a plant of the Kermadec Islands *R. cheesemanii*, is being grown on for planting out. This will then give us the complete range in the only genus of palms represented in the New Zealand flora. People from many other parts of the country may scoff at the idea of growing a nikau palm in a glasshouse. But in a district like Canterbury where, with the exception of Bank's Peninsula, the climate is too severe for its culture, it is important to be able to show people a specimen of a plant which is so familiar to many other New Zealanders.

The banana family (*Musaceae*) is well represented and a towering specimen of *Strelitzia nicotia*, some 30 feet high, catches the eyes of most people, who generally mistake it for a banana. This species was for many years wrongly called *S. augusta*. The banana itself is represented by the common plantain (*Musa paradisiaca*), and two clones of *M. acuminata*. These are 'Gros Michel' which regularly produces large bunches of fine quality fruit, and 'Dwarf Cavendish'. The so-called Abyssinian banana (*Ensete ventricosum*) is also represented. This species is perhaps more commonly known under its old name of *Musa ensete*.

One family with a large representation in this house is the *Araceae*, and in the 'jungle' there are several well grown specimens of *Alocasia macrorrhiza* over 8 feet in height, and a plant of *Monstera deliciosa* has so taken charge of an old palm trunk, that people may be forgiven if they think that the *Monstera* has a trunk 2 feet thick. However, it is on the side benches that the majority of aroids are displayed. They are too numerous to mention at length, but it is sufficient to say that they are represented by 15 genera and 95 species and cultivars. One interesting fact which many people find amazing is that the flowers of some species of aroids evolve considerable heat. In fact with some of the tropical species the spadix may develop heat which is up to 22°F or more above that of the surrounding air.

Over the past three to four years we have been building up a collection of ferns of the South Pacific and with plants from New Caledonia, Fiji, the Cook Islands, and New Zealand there is already a considerable collection. The taxonomy of these ferns is being studied by Mr. G. Brownlie of the University of Canterbury, who has been responsible for identifying many of the species, so that as well as having some aesthetic appeal a collection of this nature can serve a truly useful purpose.

Running around Cuninghame House is a gallery which not only provides additional bench space but it also enables visitors to look down upon various parts of the 'jungle' from different viewpoints, and to see some of the taller plants at more or less eye-level. In the gallery the flowering plants and those with highly coloured foliage which demand more light are grown.

On one bench a permanent display of bromeliads is arranged and, with a locality map and informative labels, it is both interesting and attractive throughout the year. In this display a succession of flowering plants is maintained, the more colourful species such as *Aechmea weilbachii*, *Tillandsia lindeniana*, and *Vriesia carinata* being grown in slightly larger quantities. The diversity of the family and various aspects concerning it are illustrated with individual plants so that by the time a person has studied the whole display quite a quantity of information has been absorbed.

In Townend House the variety of plants displayed is much smaller, the accent being on bold displays of flowering plants. However, even in this house, the opportunity of making the displays informative is not lost. Due to the nature of the plants being grown this is not so easy, but it can be done. For example, during the winter, cyclamen from one of the main displays, and usually a small group of the wild form of *Cyclamen persicum* is displayed alongside, so that people can see the way one species of plant has been developed by a process of breeding and selection, without resort to hybridisation. At present a display of house plants is being featured, and in it the accent is on those which are spectacular but not always easy to grow.

During the coming year it is intended to highlight the other flowering displays with informative labelling. People admire plants such as tuberous begonias, chrysanthemums, and cinerarias but usually they do not realise the interesting stories which often lie behind the development of these plants.

In the Garrick Cactus and Succulent House there is ample material on which to work and, as less than a half of the collection is on display at any one time, it is quite easy to change the displays frequently. One of the greatest attractions is the display of mimicry plants such as *Lithops*, *Pleiospilos*, *Argyroderma*, and *Titanopsis* which is arranged as a natural display. It is quite amusing to see the reactions of people who start to

pass by what they imagine to be nothing but an area of stones, and then suddenly discover that some of the 'stones' are indeed plants. In this house it is possible to set up displays showing the differences between cacti and succulents, the way similarity of habitat often induces like forms in totally unrelated plants, and the way that some cacti grow under very arid conditions, while others inhabit tropical forests and grow as epiphytes.

The main thing to be borne in mind with such displays is that John Citizen comes not only to stare, but providing the information is presented in a suitable manner, he is interested in learning something about the plants he sees. It is the duty of these Gardens to supply such information.

STENANTHIUM ROBUSTUM

G. A. R. PHILLIPS

My first acquaintance with this herbaceous perennial was by means of a photograph of a stately colony of it which appeared in the massive plant catalogue published by Messrs. Gauntlett of Chiddingfold, in the South of England. The herbaceous foreman of Hewitt & Co. Ltd., of Solihull, Warwickshire, told me that he had grown it years ago in the Northern Counties and it had grown tolerably well. It was by no means in general supply and the only firm offering it at the time was Messrs. B. Ruys, Royal Moerheim Nurseries, Dedemsvaart, Holland. From them I procured a dozen plants.

The popular name of this little-known plant is Feather Fleece and is quite descriptive. The plant is a strong clump of iris-like foliage, glaucous green in colour. The flower stems are tubular and carry the fleecy flower spikes from early summer for many weeks. The flowers are borne on stems up to 4 or 5 feet and comprise graceful spikes of many small cream bell flowers, attractively fringed. These are sweetly fragrant and this is particularly noticeable when cut flower spikes are brought indoors. The length of the inflorescence is between a foot and a foot and a half.

Stenanthium robustum is not an easy perennial. We found that it grew well in light loam soil to which fibrous peat had been added and fertilizer in the form of a coarse grade of bone dust. Drainage needed to be beyond reproach and any tendency towards wet soil, for any lengthy period in winter, proved to be disastrous. It is a native of the south-eastern United States and did not appear to object to the rigors of a winter in Northern Europe. In the Midland Counties of England and in Holland there were very few losses through cold, especially if blanketed with snow. Increase is by means of seed, which is slow to germinate, and even more slow to develop seedlings large enough to flower. Established clumps can be lifted and divided, an intricate operation involving the disentangling of a mass of intertwined stems.



Stenanthium robustum (see page 129)

(Photograph — Reginald A. Malby & Co.)

NOTES FROM DUNEDIN

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

Late summer and autumn in Dunedin this season caused some headaches to local gardeners. Those who were unable to devote as much time as they would have liked to to their gardens, and people whose gardening activities are limited by physical disabilities, were particularly affected. February, March and April, although warm and mild were notable for less sunshine than usual, while periods of gentle rain were more frequent. The result of these conditions was that such sun-loving plants as dahlias, petunias, *Phlox* and geraniums tended to make strong foliage growth rather than producing good crops of flowers. Some plants however, were in their element. Fuchsias, summer-flowering *Clematis*, hydrangeas, *Clethra arborea* amongst shrubs, with herbaceous plants like *Gentiana sino-ornata*, autumn flowering crocuses and colchicums were noticeable for flowering well, and not going over quickly. Unusual weather conditions favouring certain plants is to be expected, when it is possible to grow together in gardens such a wide variety of plants from many different ecological areas.

Possibly the main effects of an unusual season noticed by gardeners were the exceptional grass growth on lawns, and the need for constant weeding. It was difficult to find lawns dry enough to cut, when time spent in the garden was limited to weekends. The constant succession of crops of annual weeds—shepherd's purse, chickweed, groundsel, *Poa annua*, due to the soil being constantly warm and moist, made weeding a never-ending job in gardens of any size, where ease of maintenance had not been studied.

