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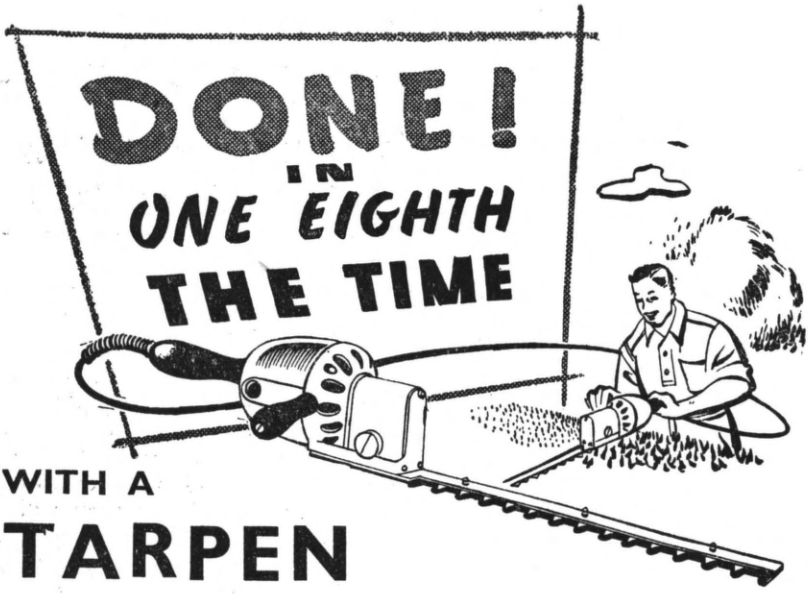

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NEW ZEALAND PLANTS AND GARDENS

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PLANTS WE HAVE MISSED

Back in the winter, in the midst of a busy planting time, I was asked, "Where can I get the white forsythia?" I confess I was non-plussed for the nonce, for a white forsythia was quite a stranger to me. In fact I doubted whether it existed. I knew it was not known to civilised horticulture. And then came a glimmer of light. It had been advertised in a magazine. A week or so later I was shown this advertisement with the caption sprawling across the top, "The White Forsythia". Below, however, in small characters were the words *"Abeliophyllum distichum"*. That explained the position for I knew abeliophyllum and the advertiser in that American paper had taken unwarranted liberties with its resemblance to forsythia. *Abeliophyllum distichum* is well illustrated in Curtis's Botanical Magazine, vol. CLXV, fig. 10. In common with forsythia it is a member of the *Oleaceae.* It forms a low, twiggy, deciduous bush 2-3ft. high with leafless stems wreathed with fragrant white flowers in winter. I grew it easily on medium loam in Warwickshire where it withstood zero temperatures. So far it appears to be unknown in New Zealand, although our leading shrub nurseries ought to have had it years ago.

Nor is abeliophyllum the only case in point. There is that dwarf *Forsythia ovata.* It grows only 4 feet high and produces its bright yellow, fragrant, campanulate flowers in winter before *F. intermedia spectabilis.* Like the species we already have in New Zealand its flowers suffer no damage from frost. What is probably the most beautiful of all deciduous azaleas, the species *vaseyi,* from the Caroline Mountains of North America, also appears to be missing from our plant collections in general circulation. I was always thoroughly delighted with this species for its lovely pale pink flowers and its floriferous habit. I have found, after a long search, *Disanthus cercidifolius* growing in a Hawke's Bay garden (see p. 155), but it appears to be in the possession of a few private garden owners only. This gloriously autumn-tinted shrub should be available freely as it has been in Europe for many years.

It is curious that the genus cytisus should be so poorly represented. There is a handful of garden varieties, but one of the most glorious of the species, *C. battandieri,* does not appear to be known. It is a free-growing small tree from Morocco. Its elegant, three parted, grey-blue foliage is in itself attractive and provides the ideal background to its racemes of golden yellow, quince-scented flowers that appear in spring. It was too tender for me, in Warwickshire, but it should offer no difficulty to North

Island gardeners. The yellow *Diervilla middendorfiana* is a delightful small shrub, quite a change from the bright pinks and reds. Its freely produced sulphur yellow flowers give a delightfully refined effect. Possibly *Dendromecon rigidum* may have been tried out here and success failed to attend efforts at acclimatisation. But the qualities of this attractive Californian climber are such that it should be tried repeatedly. I have seen it growing in the south and west of England in sheltered positions where its large buttercup yellow flowers are produced very freely for well over six months of the year. Its tenderness was the main difficulty but, in the favoured climates of New Zealand it should grow as well as it does in its native California.

These are just a few of those plants we appear to have missed, and there are many others I can name at random such as *Abies concolor* and its glaucous form, *Caryopteris mongolica,* Daphnes *collina, hybrida, petraea* and others, *Hippophae rhamnoides* (a good coastal shrub), *Rhodora canadensis, Viburnum grandiflorum, Aristolochia sipho* (climbing Dutchman's Pipe), Gaultherias *sinensis* and *wardi,* the lovely *Schizocodon soldanelloides* from Japan and the hardy Pitcher Plants called sarracenia and darlingtonia. I have grown all these at some time or other and all would be worthy additions to the remarkable collection of shrubs that grow so well in New Zealand.

G. A. R. PHILLIPS,
Editor.

LODER CUP AWARD, 1957

The award of the Loder Cup for 1957 has been made to Mr. F. W. Lokan, of Invercargill. The citation will follow in the March issue of this journal.

ALOES OF SOUTH AFRICA AS GARDEN PLANTS

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

The genus *Aloe* is confined to Africa and Arabia. There are some 136 species found in the southern portion, namely in the Union of South Africa and in the South-west Territory, that is to say, south of the River Limpopo.

Dr. G. W. Reynolds, the world authority on the genus, has resolved these 136 species to a finality in his excellent book, "The Aloes of South Africa". He is now busy working on the territory to the north, namely Central Africa, Abyssinia, Eritrea, Madagascar, Somaliland and Arabia. He has already made many journeys to these countries in quest of new species, and for the investigation of several older species about which little is known. We all look forward to his second book with keen anticipation.

As a garden subject, the aloe is hard to beat. All species are attractive both in form and in beauty of inflorescence. Most of them are easy to grow, propagation is simple (given certain conditions), all are long lived

and withstand a lot of garden neglect. What a catalogue of recommendations!

Soil and Climatic Conditions

All species require well drained, open (that is to say, sandy and stoney) soil. Many do not withstand much frost but several species are found in the Karroo and similar conditions, viz., with winter frost under very dry conditions but hot and arid conditions otherwise. They will not put up with humid and continuous rainy conditions. In the Western Cape, with winter rains and dry summers and autumns; then in the Transvaal, very dry winters and early springs, with rain in the summer months; S.W.A. arid conditions with only occasional summer rains; study these climatic conditions for cultivation procedure and you will also realise why there are so many localised species. There are few species common to two or more areas. They all need lots of warm sun, few withstand shade.

Under garden conditions, a well drained rockery made up with sandy or pebbly loam (good turf loam at that) and some really old compost, will suit most species. They can remain undisturbed for many years. Some species thrive under pot cultivation and here conditions can be made suitable. Remember, long dry rests with sudden and short spells of waterings will suit most. Feeding with manure, especially nitrogenous fertilisers, must be avoided. Some phosphatic manure such as bone meal or superphosphate can be used sparingly.

Propagation

All species can be (and maybe are better) raised from seed. These should be sown in a mixture of loam, leafmould and coarse river sand, avoiding animal manure. Choose the spring months as the warmer weather sets in for sowing, avoid all extreme humid conditions. As soon as the seedlings appear, give full light, full air and sun. As soon as the first and second true leaf appears, prick out either into trays or in individual small well drained pots. Do not over water.

Some species may be increased by cuttings, namely *Aloe ciliaris, A. tenior, A. gracilis* (*laxiflora*), and *A. bainesi,* but seedlings make the better specimens. In making cuttings, do not fail to ripen off the cut, exposing same for a few days before inserting into very sandy soil. Pieces up to 3 to 4 feet in length of *A. arborescens, A. pluridens, A. lineata,* etc., may be cut off or broken away from the parent and left lying under a tree for a few weeks before planting. This treatment avoids rotting of the cut or broken surface. Roots will usually be formed during the exposure period before planting. If so, the pieces are established in a week or two. Avoid watering.

It is not easy to obtain seed of the unusual species but membership to the S.A. Botanical Society, Kirstenbosch, Cape Town, would be of great help as this society has a system of a free issue annually to members.