In retrospect then, with a new planting season at hand, our thoughts are directed to ways and means of making gardening easier. In Dunedin, where even under normal conditions, grass mowing and weeding are constant jobs for at least 8 months of the year, ease of maintenance is an aspect of garden planning which requires particular attention. When we are keen, in good health, with ample spare time, it is very simple to overlook this point. It is when we become busier with other interests, not so fit or maybe not quite so keen as we used to be, that we start thinking on these lines. Those who planned for this change from the beginning are very fortunate to have had the wisdom to do so. For many of us who did not realise the need at that time it is more difficult to accomplish with established gardens, for it means work now to lessen future labours.

The bulk of garden work in the Dunedin area consists of grass-cutting, weeding, hedge trimming and digging. This type of work, besides being time and energy consuming, is the least enjoyable for many gardeners, although some do reap a great deal of satisfaction in doing it well. In some ways gardening is much easier in summer and in drier climates where soils are easier to work, grass growth slackens in the dry

months, and weeds are easier to handle. In Dunedin with its heavy soils it is necessary to be keen to have a good garden. The reward is in being able to grow well a much wider range of the really choice plants than is possible in some of these more favoured areas. The quick growth, flamboyant colours and luscious fruits of some northern districts can cause envious feelings to visitors from the south, but it is always refreshing to return to areas where plants which delight in cooler conditions are so much more at home. Many of the smaller alpine and rockgarden plants are particularly appealing. The smaller bulbous plants in their infinite variety have a charm all of their own, being very satisfying to grow well. Those herbaceous plants that flourish in woodlands — primulas, *Meconopsis*, campanulas, *Eremurus*, lily species, hostas and others, when planted in suitable places, widen the range of interest in late spring and summer.

Plants with glaucous foliage, woolly and hairy leaves and stems, or covered with tomentum of silver or rust coloured indumentum are often cool climate plants. These have a special attraction, being invaluable for planting as individuals or in groups for foliage effect. They act as a foil for brighter colours and help colour schemes in general. They are to be found among all types of plant life from cedars, firs and spruces to rhododendrons, senecios, stachys, Sea Holly and saxifrages. Many aristocrats among flowering shrubs prefer our southern climate

New Zealand Trades Certification Board Examinations
Entries for the November written examinations close on
1st August, 1965.

Application forms are available from Technical Colleges (for enrolled students) District Offices of the Department of Labour or The Secretary, N.Z. Trades Certification Board, Private Bag, Wellington South.

Candidates should ensure the early lodgment of their entries.



too. Magnolias, rhododendrons, eucryphias, *Cornus*, *Kalmia*, *Lapageria*, *Clematis*, and ericas are some that come readily to mind. Providing they are planted in suitable situations and given the right cultivation most of the foregoing plants are especially happy in Dunedin gardens. This is where good garden planning is so important in that gardeners may grow and enjoy them without it becoming a burden to do so.

In any district the boundaries of a garden are all important. The aim should be to disguise them in such a manner that they appear to merge into the surrounding landscape to give the effect that they are not there at all. They should also be self maintaining as much as possible. This can only be done by striving for informality which means clothing walls and fences with climbing or scrambling plants or screening them with trees and shrubs. Clipped hedges must be avoided, being replaced with informal ones. To be effective as a protective screen they must be dense and almost impenetrable. For this purpose more space is required than for the normal heavily trimmed hedge. For gardens with limited space small growing shrubs must be used, being allowed sufficient room to develop naturally. Some plants suitable for informal hedges in this locality are *Abelia grandiflora*, *Fuchsia riccartonii*, *Camellia japonica*, *Hydrangea*, *Berberis stenophylla*, *Azalea mollis*, *Erica carnea*. For internal hedges evergreen azaleas and some small growing rhododendrons and hardy ericas could be used.

In the south it is possible to form good lawns of fine grasses. This is done by sowing brown top and chewing fescue, followed by regular dressings of a mixture comprising 3 parts sulphate of ammonia and 1 part superphosphate. This mixture creates soil conditions favourable for healthy growth of the fine grasses, but discourages coarse grasses and perennial weeds.

Good garden design avoids extensive verges and odd flower beds in the lawn, which involve a considerable amount of labour. Also shrubs growing in the lawn should be avoided, being interruptions to mowing. A small motorised, reel-type mower will soon repay its initial expense in a saving of time and labour.

Weeding can be reduced to an amazing extent by employing good gardening methods. For this, mulching in one or other of its many forms is of vital importance. When used in sufficient quantities the germination of weed seeds present in the soil, will be prevented. Any perennial weeds which happen to appear to push through can be easily forked out with their entire root system intact. Waste organic materials such as half decayed or even fresh straw, well rotted sawdust or shavings, spent hops, well made compost and thin applications of lawn grass mowings, can all be used with the desired effect amongst shrubs and flower borders, between rows of vegetables and around fruit trees and small fruits in the kitchen garden. Black polythene in 6 feet widths, if spread out on vacant ground when moist, weighed down with turves, bricks or odd lengths of timber, will kill weeds and encourage worm

action. If lifted after a month or two the soil is usually in such a condition that it can easily be stirred and broken up for sowing and planting with a border fork, without having to be dug in the normal fashion. This is also advantageous in keeping decaying vegetable matter, and humus near the surface.

The other chief means of reducing weeds is by controlling their germination and spread by using natural ground cover. This can be done by planting low-growing, spreading, evergreen shrubs as much as possible, instead of forming mixed flower beds and borders. Groups of perennials and annuals can be placed amongst the shrubs so that there is little soil surface exposed for weed seed germination. Ground cover is also obtained by planting in the mulching material towards the front of shrub borders and along paths, suitable herbaceous plants which spread by means of stolons, offsets or runners, forming mat plants. Very often the lowest growing ones of this type may be allowed to flow over groups of small bulbs, as a permanent ground cover, through which the bulbs will still be able to push their way. Quite a lot of weeding in rockgardens can be eliminated by this method of planting.

Attractive shrubs well suited for ground cover purposes in Dunedin are evergreen azaleas, both *indica* and *kurume*, small growing but not dwarf rhododendrons, hardy ericas, callunas, Irish heaths, pernettyas, *Cistus*, prostrate rosemary, grevilleas and hebes. Mat forming plants useful for foliage effect as well as for bloom are many. *Ajuga* is one of the best of the quick spreading ones. Several varieties are obtainable varying in size and shade of blue. Dwarf periwinkles are excellent for clothing banks. For the front of borders aubretia, rockgarden phloxes, dwarf thymes, *Stachys macrantha*, and some native sub-alpine plants such as *Helichrysum bellidioides*, veronicas and *Pratia* are all excellent.

It is important for good weed control to spread the mulching material over the soil surface before planting. Young plants will then be able to spread quickly without seedling weeds coming up through them.

PARKS AND GARDENS OF NORTH AMERICA

H. T. BEVERIDGE (*Superintendent of Gardens and Reserves, Timaru*).
An Address presented at the Park Administration Conference, Hamilton, 1965.

The Changing Post-war Years

The years since the last war have witnessed great technical and social change in North America, and not least is change evident in the realm of horticulture.

Visiting recently with my wife, after 16 years absence, many differences were observed as we crossed the continent from west to east, Vancouver B.C. to Philadelphia, U.S.A. Ten weeks were spent in the eastern States and Canadian Provinces before returning to Vancouver.

The vastness and seeming emptiness of much of the western and central portions of Canada and U.S.A. lent the greater emphasis to the mounting congestion of the eastern cities. We were to see many instances of decayed hearts of metropolitan areas being bulldozed away, to be replaced by spacious gardens, and much other evidence of bold planning. Street trees were being planted in the downtown sidewalks of New York City, where trees had not been grown before. In parts where underground pipes or wires or other technical consideration prevented such planting, large trees were growing in wooden or concrete containers. It appeared that cost and inconvenience were secondary considerations in the urgent need to soften the face of the concrete jungle. It seemed, too, there was a greater awareness of aesthetic qualities, by the controlling authorities, than in years past.

It is true that development of parks and all manner of horticultural planning was arrested or hindered by the depression of the '30s, and by the war and its immediate aftermath. But, during the past decade, aided by a buoyant economy, ideas mooted in the earlier period have emerged strongly and are coming to fruition with evident public support and approval.

At this point I should like to quote from an editorial appearing in a recent issue of a *Journal of the Institute of Park Administration of Great Britain*. Under the heading of 'Leisure Parks for Tomorrow' I quote in part as follows: 'In the nineteen-fifties one of the interesting developments has been the recognition of the value of parks and open spaces in the new towns but, to the knowledgeable, it has been evident that their provision, architect inspired and designed, has lacked the continuity and unity of designs and purpose which the park administrator would have ensured.

The profession of park administration, in the minds of some other professions has been regarded erroneously as representing horticulture solely, controlling a purely horticultural service.

It is important that the image should reflect the many facets of the public parks and ancillary services, beyond fundamental natural art and sciences, so that the park administrator will be recognised for the contributions he is competent to make not only to the town plan but also to the social structure. The nineteen-sixties are at last realising that policy statements for recreation made by park administrators over the past forty years, which in an often unresponsive atmosphere they have striven to implement, are now almost a number one social priority and, in the remaining years of this Century, we are confident that "Leisure Parks" will fulfill the promise inherent in the continuous development of the public parks and ancillary services system.'

In short, the wider the range of contact upon the social structure the more meaningful the Parks existence. It seemed significant that one does not hear of Parks and Reserves in North America but instead, of Parks and Recreation. Inevitably, our Reserves in New Zealand, too, must come to serve in ultimate recreational uses.

Zoos in Parks

By no means new, but more common than in earlier years most of the larger cities had zoos as an integral part of the public park. Laid out in much that was good in the older tradition and frequently with a new enlightened approach, zoos are better than they were inside and outside of the restraining bars. Bars were less conspicuous, if they existed at all. Tigers on a moat-girt island looked natural and not unhappy in their confinement. Greater naturalness of environment of zoo animals was apparent everywhere.

In most of Canada and in the Northern States winters are severe, and the ground is frozen solidly for about four months. A refreshing counter to the severity of the long winter was seen in the Public Park of Calgary, Alberta where a series of large adjoining glasshouses contained a collection of exotic birds in the midst of a setting of lawns and trees and shrubs. The interior arrangement was quite informal with natural rock freely used in conjunction with flowing streams and waterfalls.

Calgary and its surrounding neighbourhood is often indented geologically with the mesozoic age of more than one million years ago — the age of dinosaurs, and the fossil remains of many species have been found in the area. It may seem appropriate therefore that exact looking replicas have been sculptured in concrete and placed strategically in a woodland of the park to educate, interest, frighten or to amuse the visitors.

Pioneer Villages

Well beyond the expanding city boundaries, Pioneer Villages have recently come into being. With the objective of preserving an insight into the every day life of the early settlers, district authorities have, in parts, assembled on suitable areas various relics, farm implements, ancient buildings and other antiques. Some of the devices for pumping, boring and for working the land were ingenious but reflecting at the same time the technological limits of the late 18th or early 19th centuries. Pit sawn timber buildings and log cabins, rustically furnished, spoke eloquently of the primitive past. The Pioneer Village is a museum in the truest sense from its setting and location. Of particular importance in this project is 'Participation' of groups and school classes — with discipline.

Control permits youngsters to actually hammer a red hot iron bar on the anvil, and the girls to spin yarn and operate looms, bake bread etc. Pilot schemes have been highly successful and plans are afoot to enlarge the scope for the future. Usually financed by the local authority, Pioneer Villages are helping citizens to review with interest and understanding the early history of their country.

A small admission charge, usually one dollar per car is collected by a caretaker on entering the parking grounds. Much could be said in favour of establishing Pioneer Villages in New Zealand. Educationally and financially they would almost certainly succeed if located near to our larger centres of population.

Park Illuminations

It could be that, in this technical age, bright artificial lighting has become integrally part of our lives. We expect it and like it. In the larger cities it is not unusual to extend the useful hours in the public parks by the use of illuminations. The gain is not only in extra visiting hours (much appreciated by visitors) but the gardens, artistically lit up, present a very different visual experience from their day time viewing.

White or amber lighting was most commonly seen but interesting and sometimes dramatic effects were obtained in the use of other colours, too. Possibilities with lighting up of shrubberies from various angles seemed endless. White illumination on a flower bed offered a unique spectacle. In the main, lighting equipment was readily moveable from one part to another and was unobtrusive when in use. The extensive coloured lighting of Niagara Falls might seem audacious to some, but that nightly brilliant spectacle is usually greeted by visitors with silent wonder.

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National Parks

Selected sites now forming a chain of natural sanctuaries across the American Continent have been established for the benefit, education and enjoyment of present and future generations. In Canada alone there are 18 National Parks covering almost 30,000 square miles. Special care is taken to preserve as nearly as possible the natural appearance of the countryside. Directional signs, seats, tables and other amenities are of primitive but functional design, pleasing and appropriate to the setting.

To help visitors enjoy the National Parks and to learn more about them an Interpretation Service is provided. This includes tours and Nature talks illustrated with colour slides and films explaining the purpose and natural phenomena of the Park. Administration is by a resident superintendent and Park wardens stationed in the various districts of the Park. The Canadian Royal Mounted Police help maintain law and order.

A wide range of accommodation is available to visitors from finest modern hotels to simple type log cabins. Use of the cabins is free as are water and fuel supplies. Throughout the parks many miles of trails are maintained in almost complete naturalness. The declared endeavour is to help visitors escape for a time the pressures of busy lives and to seek the peace and quietness of forest glades. Selected trails are developed as nature trails where different species of trees, shrubs and wild flowers are identified by label.

In the Rocky Mountains to the west of Calgary lies Banff National Park one of Canada's best known Parks.

It is 2,564 square miles in extent.

Butchard Gardens

Designed by the Butchard family fifty years ago near Victoria B.C. the Butchard Gardens are widely known. Favoured with the mild climate of coastal British Columbia tender plants not to be seen in other parts of Canada are grown to perfection. Twenty-five acres in extent, special features include an English Rose Garden, an Italian and a Japanese Garden. Developed around an abandoned limestone quarry, there are strong contrasts of rock faces, a large range of plant material, water in abundance along with varying elevations from sunken gardens to prominences.

The Butchard Gardens are open the year around and until 11 pm in summer. They are extensively illuminated in the evening hours. Full bus ranks and car parking lots testified to the presence of hundreds of

visitors at the times of our visits. The gardens are now in the care of the Victoria City Council and the admission is one dollar fifty cents, (10/6.)

Storyland Valley

A recent development of the Edmonton Park and Recreational Department Storyland Valley is a world of make-believe. Set in the outskirts of the city it has gained immediate public interest and support. It is aptly described as 'having the fantasy of a story-book fairy-land to amuse and delight both children and adults.' Four and a half acres in extent it cost 600,000 dollars, (£200,000) in construction. Besides depicting the storybook characters of Humpty Dumpty, Three Men In A Tub, The Three Pigs, Noah's Ark, etc., there are two hundred animals and birds on display.

Open to the public 12 noon to 8 pm during the warmer six months of the year, annual paid admissions of 25 cents for adults and 10 cents for children amounted to one quarter of a million. Edmonton's population is 335,000.

Private Parks Open to the Public

Millions of dollars have been invested in Parks and Gardens as corporate business, and Happy Valley on the western outskirts of Calgary is a typical example of such a pleasure park. One dollar per car is entry fee with separate charges for go-cart racing, golf, heated pool etc. One may even fish from any of the well stocked trout pools, with all necessary gear supplied. The catch is cleaned and wrapped in cellophane at 10 cents, (8½d) an inch.

The 400 acre park is open throughout the year. A ski lift operates in winter and there are such winter sports as skating, tobogganing and sleigh rides. There are dance floors and a restaurant.