Pests and Diseases

Aloes are generally free from these troubles. A small white scale can smother the leaves but taken in time with a spraying of suitable insecticide, this pest can be controlled. Mealy bug can be checked by sulphate of nicotine 1 part, water 20 parts, methylated spirit 1 part.

Stem rot can be experienced, usually through over watering. In this case cut the stem down and slice back to healthy tissues and leave exposed to dry out for a week or two before replanting.

Some Outstanding Species

Let us consider some of the outstanding species for garden cultivation. First the giants.

Aloe bainesi is found on the eastern Cape and Natal coast, not far inland. This is a noble species growing to 50 feet in height with a spread of some 25 feet. There is a plant growing outside by the front door which is quite seventy years old. It has dichotomous branches, that is to say the main stem divides into two and each sub-branch splits into two and so on. I consider *A. bainesi* typifies South African flora, grand, tough and durable. Other giants are *A. dichotoma* of the South West and *A. pillansi* of Namaqualand, but these are, frankly, difficult to grow. The hollowed stems were at one time used as poison arrow quivers by the bushmen.

A grand species is *A. excelsa* from the north with its massive candelabra like flower heads, red in colour. This with *A. speciosa,* found inland from Port Elizabeth and *A. marlothi* with horizontal flower branches from the Transvaal, are three large species that grow to 15 to 20 feet tall.

Two species that are found on the warmer and more humid coast of Natal are *A. candelabrum* and *A. thraski,* both easily cultivated. The latter I have grown in sand dunes with little humus at the seaside resort of Humewood, Port Elizabeth.

Coming down in stem height but still in the caulescent class, are *A. ferox* (*supralaevis*), *A. pluridens* and *A. africana.* I have found the last two up to 8 feet, all within a few miles of Port Elizabeth. Large specimens, just dug out with little or no root and stuck (not even planted, be it noted) into the ground will become established. *A. pluridens* flowers in June, *africana* later and *ferox,* with its massive yellow-red spear of densely packed flowers, can be seen almost any month of the year. They are so common here as not to be appreciated, but they are grand subjects.

One species used for hedge making is *A. arborescens.* This is found from Mosel Bay in the Cape right up to Inyanga in Rhodesia. This has a habit of branching from the base. It makes an impenetrable barrier as a hedge, 5 to 6 feet high and 3 to 4 feet wide; it has masses of red poker like flowers in May and June. When I was a boy in England, an old aunt of mine, very fond of her greenhouse, grew a prickly plant (a cactus?) in a 6 inch pot and this went on for years and years. No one knew the name and it never flowered. I now know this to be *A. arborescens,* under constricted conditions but very difficult to kill!

Still coming down in height but still caulescent or stemmed, I would recommend the following for ordinary garden planting. *A. lineata, A. comosa* (pinkish flowers), *A. plicatilis*—the last named is rare, comes from Tulback in the Cape, has fanlike, ribbon leaves and can be grown from cuttings.

Now for the stemless or acaulescent aloes. There are many, but I will mention a few of the most attractive ones and those which are not fussy to grow.

First *A. chabaudi,* with its lovely spreading pink to red flower heads. This comes from the North of the Transvaal and Rhodesia, where there is no frost. Secondly, *A. striata,* with its beautiful pale grey leaves, edged pink. To see a hillside of these in flower is a sight never to be forgotten, common in the Eastern Province. Then *A. dyeri, A. davyana, A. greeni* and *A. saponaria* grow in dense clusters. *A. microstigma* has attractive spotted leaves (red).

Two climbing aloes are *A. ciliaris* (red) and *A. tenuior* (yellow). These are lovely on a fence or over a trellis—easily propagated by cuttings. *A. ciliaris* flowers remind me of a rare (in the wild state) species that has similar flower heads, *A. gracilis* (*laxiflora*), beautiful lax bright red flower heads with a drooping habit, not unlike lachenalias. It flowers in May and June when flowers are scarce. Many a mayoral banquet has been brightened up with flowers of the species when nothing else was in flower. *A. gracilis* is found on hills some 25 miles to the west of Port Elizabeth. Its habit is unusual. It has slender upright rigid growths, up to 3 feet in height, and forms a dense bush. I know a bed in a local park which was old in 1921 and still exists after 36 years with little or no attention. There are four or five flower spikes at the top of each growth, a lovely subject.

Coming now right down to earth, I must enumerate a few really dwarf species that are usually found in the succulent collection and so attractive when grown in bowls.

A. humilis, the size of a cricket ball, usually found in clusters, flowers red on loose spikes 15 inches high, is found on limestone, on the coast, at Port Elizabeth. There is a yellow form found at Hankey.

A. variegata, the 'Kannie doot" or "Never die", found by Simon van der Stel in 1685 and probably the first South African plant to grow in Europe.

It has beautiful mottled grey-green and white leaves, flowers short dense heads in salmon red, found in the Karroo (Outshoorn) districts, namely, conditions that are arid, full sun, little rain, and fully exposed. Difficult to kill except by water.

A. longistyla, not unlike *A. variegata,* but I have always found it hard to grow even within 100 miles of its natural habitat.

A. albida and *A. saundersi* are two rare miniatures, not more than 6 inches in height (compared with 50 feet *A. bainesi!*). The former comes from the mountains of Swaziland.

Two small species are *A. aristata,* an attractive plant found in the northern Cape, Orange Free State and Basutoland—usually in dense clumps, and *A. brevifolia* from the Cape, both of easy culture and suitable for pots in the room.

An unusual species bordering on the true translucent succulent is *A. dinteri* with its lovely spotted, almost transparent, leaves. During World War II in 1942, whilst on an inspection of aerodromes in the S.W.A. territory, I landed at Outjo to interview the local authorities. There was no vehicle to meet me, so I started to walk to the township. Needless to say I did not keep to the road but wandered through the low shrub with

my thoughts on S.W. flora, far from world affairs I must confess. There hidden away in a low bush was a lovely aloe—none other than *A. dinteri.* I dug up two with my hands, took them along to the local hotel and laid them on the table whilst I had a wash. After the interview prior to taking off again, I returned to pick up my bag and aloes to find the latter had been cleared away. Search as I could, even to the rubbish bin, there was no sign of my priceless botanical specimens. That was the only time I contacted this unusual species.

There is a group of aloes with almost grass like foliage not unlike kniphofia or Red Hot Pokers, namely the *Leptoaloe.* Most of these are found in grass veldt. A local species is *A. micracantha,* found in low mixed flora on poor gravelly plains. Another attractive one is *A. ecklonis* from the E. Transvaal, and *A. verecunda. A. wooliana* is another that flowers well after a grass fire! In all, there are some 16 species in this attractive group, all excellent subjects for the rock garden, small, graceful and attractive.

A collection of aloes can be as exciting and absorbing as growing orchids. Recently I met a young man, a fitter on the railways with no botanical knowledge; he had, believe it or not, 106 species growing in his small suburban garden, all growing well, including that rare mountainous species, *A. polyphylla* that grows at 7,500 feet in the Basutoland mountains.

My advice is "grow aloes". You will find it an absorbing hobby and not so exacting as orchids. I have mentioned only a few of the 136 species growing in the Union of South Africa; there are many more not mentioned in this article to tempt the ordinary horticulturist.

Hybrid aloes should not be overlooked. A great friend of mine, the late Bran Key of S.A. Wild Life Protection fame, had a flare for growing hybrids in his Johannesburg garden. Although he had little botanical knowledge, he could spot a hybrid from his car travelling at 40 m.p.h. It was a revelation to see his collection of natural hybrids. The field of raising hybrid aloes is as yet unexplored.

WEED CONTROL IN HORTICULTURE

(II) CHEMICALS FOR WEED CONTROL

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

Chemical weedkillers have long been used in gardens, but it was the discovery of "hormone" weedkillers during the recent war that really created a public interest in them. There is now a wide range of chemical weedkillers available for various purposes and new ones are becoming available at short intervals. The average gardener is naturally confused by the many new materials and even the majority of nurserymen and commercial growers lag seriously behind in their use. The chemicals are grouped below according to their uses, not according to their chemical composition.