Knottes Berry Farm

From a small family business, selling home made boysenberry pies and coffee at a way-side stand near Los Angeles, California, this has grown to a giant enterprise. In park-like surroundings its chief fame lies in the restored silver mining ghost town. Regular re-enactments provide the opportunity to glimpse the rough life of frontier days.

The spacious parking lot takes up to six thousand cars, there are nine hundred employees, and as a final statistic there are annually served in the restaurant two million chicken dinners.

Disneyland

It is true that Disneyland on the outskirts of Los Angeles is an Amusement Park, but it is much more besides. It has been designed with truly creative ability. It has direct educational as well as lively entertaining value. Visitors to the Park usually are thrilled at the prospect of a ride in a submarine, especially when to most it is a 'first time'. It was so with us as we cruised down amidst 'the ruins of the lost Continent of the Atlantis'.

One can but marvel at the ingenuity and daring of Walt Disney on gazing upwards over hundreds of feet to the peak of the 'Matterhorn' mountain. This is an exact model of the mountain of the same name. Its peak clad in synthetic snow, its sides partly clothed in conifer trees and wild-flowers, and one is suddenly aware there is a mountaineering party up near the top equipped with ropes and irons, and grappling with the problems of their ascent. Later we were cruising with a party of twelve others along a jungle river flanked on either side by tall specimen trees (planted 1955 as large trees). There was the incessant chatter of parrots overhead, crocodiles encircled the launch and looked more vicious than any I had ever seen before as they snapped their wicked looking jaws shut, inches from our slight craft. Gorillas peered from the screen of bushes on the shore line, and other animals fled before our approach.

A herd of twenty elephants at the Sacred Pool trumpeted shrilly as we sailed through their scattered midst. A leading bull made a near miss as he blew a trunkful of water at us and a baby elephant alongside danced in derision as we lightly mopped away the drifted spray from our clothing. Our guide who was also skipper of the launch had earlier warned of head-hunters, and we were not to be disappointed, for as we rounded a bend in the river we came upon a party of wild looking savages dancing around a brightly burning fire, above which was suspended a cooking pot. They chanted as they danced and brandished their spears as we drew abreast and passed them. A string of shrunken heads hung from the branches of a bush near by.

At Disneyland, fantasy has moved immeasurably closer to realism. Electronics of a new order clothed with imperishable plastics combine to produce models that look exactly life-like in appearance, in movement and expression. Automation has made a giant contribution to human recreation. Average daily attendance at Disneyland was 35,000 and paid admission to the grounds cost one dollar and sixty cents, (11/3).

There are 3,000 employees and the cost of construction ten years ago was 44 million dollars. Thirty gardeners tend the 700 plant species within Disneylands 250 acres. National Geographic Magazine describes it as a 'must' for visiting horticulturists.

NOTES FROM PUKEKURA PARK

A. D. JELLYMAN, N.D.H.(N.Z.)

The land upon which New Plymouth is sited rises immediately from the sea shore towards Mount Egmont and the adjacent ranges. This land rise can be appreciated when you consider that Marsland Hill weather station is 142 feet above sea level yet barely a half mile inland. Part of the coastline consists of sandy beaches and dunes, whilst other portions have vertical cliffs at whose bases the sea pounds away.

Along this coastline the full force of the prevailing westerly winds is experienced to such an extent, that the maintenance of a display of garden plants is quite an undertaking.

There are several parks under our Reserves Department's direction, some of them established with plantings and others in the process of being developed. All of these parks are fully exposed to the westerly and northerly salt laden winds and demand special thought when it comes to selecting plant material for them. It is wasted time and labour attempting to establish ornamental plants along these areas without some shelter to break the winds, so for the present I will content myself to write about the natural growth along the coast.

Taupata (*Coprosma repens*) is a distinctive plant along our coast which is as salt resistant as any plant I know. The shining green leaves are sometimes discoloured and disfigured, this stocky bush is wind-swept in appearance, but grows in dense thickets that give a surprising amount of shelter. Associated with taupata is the karo (*Pittosporum crassifolium*) whose leathery leaves are sometimes confused with pohutukawa, but plants are easily distinguished by a defined smell and the mucilage that embeds the seeds in the prominent seed capsule. Both of these trees will grow into mounds of vegetation 10 feet or so high, and have the same capacity for seeding freely; germinating seedlings can be seen in great numbers under many of the bushes. Once the juvenile stage leaves have disappeared the pohutukawa (*Metrosideros excelsa*) is quite hardy and will make good trees to break up the force of the wind. Another common plant along the coast is the flax, *Phormium tenax*. Despite the leaves becoming rather shredded, plants are remarkably robust. The tainui (*Pomaderris apetala*) is another which shows considerable resistance to wind but is easily cut by strong gusts when in young growth.

Besides these plants there are some exotics which are really flourishing and never seem to mind a diet of salt with the accompanying wind. The Phoenix palm (*Phoenix canariensis*) and Norfolk Pine, (*Araucaria excelsa*) both flourish at Ngamotu Beach. Further along the coast at Kawaroa Park the prickly coned *Pinus muricata* forms rather nuggety trees about 25 feet in height. At Mt. Bryan, *Yucca gloriosa* and *Acanthus mollis* both thrive. The former has rosettes of glaucous, sword like, erect leaves, terminated by densely packed inflorescences 5 feet high of large cream pink veined flowers. The latter, commonly known as Bears' Breeches, is an excellent feature as ground cover, having such dark green shining leaves cut in a pattern similar to the variegated thistle. On windswept Paritutu Centennial Park there are several plants thriving with only the scantiest of shelter. Among these is a large Cape Silver Tree, *Leucadendron argenteum*, which is now 15 feet high, spreads almost 25 feet and owns a 12 inch trunk diameter at its base. Both *Hymenanchera crassifolia* and *H. novae-zealandiae* are thriving as low spreading bushes as is also the silver leafed, *Atriplex halimus* nearby.

In recent years new plantings have been undertaken, and to a degree they were successful but, on the other hand, a fair share of disappointments has been experienced. At Kawaroa plantings of *Pseudopanax* 'Mercury Bay' form, *Banksia integrifolia*, *B. serrata* and *Spartium junceum* were made. All these plants were protected by a young taupata hedge which tapered away from one end to the other until it was barely 1½ft. high. The result after one year was that all plants at the low end were cut down to almost ground level whilst those at the sheltered end of the border were comparatively robust and healthy. A similar experience has been witnessed at the City swimming pool in this Park. A hedge for screening purposes was required inside a wire mesh fence. The Australian Sheoke, *Casuarina stricta* is admirably suited to this, as it may be trained to a narrow dense hedge needing trimming once a year only. Plants were planted 1½ft. apart in well prepared soil but, as in the case of the other plants mentioned, they have been reduced to a mass of small shoots at their base.

At Mt. Bryan an even more extensive planting was carried out on two borders each receiving shelter from surrounding copses of taupata, karo community and a pohutukawa hedge. At the same time part of the borders bridged completely exposed gaps. The planting was made in bold groups of densely planted material with focal points of some single selected plants, that were planned to grow up among other material and sustain the shelter provided by its neighbours. Generally these plants in the lee of the taupata survived the extremes quite well, but in both cases of completely open gaps a tough subject such as *Corokia cotoneaster* was killed outright. Several less hardy plants, *Protea longiflora*, *Olearia gunniana* 'Blue Gem', *Leucospermum bolusii*, *Ceanothus edwardsii* suffered the same fate. Along the rest of the border some plants of Australian origin were lost, *Melaluca*, *Grevillea glabrata*, *Kunzea baxteri*, *Banksia ericaefolia*, *Eucalyptus* and a *Callistemon*. The South African plants, too, suffered a percentage of casualties particularly in the open gaps, thus losses were encountered in *Protea*, *Leucadendron* and *Leucospermum* species.