First of all for spraying lawns; the hormone weedkillers find their main use in horticulture in this work. Either 2,4-D or M.C.P.A. is used for this purpose. The easiest and safest way is to mix them with water

and to apply to the lawn by means of a watering can with a fine rose. Spray pumps usually create some fine, invisible mist, which can easily drift and cause severe damage to important garden plants. The amount to apply is always a puzzle to the occasional user. The container in which the material is purchased has printed on it the amount of active ingredient per gallon of concentrate. Usually it is 3.6 to 4 lbs. per gallon. This amount (3.6 to 4 lbs.) happens to be a suitable amount to use per acre. It should be easy to measure the lawn and to find out what portion of an acre it represents, remembering that one acre is 4840 square yards. From that it is easy to calculate what proportion of a gallon is needed to spray the lawn. The quantity of water in which to mix it before application is of small moment, provided enough water is used to damp the area slightly all over. It might be 30 to 100 gallons per acre. These hormone weedkillers allow of a wide margin of error. Even one-quarter of the dosage advised above would give fair results, and to double the recommended amount is unlikely to do much harm. On young lawns do not use hormone weedkillers until they are two or three months old, and give only about 1 lb. per acre even then. If you have clover in the lawn and want to get rid of it, use one of the mixtures sold for the purpose, containing 2,4,5T, as well as 2,4-D.

Weeds on Paths and Drives

The most efficient weedkiller for areas where everything is to be killed and the ground is to be kept bare, is arsenic. This should be bought as a solution containing about 55 per cent. arsenic. It is a very heavy liquid weighing about 15 lbs. per gallon, of which weight about 8 lbs. represent arsenic. This strong solution is diluted about 50 times with water, and applied to the path or drive through a watering can so as to thoroughly wet all weeds. It keeps the soil poisoned for some time, a heavier dose being effective for a longer time. Use rubber gloves when handling arsenic, or it can cause painful damage under the fingernails. Where its poisonous nature is an objection, sodium chlorate or Atlacide sprinkled on and washed in at about 1 oz. or more per square yard is fairly effective. A new material, C.M.U., can be used in the same way. It is still very expensive (about 40/- per lb.), but 2 ozs. in 1 gallon of water is sufficient to treat 100 square feet of ground (an area 10 feet square). When using C.M.U., sodium chlorate, or Atlacide, take special care not to apply them near the root run of valuable plants, as the poisons may be washed towards the roots.

Weeds Amongst Growing Crops

There are some garden crops, but not many, which can be sprayed overall to kill weeds without harm to the crops. For instance carrots, parsnips, and celery can be sprayed with power kerosene without much harm to the crop. This method is very useful in carrot growing. To save kerosene, intercultivation of the crop is done by hoeing, and the spray is used only on a narrow strip along the row. Young maize and sweet corn can be sprayed with the hormone 2,4-D or M.C.P.A. when it is about 4 inches high. Most pea varieties can be sprayed with a light dose of M.C.P.A. or of M.C.P.B. after they are 4 or 5 inches high.

On the whole however, weeds in horticultural crops cannot be controlled by this selective type of spray, because most of the crops would be damaged or killed by the spray.

However, there are alternative methods which are fairly satisfactory. Best of them all, in my opinion, is the diesel oil emulsion spray with plant poisons dissolved in the oil. The oldest of these 'fortifying agents' to dissolve in the oil is the yellow 'dinitro' material sold as 'Sinox General' or as 'Pre-emerge.' This is an extremely effective material, but dirty to use, because it is a very powerful and persistent yellow dye. As a colourless substitute, the chemical called Penta-chloro-phenol ("P.C.P.," as it is abbreviated) is very effective, and a solution of P.C.P. in diesel oil, all ready to emulsify with water, is now available in New Zealand.

I have not used much of the P.C.P. type, but my experience with the di-nitro type is fairly typical of what can be expected from the P.C.P. emulsion.

The important point about these diesel emulsions is that they kill all plants by contact only. They kill practically everything they touch, but they are not translocated in the plant, nor do they penetrate into the soil. In moderate doses they do little or no harm to older woody stems such as occur at the bases of established trees and shrubs in the garden. The fact that the oil is not noticeably washed into the soil means that we can spray and kill all the weed seedlings above a crop which is planted but is not yet above ground.

Pre-Emergence Spraying

This ability to clean up the weeds before the crop emerges above ground, is tremendously useful in horticulture. Not only are all the weed-seedlings killed by the spray, but especially on damp, cool soil, an oil film persists for a good many days or even weeks, and any seedlings germinating actually on the surface are killed. The crop seeds, germinating from ½ inch or more in depth, rarely suffer any damage even when they grow up through the surface film of oil. If the crop emerges into clean soil, and if no weed seedlings germinate on the surface for a week or two, then the crop has a flying start on weeds, and subsequent weed control is much easier. The crops for which pre-emergence spray is especially suitable are those which take longest to emerge after planting, because in this long period there is more chance for weeds to grow. Various sorts of bulbs such as daffodils, tulips, lilies, and the like, are ideal for its use. I have used it on beds really thick with weeds, when the shoots of tulips and lilies were showing an occasional tip just through the ground. The only harm done was to as much of the tip as was showing above ground. Asparagus beds, before the sprouts begin to emerge in the spring can be cleaned up in the same way. Any sort of seeds like peas, beans, or other crops which take more than about ten days to appear, can be sprayed just before you expect them to show above ground. Very quick germinating crops like turnips, cabbages, and cauliflowers are scarcely worth pre-emergence spray in the garden, because they appear above ground very quickly. Even carrots and parsnips which can be later weeded by power kerosene, are easier to manage if treated with pre-emergence spray. The carrots will then be well advanced while the weeds are small and more

readily killed by the kerosene. It must be realised that pre-emergence spray is of no use in the case of perennial weeds like couch grass, or oxalis. Grass weeds like *Poa annua* are also rather resistant to the pre-emergence spray, because once they have formed a good-sized tuft, their crowns are apt to survive. The new materials 'Dalapon' and 'A.T.A.' offer hope in the case of weed grasses.

Diesel-based Sprays for General Purposes

Apart from its use as a pre-emergence spray, the diesel P.C.P. emulsion is an invaluable general weed killer, especially in the wet months when cultivation is both difficult and of little use. Provided it is not sprayed directly on the useful plants, but is directed at the weeds, it is most useful in many places where hand weeding would otherwise be necessary. Among shrubs, in the rose bed, around fruit trees, the edges of beds or paths where it is better not to disturb the soil—all these are easily and very quickly weeded with the diesel emulsion. Half an hour's spraying will do as much as a whole day's hand work, and more effectively. It is certainly preferable to apply the first spray in autumn while the weeds are not more than an inch or so high, and to respray each time they reach that height. A weaker spray mixture can be successfully used at that stage of growth than later.

For applying these oily sprays, a knapsack pump is suitable, but try to secure one with synthetic oil resistant rubber fittings, in place of natural rubber. Plastic gloves should be worn, and a cheap plastic raincoat will be proof against oil leakage. Women gardeners may find a smaller type of knapsack easier to handle than the common type.

Crag Herbicide I

This material is fairly new to most people, but has considerable possibilities. It is a form of 2,4-D hormone weedkiller which is chemically combined, so that it can be sprayed on to the leaves of plants without harming them. However, where it lies on the soil it is broken down to 2,4-D by soil bacteria, and it kills germinating seeds in the upper layers of soil. For instance, young azalea and rhododendron plants were set out last September, and about two weeks later were sprayed with 'Crag I' at the rate of 6 lbs. and 12 lbs. per acre, although the normal amount is about 4 lbs. per acre. The weed control was very good, and only the 12 lbs. dose showed much damage to the azaleas. This was a hard test for the weedkiller, because the roots of the azaleas and rhododendrons were fairly close to the surface in light soil, conditions which favour the weedkiller penetrating to the roots.

There is room for a great deal of experiment with this material by gardeners themselves, under their own conditions of soil, temperature, and rainfall, and in plantings of many species. It may well be found useful to spray whole beds at once after setting out bedding plants, and again every three weeks or so, until the plants can master the weeds. It must be emphasised that this material is applied before the weeds are established. Its use will depend on experience of each gardener in his own circumstances. Factors such as soil moisture and temperature play an important part in its effectiveness.

Grass-killing Chemicals

The chemical T.C.A. has proved to be a good one to kill out couch grass. Used at about 100 lbs. per acre, it quickly kills the couch grass, and most crops can be planted within two or three months of such a heavy dose. Twenty or thirty pounds per acre will kill or severely check couch grass and can even be applied to the ground while many crops are growing there, provided it is kept off their leaves.

Dalapon is a most sensational new grass killer. While T.C.A. works through the soil and the roots, dalapon, like a hormone, works through the leaves. As little as about 10 lbs. dissolved in water, is enough to kill all the grass on an acre of average pasture. It should be sprayed on when the plants are growing actively and needs about one day of rain-free weather following application. I have found it a great boon in cleaning up young grass around headlands, under hedges and in such awkward places. So far it appears to kill couch grass quite successfully. This, if verified by further trials, means we can now easily kill out couch grass among shrubs, without harming them or poisoning the soil.

Another exciting new chemical is A.T.A. ('amino-tri-azole' in full), sold commercially also as 'Amizol.' Dissolved in water alone or with dalapon it can be used to kill a wide range of weeds. It works through the leaf as dalapon does and is conducted down through the plant, killing underground parts of some weeds. Only trials will prove just what it will kill, but Californian thistle is already claimed as one victim. The effect on weeds like sorrel will be most interesting.

These are some of the more recent advances in weed control. There are new materials becoming available almost every month, but the above are those which at the moment are well enough tried to show real prospects of extensive usefulness in our horticulture.

SOME NATIVE PLANTS FOR THE GARDEN

FRANCES DUGUID (*Levin*)

I would like to put in a plea for a more imaginative use of New Zealand native plants in mixed gardens. The bush remnants of one's own district give an indication of what may be expected to thrive and an example of the conditions required. In the lowlands of the Horowhenua district on the west coast of the Wellington Province there are many plants which make successful and effective garden subjects. Though most like some shelter from wind, an adequate supply of sunshine is also essential.

In natural clearings and on sunny banks one may find *Dianella intermedia* (Blueberry), whose grasslike tufts are graced with china blue berries. Freedom from wind disturbance ensures that the berries do not drop too soon. This, and the following, are suitable on the edge of a shrubbery. While rambling along the sandstone promontories bordering Lake Papaitonga, one is attracted by clumps of *Libertia ixioides* (a native iris). In partly sunlit corners, under shrubs, its golden seed capsules may be found

for most of the year. When the small white flowers come in the Spring, many of the previous year's capsules are still in evidence. Another libertia, growing on scrub covered clay hills of Wellington and elsewhere, is particularly effective on an open rockery, for though the seed-capsules in this case are inconspicuous, the flowers are larger and very plentiful. A Horowhenua coastal species, *L. peregrinans,* has plenty of cream flowers up to 1 inch in diameter. Its natural habitat is damp coastal flats. My first view of a large area of this in full flower was a memorable one, especially as it was completely unexpected. Any of the libertias grow easily from seed, though they may also be grown from fans. *L. peregrinans* requires room to spread for its wanders, as its name implies.

Sheltered riverbanks are the home of *Pratia angulata,* a creeping plant very suitable for rockery pockets, preferably sunny, as this encourages dwarfing of the foliage. A generous number of white five-lobed flowers are followed by pale magenta fruits, both on the plant at once.

The small-leaved Lacebark *Hoheria angustifolia* is a graceful small tree, suitable for a medium to moist situation. It has a very twiggy juvenile form whose interlacing branchlets bear tiny roundish leaves. After about six years this stage, which is interesting while it lasts, is superceded by the erect tree form in which a shapely crown is covered with sharply toothed narrow leaves about 1 inch long. The flowers and seeds are a smaller edition of the more familiar lacebarks, and its graceful form, whether juvenile or adult, makes this well worth growing. Its natural habitat is in alluvial valleys and flats. Its seeds are usually out of reach, but seedlings may sometimes be found in moist spots at the foot of the mature tree. Only sleuthing of a fairly high order makes it possible to recognise the connection between the small leaved, twiggy seedlings and the very dissimilar parents and this adds spice to the quest.

While on the subject of lacebarks it is not a very long step to consider *Plagianthus betulinus,* which for some obscure reason is distinguished from its cousins by the name of Ribbonwood (manatu). The lacy layers of underbark are very similiar in both hoheria and plagianthus, but the latter has not the large white flowers of the hoherias. After a few years of a dainty juvenile form, it makes rapid growth to a height of 20 to 25 feet. For a few weeks it is leafless; then in spring, when the new, pale leaves are half grown, large panicles of many tiny cream flowers hang from the twigs in a feathery cloud. After enjoying this for a number of years, I feel that it should be grown more often than it is, where there is enough room. Seedlings occur in sparse bush in gravelly areas beside the river, and grow very easily under most conditions.

A very attractive shrub of the more fertile bush verges, mainly in the south of this district, is *Melicope ternata.* In a sunny situation it forms a well shaped shrub up to about 10 feet high. Its glossy lime green leaves give out a pungent scent when crushed.

Many native climbers are effective without requiring much space or any special treatment. I have found by a happy chance that three species of clematis from this district provide a continuous series of flowers throughout the springtime. Only very small seedlings are transplantable, and these differ in form from the adult plants. *Clematis indivisa* is at

home in the damp bush of the foothills and the totara thickets of gravelly river flats. It large pure white flowers are the first to bloom. In the dune scrub towards Hokio Beach is *Clematis hexasepala,* with smaller, more papery flowers. I have had a bushhouse 8 to 10 feet completely roofed with these flowers and their scent was wafted for many yards around. The smallest of the trio, *C. parviflora,* has a profusion of cream yellow flowers which in their natural state festoon shrubs and even bracken by the Ohau River. Their flowering time is announced by the scent, which appears to be the exclusive attribute of the male flowers. A rather more cloying scent is produced by another generously flowering climber, *Parsonsia heterophylla,* with white flowers. This is plentiful on sunny bush edges and roadsides throughout the district while its smaller-flowered relative, *P. capsularis,* is more generally coastal. This is not so showy as *P. heterophylla,* but has the amiable habit of producing its pinkish cream flowers twice a year. *Tetrapathaea tetrandra,* the New Zealand passion-flower, comes from riverside bush. Its small white flowers fade to yellow, and paired plants are needed to produce a crop of the conspicuous orange coloured fruit.

Trees of *Elaeocarpus dentatus* (Hinau) and *Knightia excelsa* are effective in parklike surroundings or beside a long driveway. Both will bloom after about eight years but are uninteresting in the early stages. Hinau in flower hangs out myriads of white fringed cups, best seen from underneath the tree. Rewarewa, a proteaceous tree, has some of New Zealand's most spectacular flowers: long narrow dark red petals coil back like watch-springs when mature leaving the yellow styles extended, giving the inflorescence a "bottle-brush" appearance. These trees like good soil, and will flower only in full sunshine.

PALMS AND THEIR CULTURE IN NEW ZEALAND

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PART III.

Parts 1 and 2 of this article appeared respectively in the June and September issue of "New Zealand Plants and Gardens" and dealt mainly with the usefulness, climatic range, propagation, transplanting, culture, and distribution of palms in New Zealand. The conclusion, part 4, will be published in the March issue and will contain a discussion on the main characteristics of palmate palms, species growing indoors, selecting species for outdoors and brief notes on cycads.

List of Palm Species Growing in New Zealand

It is not intended herein to give a full description of the various introduced and exotic palm species, but a general discussion on their main characteristics as grown in New Zealand. It is possible that a few species not widely grown may unintentionally have been omitted.

As there is a wide divergence in the nomenclature of genera and species of palms, there may be some criticism of that used. Botanists have

generally realised at the time of planting. Many other species which do not grow to such an enormous size are much more suitable for planting in small residential sections.

P. silvestris: (Wild Date of India). The many specimens growing in Auckland of this species are generally mistaken for *P. canariensis*. There are three main differences by which the former can be distinguished. The leaves are much more rigid and a little shorter; the trunk diameter is less and the foliage generally is greyish-green. Well grown specimens in spacious surroundings can be distinctly attractive.

P. rupicola: There appear to be at least two types of this species growing in New Zealand. The more common is generally found growing in clumps as it produces offshoots freely at ground level. The trunk is moderately thick and the old leaf stalks adhere to the trunk for a great number of years, presenting a ragged or untidy appearance. The less common type has a thinner trunk and the dead leaf stalks readily fall away. Both types have similar foliage which is perfectly arched and uniformly arrayed. The gracefulness of the recurving leaves makes the species more attractive than any of the other large phoenix species. Trees of the more slender type when kept to a single trunk are objects of great beauty.