Despite these losses many plants grew remarkably well and showed no regrets for their home whatsoever. A large bay of *Rosmarinus lavandulaceus* grew profusely, while further along the front row, *Felicia-amelloides* 'Santa Anita' made remarkable growth. *Cistus* 'Gallipoli' made growth as healthy as the above plants and seems to hold hope for the yellow flowered grey leaved *Halimium lasianthum* var. *formosum*, a closely allied plant from Portugal. *Hebe laingii* and *H. albicans* grew moderately well, whilst *H. andersonii* 'Variegata' and *H. lobellioides* have revelled in the situation. The grey leaved *Senecio laxifolius*, and *compacta* both are growing quite well and the various ornamental flaxes are quite undamaged. So far as flourishing plants are concerned it is noticeable that in most cases these are squat compact bushes, and generally the taller background plants while they are surviving will not show this apparent vigour as seen in the younger plants.

Truly this seaside planting is a hazardous undertaking in these conditions yet, from the foregoing, several conclusions can be reached. Shelter is the most important equipment for any such planting. Should it not exist then create some and reduce the force and siting of the wind where possible. The effect of this has been at East End Beach where pohutukawas have been planted along the area, protected by heavy sacking on the seaside. This has resulted in good growth and very little damage in their first year which is a crucial step towards establishment. Planting will need to be fairly dense to survive the strong winds and the best way to do this would be to plan the proposed area with the plants selected placed at distances suitable for mature plants. Having done this, plant around these with cheap, easily grown plants that will grow rapidly and provide shelter, yet can at a later date be trimmed back to make room for the developing feature plant. Dividends are rewarded by thorough preparation of planting sites for plants. Should the soil be sandy import some good turfy loam or even clay and remove all sand from the individual sites, replacing it with the imported soil. This at least will give the plants a more moisture retentive medium for establishment.

To deal with these shrubs and plants that may act as 'fillers' I wish to list a few that appear to me to be useful. *Atriplex halimus* is grown easily from hardwood cuttings, *Correa alba* shows much salt wind resistance and grows quickly in prepared sites, but is sometimes slow rooting as a hardwood open ground cutting. Almost any of the *Hebe speciosa* group will grow rapidly from cuttings and make a quick shrub for the intended purpose. *Plumbago capensis*, *Santolina*, *Lavandula* and *Senecio* will all grow as hardwood cuttings outdoors if taken in late autumn. Creeping rosemary, *Rosmarinus lavandulaceus* is better taken from established plants. Seedlings can be collected of *Cistus*, taupata, tainui and karo and grown on. Side shoots may be severed from flax and planted up for a year in a sheltered place before positioning in an exposed border.

These are but some of the plants that will be of use in exposed situations, and I have no doubt there are many others. Anybody faced with this type of planting would be well advised to keep to plants which can be seen flourishing in the locality first and get them growing well before progressing to plants of less tested hardiness.

PUBLICATIONS RECEIVED

CURTIS'S BOTANICAL MAGAZINE, edited by Sir George Taylor, D.Sc., V.M.H., F.L.S., Director, Royal Botanic Gardens, Kew. Published by the Royal Horticultural Society, London. Vol. CLXXV, Part I (New Series).

Although there is only one Australian plant included in this issue, there are a number that are of interest to New Zealand horticulturists. The Australian is *Glossodia major*, a member of the *Orchidaceae*, native to all States, except Western Australia, and Tasmania. It has slender stems bearing small but attractive blue or violet flowers. *Gaultheria elliptica*, from Brazil, is closely

allied to *Pernettya* and *Leucothoe*, bearing clusters of short stems of reddish pink bell flowers in white calyces. A charming *Iris* of the *oncocyclus* group is *I. demawendica*, from Iran. It has the form typical of this group, with standards of bluish mauve and falls of reddish mauve. *Abutilon ochsenii*, from Chile, has nicely rounded, wide open lavender blue flowers with golden orange anthers; it should be very suitable for North Island conditions. Other plants included in this issue are *Manglietia insignis*, of the *Magnolia* family with sulphur flowers and rich red seed heads (Central Himalaya); *Euphorbia wallichii* (Afghanistan); *Ehretia thyrsoflora* (China, Japan and Korea); *Cyclamen creticum* (Crete); *Holboellia coriacea* (Central China); *Primula warshenewskiana* subsp. *rhodantha*, a dwarf species from moist meadows in Eastern Afghanistan; *Trillium rivale* (Western North America).

AN APPEAL TO ALL DISTRICT COUNCIL SECRETARIES

At the Annual Conference held at Hamilton in February it was decided 'That District Council notes be re-instated in the Journal with restricted space and re-edited where necessary: the exclusion of such notes is causing concern as they are considered to be of interest to the majority of members—the general readers—the parochial nature of the notes creating such interest.'

In order to be able to include notes of the activities of the District Councils, and any items of particular horticultural interest such as reports of unusual plants, outstanding specimen trees, plant breeding, etc. it is necessary that the Editor should receive copy not later than the following dates:

10th August for inclusion in the September issue

30th October for inclusion in the December issue (to escape the Christmas rush)

10th February for inclusion in the March issue

10th May for inclusion in the June issue

Please address to The Editor, N.Z. Plants and Gardens, P.O. Box 5, Paraparaumu. (All copy should be clearly typed with double spacing.)

DISTRICT COUNCIL REPORTS

NORTH TARANAKI

The first evening meeting for 1965 began with a good attendance of over seventy people for a distinguished speaker, Mr. W. R. Stevens, of Wanganui. Mr. Stevens spoke on the trips he and his wife made to South Africa last autumn. His main mission was to collect leucodendrons and other proteaceous plants and to this end he was very successful. The condition of leucadendrons and proteas in the wild were rather sparse in growth compared with the New Zealand grown specimens. The reason for this, he said, was the lack of humus, hard conditions and lack of pruning. It was interesting to hear Mr. Stevens say that to every plant he planted he gave a site prepared with compost and, failing that, an application of fertilizer. With regular pruning leucadendrons

should live for ten to fifteen years. Perhaps the most interesting point about the *Proteaceae* in South Africa was that *Phytophthora* the root fungus was in evidence in the northern parts. One grower reported the sudden, unaccountable death of a batch of *Serruria florida*, but did not know that *Phytophthora* had been responsible.

In Northern Transvaal, Mr. Stevens spoke of a pit prop industry using *Eucalyptus lehmannii*, whose growth was so rapid that they matured for use in seven years. In this area *Pinus patula* was also widely grown.

Besides speaking about his collecting of *Protea* and *Leucadendron* seed, some time was spent collecting ericas and seeds of bulbous plants. Mr. Stevens spent countless hours sieving and cleaning seeds for dispatch to New Zealand. In some cases from large quantities of seed capsules the seeds collected would barely cover a threepenny bit and of these in some cases just a few plants grow. Mr. Stevens brought back twenty species of *Erica* not known in this country, plus much other material.

Several plants were given special mention. For instance, the lack of cultivation of *Brunia nodifolia* in New Zealand. This species grows about 3 ft high, has pure white pom pom heads and grows profusely among the leucadendrons which virtually are scrub plants in South Africa. A clone of *Protea mellifera* with pure white bracts with red centres greatly impressed Mr. Stevens and he had raised several seedlings of it, no doubt hoping for at least one identical to the clone.

The laws governing the protection of the South African wild flowers were full of anomalies and pitfalls, the emphasis being on conservation and not preservation. Thus rare species such as *Nerine marginata*, known to grow only in a few localities, were not allowed to be touched and no effort was being made to propagate and distribute them. Mr. Stevens advocated that the rare plants should have seeds collected and distributed as widely as possible to ensure continuity of the species.