P. reclinata: A relatively small palm compared with the species mentioned in the foregoing. The diameter of the trunk does not greatly exceed 6 ins. The average length of the leaves is approximately 6 ft., but sometimes is appreciably less in mature trees. The species produces offshoots at ground level and when these are allowed to develop into a clump the trees seldom grow more than about 15 ft. high. When the tree is kept to a single trunk a much greater height may be attained. The foliage of *P. reclinata,* when the palm is comparatively young, is distinctly reclining and graceful, but becomes progressively less recurved with age. This species is sufficiently small to be readily accommodated on most residential sections. It is hardy in all ways, consequently could be expected to succeed where many other species would fail.

P. roebeleni: An extremely attractive dwarf species which seldom exceeds a height of 4 ft. when grown outdoors in this country. The thin, smooth trunk and dainty, gracefully recurved, feather-like leaves present a most pleasing picture. It is equally beautiful whether grown in pots, tubs, or in the open ground, provided there is adequate shelter. The foliage is not injured when fully exposed to the sun.

The genus rhopalostylis includes the only palm native to New Zealand and this species is found nowhere else. Another species of the same genus is to be found in a number of private gardens, principally in Auckland, having been introduced from Norfolk or Kermadic Islands where it originated. Both species are moderately frost tender and the foliage may become a somewhat bronzed colour if fully exposed to the sun in some districts. The pinnate leaves are large, sometimes attaining a length of more than 12 ft. They are readily damaged by wind and when grown in exposed situations the mature leaves are generally unattractive due to wind damage. There are no spines on the leaves. Large clusters of flowers are produced on the shiny, green trunk immediately below the lowest leaves. These give rise to large numbers of spherical, bright red seeds which are distinctly ornamental.

suggested many name changes during the last few decades, but not all of these have been adopted by the commercial plant propagators, with the result that some names in common use today are botanically incorrect. Use of the correct name with the most common synonyms following in parentheses has been aimed at.

In the discussion of the different species that follows, no attempt has been made to list them in order of merit. The only order observed is that those with pinnate leaves are listed first, followed by those with palmate leaves.

Pinnate Palms

The genus phoenix is represented by no fewer than six species. They vary in size from the massive *canariensis* down to the dainty dwarf *roebeleni*. With the possible exception of the latter they are all relatively hardy and will withstand extreme abuse. They will thrive in windy situations and show little foliage injury. The genus will flourish in a wide range of soil types, the foliage is not injured by light frosts, and the cut leaves have been shown on many occasions to be well suited for street or hall decorations on festive occasions. An objectionable feature common more or less to the five larger species is the many stiff, sharply pointed spines near the base of the leaves.

Within the genus much cross-pollination of species is believed to have taken place in this and in other countries with the result that a considerable amount of variation within most of the species is now plainly evident and has rendered the separation of some species almost impossible. This has led to much confusion in the botany of phoenix. The seeds of this genus are readily recognised by a pronounced longitudinal groove. The male and female flowers are invariably produced on different trees.

P. dactylifera: (Date Palm). Odd trees are to be found in most towns in the North Island and some in the South Island. Probably all of these are chance seedlings from imported edible dates. Although it is one of the hardiest species, it has not been known to bear fruit in New Zealand. A habit of the Date Palm is to produce abundant offshoots with wrinkled and deformed leaves and for several feet above ground level. This tendency generally results in the tree becoming unattractive in appearance as the suckers are not easily removed. The leaves are rather stiff and ungraceful and the thorns are particularly vicious. By carefully removing all sucker growth as it appears and dead leaf stalks from the trunk the tree can be maintained as a creditable garden specimen. The tallest Date Palms in New Zealand are about 20 ft. high.

P. canariensis: (Canary Island Palm). The most massive species of phoenix in New Zealand and most extensively grown. Avenues have been planted in parks and streets in both North and South Islands for which purpose they are most suitable. Of the many hundreds that have reached maturity in residential sections of average size, nearly all have outgrown the space available. For the same reason many others have been removed before reaching maturity. The masses of roots produced near the soil surface can render nearby garden plots almost useless and those that penetrate more deeply are liable to block drains. A well grown Canary Island Palm when fully developed has a spread of over 30 ft. which fact is not

R. sapida: (New Zealand Nikau). When grown in its natural habitat, which is in the shade of the New Zealand native forest trees, the Nikau is a palm of which New Zealanders are justly proud. The tender recurved foliage which crowns the smooth, green trunk compares favourably with nearly all of the imported species. However, when grown in exposed situations the Nikau palm bears little resemblance to the picture it presents in the native forests. The leaves die and are shed before they become recurved or even reach a horizontal plane and the remaining leaves are generally torn by the wind, giving a ragged and untidy appearance.

R. baueri: (Norfolk and Kermadic Island Nikau). This species does not differ greatly from *R. sapida.* It is more vigorous than the latter and when reasonably sheltered the lower leaves become about horizontal before falling. The palm is quite suitable for growing in pots or tubs, as the leaves of young plants are gracefully arched. Although *R. baueri* is indigenous to islands situated near to the tropics, it appears to be equally tolerant of cold temperatures as the New Zealand Nikau and is the more beautiful of the two.

The genus cocos includes the Coconut Palm *C. nucifera Linn.,* which is the most important of cultivated palms. Many attempts have been made by amateur gardeners to establish the species outdoors in New Zealand but without success. There are, however, many species of cocos that are not tropical in their requirements and two of these flourish in many parts of this country.

C. plumosa Hook St. (*C. romanzoffiana*) is a universally popular palm and well grown specimens 30 ft. to 40 ft. high are to be found in many provincial towns of the North Island. The outstanding feature of this species is the exceptionally attractive foliage. The pinnae (leaflets) are arranged irregularly around the mid-rib which gives the giant leaves an ostrich plume effect. These make a stately crown to its straight and smooth trunk. The large seeds are edible and the flavour is similar to that of coconut. In comparatively young plants the leaves stand almost erect for the greater part of their immense length with the tips only recurved. This enables the palm to be grown much nearer to paths and other trees than those that have a more spreading habit of growth. It is one of the tall species suitable for lining a driveway.

C. yatay Mart. (Wine Palm). This palm has little resemblance to *C. plumosa* as the long, pinnate leaves and narrow leaflets are extremely drooping in their habit of growth. The silvery-green colour of the giant leaves is most outstanding and beautiful. The trunk is massive and is normally covered with sheaths from the base of dead leaves. It seldom exceeds 14 ft. in height and because of growth habit the trees do not occupy an unduly large space. This species compares favourably in hardiness with the larger species of phoenix and is tolerant of windy situations. Enormous clusters of round, edible fruit about $\frac{3}{4}$ inch in diameter are produced. These become pink colour when ripe and are most attractive in appearance.

The genus howea (kentia) is endemic to Lord Howe Island and two species of the genera are grown extensively in New Zealand, mainly,

but not exclusively, as indoor specimens. They are more popular for pot culture than any other palm and also make excellent garden specimens. The genus is still widely known in this and other countries as kentia. Both species are similar in many details. The trunk is glossy green with clearly defined annular rings similar to that of the Nikau. The gracefully arched, pinnate, spineless leaves will withstand light frost after a trunk has commenced to develop.

H. fosteriana: This species is grown to a far greater extent than *H. belmoreana.* Probably this is accounted for mainly by the former being more readily propagated. The seeds germinate more quickly and the rate of growth is faster. On old palm trees seeds are generally produced in great numbers and are an attractive reddish colour when fully matured. The individual seeds are 1 inch long, ½ inch in diameter, roundly pointed at either end and are borne on long racemes. These are produced mainly in clusters of 3 to 5 immediately beneath the lowest leaves.

H. belmoreana: Although this species is less common than *H. fosteriana* it is suggested that it is the more beautiful of the two until it has attained a height of at least 6 ft. to 8 ft. Both the mid-rib and the leaflets of the foliage are arched in a more graceful manner than those of the latter species. The seeds of *H. belmoreana* are similar, although slightly smaller than those of the other species, and the racemes, which are about 3 ft. long, are produced singly.

Archontophoenix cunninghami H. Wendl. and Drude (*Seaforthia elegans*), is to be found in most palm growing countries and is prized as a stately lawn specimen. The straight, shiny-green trunk is slender in comparison with many other species. The feather-like leaves are moderately large for the size of the trunk but there are relatively few. It invariably presents a tidy and dignified appearance and is moderately hardy. An unusual feature is the beautiful floral display presented by the many hundreds of purple flowers arranged along numerous pendant racemes. These large clusters are produced annually immediately below the leaves. The flowers are followed by spherical, green-coloured berries which change to bright red at maturity. The flowers and ripe berries are generally present at the same time on opposite sides of the trunk.

Hedyscepe canterburyana Wendl. and Drude (*Kentia canterburyana*). Only two trees of this genus are known in New Zealand. They are extremely beautiful specimens about 10 ft. high with leaves larger than those of *Howea fosteriana* but similar in most other respects. The large, oval seeds are borne in clusters and measure 2 x 1 inches. The scarcity of available seed compared with that of the more popular species is probably the principal reason why *H. canterburyana* is not grown much more extensively for both indoor and outdoor use.

Jubaea chinensis (Mol.) Baill (*Jubaea spectabilis*). The most outstanding feature of this palm is the enormous thickness of its stem. The spineless, pinnate leaves somewhat resemble those of the Date Palm but are shorter and less recurved than the latter. It is one of the hardiest species of palms, relatively slow growing and requires ample space to be shown to advantage. In Chile large trunks are claimed to yield 90 gallons of sugary sap which, when boiled, is sold as "Palm honey."

LOCAL BODY FORESTRY IN NEW ZEALAND

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(Reprinted from "Proceedings of the 1957 Conference" by permission of The New Zealand Institute of Parks Administration)

The purpose of this paper is to encourage the growing of trees for timber purposes and beautification by Local Bodies in New Zealand. Unfortunately, there is in this country a general public opinion that exotic forests should be established in blocks of vast acreage, situated on the poorest soils and in the most remote localities. Each of these three fallacies will be dealt with later in the paper.

Community Ownership

Where forestry is most successfully practised overseas, in such countries as France, Sweden, Switzerland and Germany, the local bodies own a significant proportion of the total forest area. This is regarded as highly desirable in forming and maintaining a good national forest policy. A suitable distribution of forest ownership is recommended as one-third Government, one-third private, and one-third communal or local body. Considering the exotic plantations of this country, we find ownership distributed approximately as follows:

Government	53%
Private	38%
Local Body	9%

Of the 38% of privately-owned forest, some 35% is company owned. It will thus be seen that local body ownership plays a comparatively small part in New Zealand forestry today.

Native Forests

In the above figures no consideration has been given to our native forests, where the proportion of local body ownership would be almost negligible. The native forests are destined to supply an ever decreasing proportion of our timber requirements, certainly for the next few generations, and the deficiency must be made up by the use of lower quality timbers from our exotic plantations, and/or the importation of special purposes quality timbers from overseas. Although it would appear possible to perpetuate some of our kauri and beech forests, the problem of our podocarp forests, which yield our main native soft-woods, appears to have no practical solution. Beech and kauri do not present the silvicultural difficulties—although they are by no means simple—that the podocarps do, and no forester would be prepared to guarantee that our native forests could supply more than a small percentage of our timber requirements one hundred, or even two hundred, years hence. The immediate problem, therefore, is the existence of the establishment of suitably situated forests of exotic species yielding wood supplies of the best quality obtainable at economic prices.

Popular Fallacies

Over the last fifty years or more there has been a general opinion that the world is desperately short of wood, or was on the brink of a

world shortage. Although there have been, and still are, shortages in certain geographical regions and shortages of particular qualities and types, there seems to be no justification for this general assumption. Many European countries have achieved a standard of perpetual production from their forests, while in other parts of the world there are still large untouched tracts of virgin forests. Many countries are still exporters of timber, as the producers of exotic pine for export in this part of New Zealand know to their cost. Competition in quality and price is keen, and on the Australian market our pine exports meet this competition from Scandinavian countries, where forest management is on a perpetual yield basis, and the competition of timbers from the Pacific Coast of North America, which have been cut from virgin stands usually in the process of being converted to a perpetual yield basis. Australia is the only market which has been developed so far of any importance to us. Does this present a picture of a wood-hungry world?

Future Demands

Increasing amounts may be required with the development of backward countries, but these parts of the world usually cannot afford to import timber, and make do with substitutes. The increased use of pulp and paper may create a demand for our poor quality timbers, but it does not seem to be realised in this country that such industries must be based on economically sound forestry. If the grower of the forest does not receive sufficient to reward him for his expenditure, then there is no justification for keeping the land in forest. A good measure of State assistance to the grower would be reasonable because of national interests, but the rival claims of agriculture to any particular piece of land should always be kept in view. Similarly, the State should not supply raw wood material to industry at extremely low rates—much below cost—merely for the sake of encouraging industry.

Rate of Growth

Another fallacy widely publicised in New Zealand is that trees grow faster here than anywhere else in the world. Compared with some tropical and sub-tropical countries, our growth is slow. Certainly with *Pinus radiata,* and some other Northern Hemisphere conifers, our rate of growth is exceptionally good, but no better than in selected areas in South Africa, Australia and South America. In other countries, other species grow more rapidly than our exotic pine stands: for example, Larsen, author of "Genetics in Silviculture" (1955) records on page 219 a naturally regenerated stand of *Eucalyptus regnans* in Australia, which is nearly 30 metres (98½ feet) high at 10 years of age.

Size of Areas

At the commencement of this paper it was stated that public opinion held the view that exotic forests should be established in blocks of vast acreage, on the poorest of soils and in remote localities. It is much more desirable to have a larger number of smaller forests than a few vast areas. This is a much better insurance against climatic hazards, against the outbreak and spread of disease, and of great assistance in the control of forest fires. There are also greater possibilities of using the output of the forest,

especially the materials derived from thinnings, in the local areas where the forests are small and well distributed. The best examples of forestry in New Zealand are not to be found in the vase acreages of *Pinus radiata* in the pumice regions of the Central North Island, but in the small scattered plantations belonging to local bodies in Canterbury.

Poor Soils

Where the soils are useless for agriculture, average opinion regards them as suitable for forestry. To grow good timber crops, however, careful consideration must be given to the choice of soils. Agriculture will naturally take the best soils, and improved modern methods of land treatment have greatly extended the areas suitable for successful farming. To plant forests on the poorest of barren soils will result only in the production of low yielding stands of poor form, and these stands will be predisposed to attack by disease. Some soils not suitable for agriculture are certainly possible for forestry, but in general forestry must compete with agriculture in acquiring the poorer quality agricultural soils.

Location

More than half of New Zealand's exotic forest is located within fifty miles of Rotorua. Only a few acres of State or Company owned forests are planted within fifty miles of any of the four main towns. The result is at present excess raw material in the Rotorua region, and mostly transport of timber products from this region to areas where shortages occur. The President of the N.Z. Institute of Forests, in his presidential address in 1953, estimated that to supply the shortages in Wellington, Hawke's Bay and Taranaki from this Rotorua region, from 1960 to the end of the century, will cost £1½ million per annum in freight charges. Much of this could have been saved by a wiser policy in earlier years in site selection nearer to centres of consumption. It must be remembered that wood is a bulky product, and that in a rotation of 40 years a stand of *Pinus radiata* may produce in the final crop and the intermediate thinnings a total weight up to 400 tons per acre. This represents 10 tons per acre per annum which has to be moved from the forest to the user. A good stand of timber can be worth twice as much to the owner 20 miles from the market, compared with 100 miles from the market.

The Local Community

Where tree-growing is practised by the local community many of the above disadvantages are eliminated. It is not suggested that small towns should engage in large forestry efforts, but the local community frequently possesses many of the advantages which go to make a success of small forestry operations.

Size

Firstly, in the acreage to be established, these will naturally be much smaller in unit size than where national projects are concerned. Management may be made more troublesome, and fire protection may have to be eliminated if the units are too small to justify purely protective measures. Areas with naturally protected boundaries, such as clean grazed farm

land, or river or lake boundaries, are highly desirable. Adequate and timely pruning and thinning, with the removal of all useful material from the latter operation, will also greatly assist in reducing the fire risk. The isolation of the various blocks will also assist in reducing the severity of any epidemic disease. It is interesting to note that the greatest damage to exotic pines, so far recorded in New Zealand, by insect epidemic has occurred—

(1) In the extensive areas of pine established in the central pumice areas of the North Island.

(2) In an extensive pine area established on a very poor soil site on the Canterbury Plains.

Areas Available

Local Bodies frequently own areas for other purposes which can be utilised in whole or in part for forestry activities. Particularly does this refer to watershed catchment areas, and to the more extensive of the areas reserved for recreation but unsuitable for development as sports grounds. These areas should not be dismissed as too small and of no economic importance. Small forest areas owned by a large number of local bodies can make an important contribution to the national forest wealth. How many people would think that the hedgerow and park timber in Great Britain would form a significant portion of the total standing timber in the country? The British Departmental Committee on Hedgerow and Farm Timber reported on March 18th, 1956, that "the total volume of timber in the hedges and parks at the time of census in 1951 was 807 million cubic feet, or 21% of the total value of standing timber in Great Britain. The total volume of hedgerow and park timber would require about 400,000 acres of woodland suitable for growing hardwoods to accommodate it."