A set of slides showing the type of landscape and the plants formed the latter part of Mr Stevens' talk. In conclusion, Mr Stevens said, 'Never let anyone tell you that you can't grow a plant in your climate. Get hold of stock of the plants and try and you'd be surprised at what you can grow'.

Mr. V. C. Davies passed the vote of thanks and paid tribute to Mr. Stevens' dedications to the Australian and South African floras and securing stock, growing it in New Zealand and even supplying stock back to the home countries of some plants. New Zealand owes a great deal to Mr. Stevens for many garden treasures, one of which comes to mind being *Kniphofia zululandia*, 'Winter Cheer'.

WHANGAREI

FEBRUARY

The lecturer at the November meeting was Mr. E. Farnell, F.R.I.H.(N.Z.) of Auckland, a noted grower and breeder of gerberas, whose advice on the cultivation and care of these popular plants is always listened to with attention and respect.

Mr. Farnell opened his lecture by saying that though the *Gerbera* is principally an African plant, it has become so well-known in New Zealand and as this country leads the world in the breeding of gerberas the N.Z. Gerbera Society has been appointed the authority on the nomenclature of the species and cultivars.

In recent years great advances had been made in plant breeding especially with lilliums also with *Hibiscus* of which latter many hundreds of hybrids were grown, some of which were being grown in New Zealand and showed great improvement in size and colour, though possibly not as hardy as older sorts.

Gerberas also had been much improved, and those of five to ten years ago were now out of date. Rose growers especially would realise how quickly older roses were superseded by newer hybrids. Who, for instance, now had a 'Marechal Neil' rose in his garden?

Though the *Gerbera* was generally thought of as a purely African plant, there were a few coming from other parts of the world—Siberia, Tibet and South America contributing species, but it was *Gerbera jamesonii* from Natal that was the source of our present-day plants and the progenitor of the many beautiful hybrids now grown.

In its native country the *Gerbera* grew under quite opposite climatic conditions from those here. It had very dry winter conditions and flowered in the wet spring, whereas our winters were wet and succeeding months dry. On this account special precautions were necessary to ensure good drainage in winter, and adequate moisture in summer.

All soils except very heavy ones were suitable for gerberas, but deep cultivation was required to secure the essential drainage. Digging should be two spits deep. In the initial preparation compost and bone dust could be incorporated with the soil but never blood and bone. Gerberas should be grown in separate beds.

No manuring should be done until growth was established. If plants were covered with polythene they would bloom in the winter, but the covers should not be removed till after the rains cease. If the covers were taken off too soon the plants became waterlogged and died.

Manuring should be very carefully done—little and often was far better than heavy doses at long intervals. Soils vary and so do their requirements but a useful mixture would be 2 parts superphosphate, 2 parts blood and bone and 1 part sulphate of potash. Always avoid too much nitrogenous manure as this induced too much foliage at the expense of flowers. Old leaves should be removed. Beds should be raised, especially for winter, but moisture supplied in hot weather.

When putting in young plants the roots should go straight down and not be spread out as is usual with most other garden subjects. When older plants were subdivided roots should be cut to four inches.

Diseases of gerberas were then dealt with. White rust was the commonest of these, and attacked the new leaves in October and November. This could be prevented by a regular course of spraying, though it could not be cured. All fungoid diseases needed heat and moisture together in order to grow. Spray should have a sticker with it to maintain protection. The spray recommended was Dithane M.45 used with the spreader Agral L.N.

Red spider was the worst pest attacking gerberas and a malathion spray would combat it.

White rust was known to develop in early spring, but when plants were kept dry under polythene it did not develop, so care should be taken when watering to keep the foliage dry.

Dividing of gerberas should be done in the first week of November. They were gross feeders and should receive a sprinkling of manure several times during the ensuing summer but none should be given after March.

As they impoverish the soil, gerberas should be lifted every two years in November, and leaves cut and roots shortened when subdividing and replanting, preferably in new plots. If in the old plot the soil should have compost added together with manure.

Good gerberas last a fortnight in water. They should have a stiff neck and should be picked early in the morning or after sunset, then have the bottom inch of stalk put in boiling water for a few seconds and then in cold water up to their necks. Water should be changed at intervals, and the addition of a few drops of disinfectant such as a very weak solution of Condy's Crystals would prevent the growth of bacteria.

When considering hybridisation of gerberas it was essential to realise that all double flowers were female, but single flowers were complete, that is, both male and female were present.

No seeds can set naturally on the doubles, so pollen must be transferred from the single flowers. Choose a fine mid-day to make the pollination. Look for the stigma on the female flower and using the finger or a camel hair brush dust it with the pollen. Care must be taken to see that the stigma is ready for pollination. If the style (the thin stalk-like thread that carries the stigma) is too long the stigma will not be fertile.

Seed should be sown as soon as ripe with the little parachute-like head above ground.

MARCH.

Mesdames McKinnel and May gave us some ideas for making small sections attractive and interesting in ways which are not beyond the horticultural or financial ability of the average gardener. Mrs. McKinnel, F.R.I.H.(N.Z.) dealt with the problems of varying types of section, and Mrs. May described in detail the construction of a rock garden, together with the types of plants suitable for it. Mrs. McKinnel opened her remarks with a stimulating thought: Australian gardens are said to have a typical layout, English gardens are renowned throughout the world for their naturalistic character, but she wondered if there were such a thing as a typical New Zealand garden.

Taking the small, flat section of one-fifth acre first, where the space between the house and the street was small, the possibilities were limited, but variety and interest could be provided by making a paved garden. Paving should not be of the crazy type, but of large, rectangular blocks set at varying angles and with enough space between for planting. Many low-growing plants could be established here, including some of the smallest conifers up to 2ft. in height. A pergola or trellis at the end would provide support for a creeper of not too rampant habit. To prevent too vigorous growth it might be planted in a container. A small pool set amidst the paving would add interest. Against the house rocks might be used to give a home for taller subjects.

Where space was not so limited and there was a small slope, it could be faced with stone and trailing plants grown above it. Taller plants should come nearer the house, and points of interest could be provided by such subjects as a pencil conifer or a weeping standard rose. The street frontage could be planted with a variety of small shrubs, whilst the main garden would be at the back.

In gardens of half an acre or more there was much greater scope and taller trees or shrubs used. Such areas could be greatly improved by the addition of some special feature such as a rock garden, a bog and water garden, and especially by a fernery. It was exceptional to find a fernery in a New Zealand garden, though our country is a land famous for ferns. Such a place would provide a cool retreat in hot weather. With a steep section the main concern is to conserve soil, so it is essential to terrace the site, bringing soil up from below to provide level areas around the house, and to reduce the steepness of other parts. If each terrace were faced with stone or brick, it added greatly to the general effect, besides giving ideal growing places for many ornamentals, either erect or drooping, over the edges. No stones should ever be painted. It was in bad taste and not in keeping with nature. All-the-year-round colour could be achieved in many ways and should not depend on annuals, but provided, especially in winter, by shrubs with coloured foliage, or by those which bloom at that time, such as *magnolias*, *camellias* and *luculia*. Ornaments should be used with the utmost discretion, but such things as bird baths or tables were in harmony with nature and added pleasure and interest.

Mrs. McKinnel's final suggestion was for a sunken garden, and though she had not seen any in New Zealand, she recommended it as a very beautiful

feature for anyone who could devote the space for such a purpose. One she remembered with great pleasure was in Scotland, and was of half an acre, planted with roses.