Most local bodies own picnic reserves which in many cases could be improved by the planting of a few acres of forest. Areas of scrub or rough hillside could often be planted with advantage to provide shade, shelter, interest and improved appearance. These reserves are often situated on soils which are of higher quality than those usually allotted to forest, and provide opportunities for planting species, particularly hardwoods, which require better conditions. That the aesthetic side of forests is appreciated overseas can be seen from an extract from the Journal "Parks and Sports Grounds," June, 1956, which states: "The Forestry Commission proposes to hold a short course on forestry for officers of local authorities . . . with the object of helping these officers to combine ecnomic and aesthetic aspects of forestry." The first subject mentioned is "The Forest for Timber and Beauty."

Fire Risk

Some people may raise the question of fire danger, particularly with picnic areas. *Pinus radiata* in particular usually provides our highest fire risk, and it is a very high one. Even this can be greatly reduced if the boundaries are clean and the stand is high pruned and well thinned. But there is no need to confine one's choice to a single species—there is ample scope for the most selective planter. If conifers are desired, the two

larches, European and Japanese, will provide two of the most ornamental trees, and moreover they will not carry fire, provided there is no ground cover of inflamable growth, such as gorse or bracken. Fire risk is also considerably reduced in a stand of Douglas Fir, and like the broadleaf trees there is little risk provided any inflamable growth on the forest margins or the forest floor is eliminated.

Conclusion

It is hoped that this paper will stimulate interest in the further planting of trees by local bodies, and that eventually New Zealand local bodies will provide a more significant percentage of the total forest ownership. The Chairmen of Reserves Committees, and the Parks Superintendents, are the correct people to whom to address this appeal.

During the discussion which followed it was mentioned that an overseas forester had recommended the planting of poplar trees round the margins of plantations as a means of reducing fire risk. It was contended that this was not the case inasmuch as grass grew well under poplar trees but not under conifers. During dry periods the grass withered and became highly inflamable. Many forest fires had their origin in ground fires started in the marginal grass areas.

Mr. J. Mackenzie mentioned that his department at Hastings was disposing of 10 acres of *Pinus radiata* per annum for which it was benefiting to the extent of £5340 a year, which he considered was quite a tidy sum for a small parks department. He also stated that pinus timber was being used for first-class weather boards.

Mr. Gilpin, Christchurch, stated that the Christchurch City Council had received approximately £25,000 last year from thirty acres of pine. He explained that this was the net return and of the gross amount paid into the General Fund, his Department was credited with 12½% which was funded for the purpose of capital expenditure on the forests such as the purchase of further land, fencing and roading. He also mentioned that the annual felling programme was being regulated so that it would proceed indefinitely. The output could easily be doubled, but such a practice would lead to lean years in the future.

In proposing a vote of thanks, Dr. Annett said he was honoured to do so and congratulated Mr. Skipworth on his very able paper. He also made reference to the vast pinus forests established in thhe Waikato and Rotorua districts.

THE FRONT GARDEN

DOUGLAS ELLIOTT (*New Plymouth*)

The average town house is placed on the section in such a way as to make the front garden the biggest and most important part of the lay-out. If the owner is willing to make of the area a sort of public park, open for all to see, it certainly adds to the attractiveness of the street; but if he wants to make the most use of his property and develop his garden into an outdoor living-room he is almost certain to feel the need

for privacy and will usually get this by installing a high fence or hedge, which does not add to the beauty of the street or the neighbouring gardens.

Better use is made of the property by placing the house nearer the street so that the small open front garden is a pleasant setting for the house while the larger area at the back, screened by the house, can be planned as an enclosed area without in any way spoiling the general effect or giving the impression that the owner is a recluse.

Let us imagine you have a level section with a small front garden. One of the first things to decide is the position of the footpath from street to front door. There is too much variation in design of houses and placing of doors and garages to permit any general rule about where to put the path but there is one rule about the shape of the path that usually works out well: let it be as direct as possible. Straight is best but if your path winds it must wind for a reason—to dodge a big tree or shrub, and it should follow the line that you would normally take if the whole area was in lawn and you could walk where you please. Unreasonable kinks and bends will result in the users cutting the corners and wearing bare patches in your lawn.

Keen to try out new materials in their homes, people are coming round to the idea that new materials may also be used in their gardens, especially in paths. They no longer thing large unbroken areas of plain concrete are essential. Not that concrete doesn't make a good path. It is very smooth and serviceable and ideal for prams and barrows and children's trolleys and tricycles; but it is very uninteresting and commercial looking and is also very glaring in sunny weather.

Almost equally serviceable but much more pleasing in the garden picture is paving made from concrete blocks. You can buy them already made or make your own, not a difficult job.

Rectangular blocks are easiest to fit together into a solid path, using mortar or soil in the joints. Crazy paving is scorned by some people but I think it fits in perfectly in some gardens and my only objection is when it is badly laid so that it looks messy. This is easily avoided if, instead of putting in the pieces completely haphazard, you sort them out so that two or three pieces look as though they were originally one big piece. This makes a more unified composition.

Whatever shape you use, you can set the blocks on well-firmed gravel or soil. Joints filled with mortar make a clean job that needs no upkeep other than an occasional sweeping. Earth-filled joints may be planted with grass or low-growing rock plants. If you fill the joints with gravel you will find that weeds grow there but these are easy to keep under control with a weed-killer.

Bricks, easily put in place by the amateur, make a durable and attractive surface that can be laid in a variety of patterns. The treatment of the joints is the same as for paving blocks. Red bricks, especially after they have weathered a bit, blend well with surrounding lawns and paths.

A big advantage with paving blocks and bricks is that you can fairly

easily change the position of the path without having to buy a fresh batch of material.

Asphalt is one of the cheapest surfaces and is pleasant in that it is not glaring and is also not too hard. But it has to be resurfaced now and then, and sometimes in very hot weather it is too soft. It needs a permanent edging of concrete or brick to prevent crumbling.

Gravel is good where there are no children to tramp it indoors and where the path runs between garden borders so that bits of stone are unlikely to get on to the lawn and into the mower. It is particularly well suited to an informal cottage garden and blends perfectly with flowers. But it has the drawback of requiring a lot of attention to keep it clean.

For a path that is little used stepping stones are economical and decorative. Set at lawn level, they are no trouble to keep tidy, because the mower runs safely right over them. Such a path is sometimes an aid in unifying your garden picture by leading the eye across the lawn to some feature such as a bird-bath or pool. Before setting the blocks permanently in position, try them out for spacing and line.

So much for the paths. Now we have to decide how we're going to arrange the lawn and the plant borders. While a well kept lawn alone makes a good setting for a house, it is somewhat bare and is greatly improved by the addition of well-placed plants. Because we want the setting to look right all the year round, the main planting should be permanent—shrubs and trees, several of which should be evergreens.

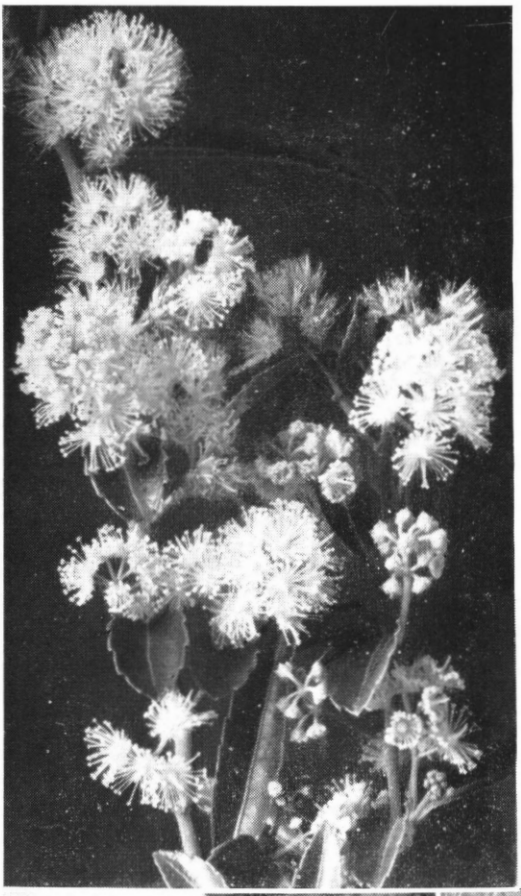
I would suggest you always leave the lawn as one smooth space. You may plant one or two specimen shrubs or trees in this space but don't break it up with flower beds; they are difficult to keep in constant bloom and are a nuisance to mow around. The unbroken lawn looks more spacious.