The Rock Garden

Mrs. May then gave members a lively and humorous account of making a rock garden which she considered could form a feature in any garden, however small. Nowhere else could one grow so many treasures in a limited space, as a well-constructed rockery provides suitable places for sun or shade-loving plants, and small ones or miniatures are safer in a pocket among the rocks than in the open garden. Large rocks enhance the beauty of such things as small conifers, particularly such as *Juniperus communis* 'Compressa' or *Juniperus horizontalis*, a spreading blue-mauve plant, all at home among the rocks. The brilliant red of *Anemone St. Bravo*, pink *Alstromeria hookeri*, only 6in. high, with the white bells of *Acis autumnalis* and the lovely *Cyclamen neapolitanum* make a lovely picture; so, too, purple crocus beside yellow *Sternbergia*, miniature daffodils and white hoop petticoats and *Gladiolus tristis* with its sweet perfume. Rock *Phlox* cover themselves with blossom and look well beside silvery *Artemisia* and the clear yellow flowers of *Anagallis linifolia*. *Leschenaultia biloba* from West Australia revels in the good drainage provided by scoria and in the heat reflected from rocks. In July, *Romulea sabulosa* is a mass of brilliant wine-coloured flowers. Some of the miniature roses make colourful groups, as well as the rock *Dianthus*, especially 'Mars'. These must have their roots tucked under a rock to ensure a cool root run. Dwarf ericas, coloured succulents and coloured foliage plants such as geraniums are all at home among the rocks. Some subaplines, native of N.Z. also do well, if suitably placed. Among these are several hebes — *youngii* and 'Winter Gold', also the parahebes *lyallii* and *catarrastae*. *Rubus parvus*, with bronzy leaves and rather large fruits, is a real gem from the West Coast of the South Island, and the female form of *Fuchsia procumbens* is a plant to be treasured anywhere.

One could build a rock garden almost anywhere, but if one is fortunate enough to have a natural slope, the work is half done. Never build under trees as drips are harmful to most plants. Drainage is the most essential requirement. This may be provided by excavating the site and putting in a good amount of coarse stone or gravel. Next will come a very porous mixture of good loam and scoria, about one yard of scoria (fine) to six of earth, the whole topped off with fine scoria. Rocks should be rather large and buried in the soil at least one-third, so that they are firm and can, if need arise, be walked over. In placing them, think of a small mountain range of varying heights, and strive to imitate nature. If a pool is made, the soil excavated helps to build the rockery and so saves labour. When completed the rockery was 3ft. 6in. at its highest point, sloping down to one foot above a curved pool 16ft. by 5ft.

REPORT OF THE EXAMINING BOARD

On behalf of the Examining Board I have pleasure in submitting the following Report for 1964.

1. **Meetings:** The Board met on four occasions during the year with an average attendance of 10 members.
2. **Syllabus of Examinations:** The Examinations Syllabus of the Institute includes the following Diplomas and Certificates.
 - (a) National Diploma in Horticulture—N.D.H.(N.Z.)
 - (b) National Diploma in Fruit Culture—N.D.F.C.(N.Z.)
 - (c) National Diploma in Apiculture—N.D.Ap.(N.Z.)
 - (d) Certificate in Vegetable Culture—C.V.C.(N.Z.)
 - (e) Certificate in School Gardening—C.S.G.(N.Z.)
 - (f) Seedsman's Certificate—S.C.(N.Z.)

3. **Applications for Registration for Examinations:** During the year applications were accepted from new candidates for the following examinations:

		(1963)
National Diploma in Horticulture	19	(27)
National Diploma in Fruit Culture	4	(4)
National Diploma in Apiculture	3	(1)
Certificate in Vegetable Culture	—	(2)
Certificate in School Gardening	—	(—)
Seedman's Certificate	—	(—)

4. **1964 Examinations:**

- (1) Results—these are appended separately.
 (2) **Statistics**—the following tables will be of interest, 1963 corresponding figures are shown in parenthesis.

N.D.H. Examinations	Junior		Intermediate		Diploma	
Number of Entries	40	(45)	23	(29)	19	(17)
Number of Passes	21	(30)	18	(19)	15	(14)
Percentage of Passes	52.5	(66.6)	78.3	(65.5)	79	(82.3)
Average marks						
(Passes only)	58.6	(60.5)	64.4	(62.5)	63.7	(62.3)

N.D.F.C. Examinations:

Number of Entries	2	(9)	8	(1)	4	(6)
Number of Passes	2	(8)	8	(1)	3	(5)
Percentage of Passes	100	(88.8)	100	(100)	75	(83.3)
Average Marks						
(Passes only)	51	(68.2)	66	(64)	58	(63.1)

N.D.Ap. Examination:

Number of Entries	5	(1)	2	(2)
Number of Passes	4	(1)	2	(2)
Percentage of Passes	80	(100)	100	(100)
Average Marks				
(Passes only)	64	(65)	75	(81)

Extra Certificate—N.D.H.

It is pleasing to report that two holders of the N.D.H. sat for the Extra Certificate, one in Trees and Shrubs and one in Vegetable Growing. One candidate was successful in the examination.

	Cert. in School Gardening		Cert. in Vegetable Culture	
Number of Entries	2	(1)	2	(1)
Number of Passes	2	(1)	2	(1)
Percentage of Passes	100	(100)	100	(100)
Average Marks (Passes only)	65	(63)	62	(51)

The names of candidates who completed sections of the examinations in 1964 are:

N.D.H. Junior Certificate

B. L. Buchanan (Auckland)
 R. A. Price (Auckland)
 M. B. Thomas (Levin)
 J. Woodley (Christchurch)
 B. R. Young (Auckland)
 D. S. Gay (Nelson)

N.D.H. Inter. Certificate

Miss M. L. Ballagh (Levin)
 E. H. Latimer (Auckland)

A. D. McArthur (Hamilton)
 M. J. Paynter (Hastings)
 K. J. Pick (Hamilton)

N.D.H. Final

G. L. K. Jones (Christchurch)
 W. H. McLeary (Tuakau)
 J. B. Laurenson (Auckland)
 G. van der Mespel (Levin)

N.D.Ap. Intermediate Certificate

V. A. Cook (Oamaru)

5. Oral and Practical Examinations 1964:

The 1964 examinations for all candidates were held in Christchurch where the facilities again proved to be very satisfactory and afforded efficient conduct of the examinations for all concerned. The Examining Board expresses its sincere thanks to Mr. Gilpin (Director) and Staff of the Christchurch Botanic Gardens, also members of the National Beekeepers' Association, and officers of the Department of Agriculture for their valued assistance and the facilities offered. The Board also expresses thanks to the Canterbury District Council for hospitality given to candidates and examiners.

Statistics for 1964 Oral and Practical Examinations:

	N.D.H.			N.D.F.C.			N.D.Ap.
Number of Entries	10	5	4	—	3	—	1
Number of Passes	4	3	3	—	3	—	1

6. Government Grant for Examinations:

The Examining Board acknowledge with appreciation the capitation granted by the Minister of Agriculture for assistance to the Institute in the conduct of the examinations.

7. Personal:

The Examining Board places on record its sincere regret at the death of Mr. M. J. Barnett, M.B.E., A.H.R.I.H.(N.Z.), N.D.H.(N.Z.), A.H.R.H.S., of Christchurch, who served on the Board with distinction for very many years. His wide practical experience and knowledge of horticulture fitted him for a unique place in the counsels of the Board and he freely gave of his knowledge and experience for the benefit of the Board and students alike. For many years Mr. Barnett was chief examiner in the Oral and Practical examinations and relinquished his position only because of failing health. He retained a deep interest in the activities of the Board right to the end.

During the year the Board was strengthened by the appointment of Dr. J. A. Veale (Professor of Horticulture, Massey University), Mr. P. C. Gardner (nominated by the Horticultural Trades Association) and Mr. G. G. Henderson (Assistant Director of Reserves, Christchurch).

8. The question of holding all Oral and Practical Examinations in Christchurch has been before the Examining Board again during the year. An inspection was made of the facilities offering in Palmerston North at Massey University and the Parks Department of the City Council. Neither place in itself had the complete facilities. Developmental changes were taking place at Massey University and these could affect the position quite materially.

In view of the excellent conditions and facilities available in Christchurch it had been agreed to continue to hold all examinations there, but if full suitable facilities eventually became available at Massey Uni-

versity in the course of its development, or in any other North Island centre, the position would be reconsidered. The Board is conscious of the cost and time taken up by candidates attending these examinations in Christchurch, particularly those from the North.

9. **Director of Parks and Gardens, Canberra (Australia)**

At his request, full particulars of the Institute's examinations have been supplied to the Director of Parks and Gardens at Canberra.

10. **New Zealand Forest Service Training and Examination Scheme:**

Discussions were held, at the invitation of the N.Z. Forest Service, on the possibilities of a training and examination scheme for Forestry Nursery Trainees. Subsequently the Forest Service had decided not to proceed with it, but were investigating alternative proposals.

11. **New Zealand Horticultural Seedman's Certificate Examination:**

Careful consideration has been given to the prescriptions of this examination, in consultation with the N.Z. Horticultural Seedsman's Association. There was little interest in the examination, and it seemed that a change was taking place within the Seed Trade with an increasing volume of business being handled by Chain Stores. The qualification seemed now to have very limited application.

12. **National Beekeepers' Association:**

The assistance received from the Association in matters of examiners for beekeeping subjects, of interpretation of examination prescriptions and the setting up of a library of textbooks for the help of apiculture examination candidates, has been appreciated by the Board. Interest in the new Diploma in Apiculture is increasing.

13. **New Zealand Trades Certification Board:**

Mr. E. Hutt was nominated to represent the Institute on the Examination Revision Committee of the Trades Certification Board.

14. **Acknowledgements:**

The Examining Board acknowledges with sincere thanks the help and assistance received from all who have been associated with the conduct of the examinations this year.

- (a) The panel of examiners.
- (b) The Christchurch City Council Parks and Reserves Department, and officers of the Department of Agriculture.
- (c) Honorary supervisors at centres for written examinations.
- (d) The Canterbury District Council for assistance and hospitality with Oral and Practical examinations.
- (e) The Director of Horticulture and Officers of the Horticulture Division.
- (f) The National Beekeepers' Association of New Zealand Inc., for their collaboration and help in matters relating to the National Diploma in Apiculture.
- (g) The Dominion Secretary, Mr. K. J. Lemmon, for his courteous and efficient attention to the Board's business.

On behalf of the Examining Board,

H. D. GORDON,
Chairman.

1964 EXAMINATIONS

The results of this year's examinations conducted by the Royal New Zealand Institute of Horticulture in Horticulture, Fruit Culture, Apiculture, Vegetable Culture and School Gardening, both written and practical, have been released. The oral and practical examinations were conducted at Christchurch which is the permanent examination centre for all candidates in the oral and practical examinations.

A total of 52 candidates presented themselves for examination and the percentage of passes obtained was 75 per cent.

The coveted Cockayne Memorial Medal for the candidate completing the Diploma in Horticulture and gaining the highest average marks in the final stage of the examination was awarded to G. L. K. Jones of Christchurch; the Junior Memorial Prize for the candidate gaining the highest marks in the Oral and Practical Stage I examination was awarded to J. Woodley of Christchurch; the David Tannock Memorial Prize for the highest marks in the Oral and Practical examination Stage III was awarded to G. L. K. Jones of Christchurch; the J. A. Campbell Memorial Prize for the candidate completing the Intermediate examination and gaining the highest average marks was awarded to E. H. Latimer of Auckland.

The subjects in which passes have been gained by candidates are indicated by code numbers as follows:

Bookkeeping (2), horticultural botany (3), plant protection stage I (4), oral and practical stage I (5), principles of botanical classification (6), horticulture stage I (7), special subject (8), oral and practical stage II (9), horticulture stage II (10), plant protection stage II (11), oral and practical stage III (12), thesis (13), horticultural economics (14), fruit culture stage I (15), soils and soil management (16), plant and plant breeding (17), extra certificate (18), beekeeping (19), entomology (20), bee pasturage (21).

AUCKLAND

Buchanan, B. L., 5
 Chapple, D. L., 8
 Dun, B. G., 4
 Latimer, E. H., 7, 9
 Laurenson, J. B., 13
 McLeary, W. H., 10, 12, 13
 Price, R. A., 5
 Sholl, B. J., 8
 Walker, C. M., 13
 Young, B. R., 2, 7
 Young, G. M., 3, 4

CHRISTCHURCH

Aitken, N. A., 11
 Jones, G. L. K., 10, 12, 13
 Mander, G. D., 11
 Scadden, W. J., 6
 Whittle, L. F., 10, 11, 12
 Woodley, J., 3, 4, 5

HAMILTON

Hale, D. J., 3
 McArthur, A. D., 9, 10
 Pick, K. J., 9, 11, 14
 Smith, C. R., 3

GERALDINE

Burns, R. I., 2, 5, 19

HASTINGS

Paynter, M. J., 7, 9, 15

KAIKOHE

Lees, J. A., 7, 15

LEVIN

Ballagh, M. A. (Miss), 7, 8, 9
 Bennett, R. D., 16, 17
 Foxton, G., 9
 Thomas, M. B., 2, 5, 8
 Vander Mespel, G. J., 14

MASTERTON

Pugh, C. R., 10, 11

NAPIER

Walker, C. R., 3, 4

NELSON

Gay, D. S., 2, 7

NEW PLYMOUTH

Howell, I. H., 6, 8
 Jellyman, A. D., 18
 Rumbal, J. P., 6, 8

OAMARU

Cook, V. A., 2, 20, 21

PALMERSTON NORTH

Clausen, P. V., 3, 4
 Scott, R. M., 3, 4

WAIMATE

Wilkins, R. G., 2, 3, 4

WELLINGTON

Bennett, G. S., 7, 8
 Lokum, L., 6

WHANGAREI

Anderson, D. S., 3, 4

ERRATUM

CONFERENCE HIGHLIGHTS, March issue, p.101. The opening sentence should read 'This is the second Conference organised by the Waikato District Council, the first having been held on 17th February, 1954'. It is regretted that this error should have occurred.

an invitation . . .

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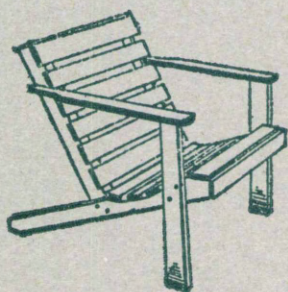
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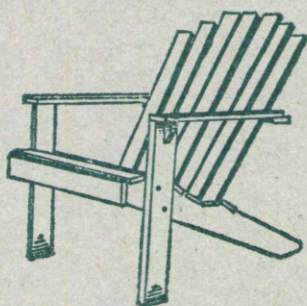
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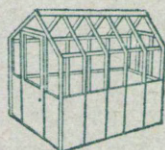


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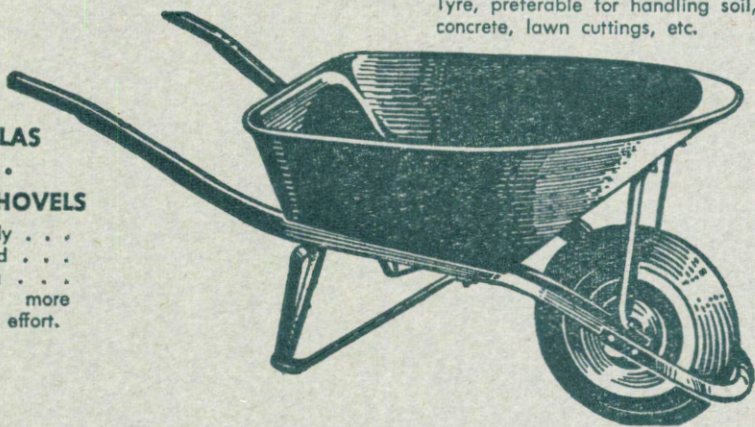
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