This means that your only way to have shrubs is in a wide border around the lawn. Some folk are a bit alarmed at the idea of having 6-feet wide borders of cultivated ground and wonder how much upkeep they will involve. If you plant only shrubs and trees the upkeep is simple, only fairly regular hoeing with perhaps a light digging when the weeds grow big during the winter. A mulch of sawdust will simplify the job still further and at the same time benefit the plants. After three or four years the shrubs will cover much of the ground and the upkeep will be much less arduous than it would have been if you had planted each shrub in a separate hole in the lawn.

You will make the outline or profile of your planting more interesting if you use plants of different heights and shapes; and it always improves the composition when you have taller plants at the ends or corners of your borders. They frame the picture.

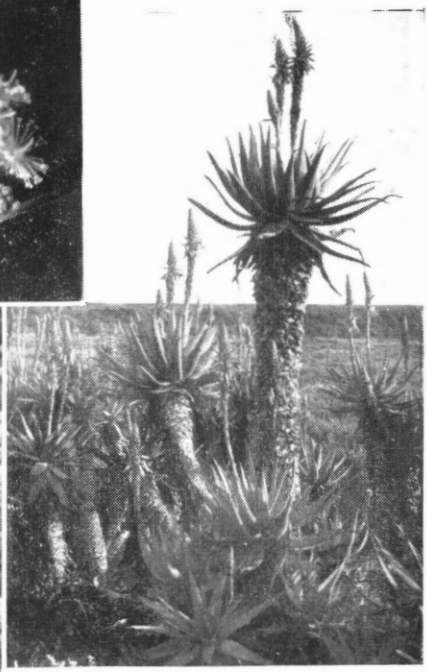
If you continue the shrub border right along the front boundary, you can dispense with the time-wasting hedge and may even be able to do without a fence because the shrubs and trees will soon make a barrier against the entry of people, if not of animals.

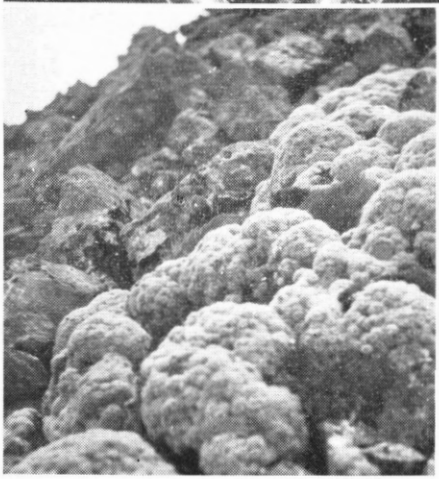
Straight edges to shrub borders are occasionally necessary because of space limits or the style of house but usually curved borders are



Azara lanceolata
(see page 219)

Aloe lineata
(see page 189)





Haastia pulvinaris
(see page 219)

Phoenix rupicola at Supreme Court, Auckland, 23rd April, 1953.
(See page 198)

Howea fosteriana at Remuera, Auckland, 24th April, 1953.
(See page 201)

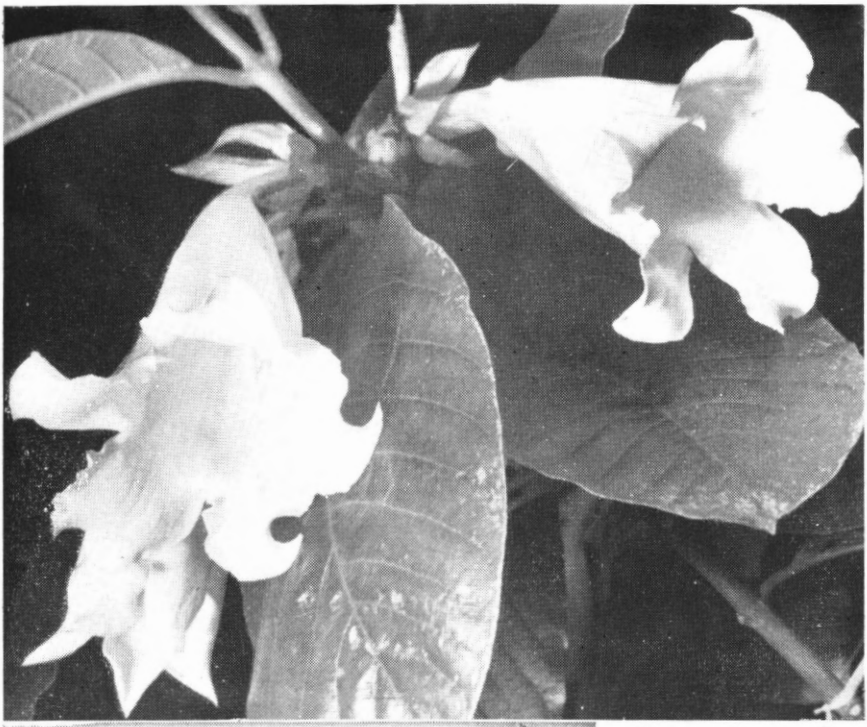
A very small front garden with a simple but well chosen planting that goes well with the house and gives a little privacy without closing the place in.

(See page 206)

(Douglas Elliott)

Lilium rubellum

(see page 211)



Beaumontia grandiflora

(see page 220)

(Auckland City Council, Auckland)

Anther Smut in Carnations

(see page 217)

(Fruit Research Station, Dept. of Scientific and Industrial Research)

much more attractive and give an illusion of greater space. Use wooden pegs to mark the outline and adjust their position until the line looks pleasing from all angles. A hose is handy for marking the line as it seldom lies in any but graceful curves.

LILIES IN SOUTHLAND

J. C. MORRIS (Gore)

Having been invited to write a short article on lilies, I am penning these lines on a subject which has been of all-absorbing interest to me for many years and one in which I have found endless pleasure. I have been growing lilies for a long time, but the experience in many fields of culture has taught me that there is still much to learn and that there is something fresh to be discovered every year.

The study of lily culture has involved the reading of many articles on the subject and has meant correspondence with enthusiasts in other parts of the world. One conclusion I have reached from these is that we in New Zealand are very fortunate in having a climate that favours the culture of a wide variety of lilies satisfactorily. The main reason, I think, is that in this country we have a wide variety of climatic conditions, varying from winters with heavy frosts, such as we experience in the south, to areas where mild winter conditions are experienced. To my mind this has a great bearing on the subject of lily growing.

In the southern areas of New Zealand, where I have had most of my experience in lily growing, it is not possible to cultivate seed outside with any degree of success. The alternative, therefore, is to grow seed under glass in specially prepared boxes. This naturally entails a lot of extra work, but the effort is well worth while.

A lot has been written, and many questions have been asked, about the best time to transplant lilies, but to my mind the answer should always depend upon what the winter conditions are like. My practice has always been to transplant lilies early, if possible, the reason being that the bulbs have a good chance to settle in before the onset of winter. If, however, winter conditions are milder, there is nothing to be gained from planting early, and in these circumstances it is better to allow the foliage to wither first.

The average gardener is in some respects a queer person. If a plant is comparatively easy to grow, he quickly loses interest in it, no matter how beautiful the result may be, and yet when he comes up against something which taxes his skill he tends to persevere with it in trying to attain success. An illustration of this comes to mind. Some years ago I was visiting New Plymouth and was amazed to see some really beautiful Arum Lilies, with very large flowers, growing wild. The bulbs, it seems, had been discarded and thrown over a bank. I remarked on this and was equally amazed at the reply: "Oh! they are only weeds." And yet we go to a lot of trouble to coax them to flower at all.

An easy method of increasing one's supply of lilies is by removing the scales from the bulbs. Some growers are not in favour of this method

of propagation, but it is the only way to increase hybrids true to type. The main point to be watched is to ensure that the scales are taken from healthy bulbs. It is useless taking scales from sickly or diseased bulbs and expect to produce healthy plants from them.

The scale method has a great many advantages over production from seed. For one thing, it is much quicker than seed, and, furthermore, the scales can be planted out in drills in open ground with very little attention. There is no need to take any particular care in planting scales. All that is required is to place them in the ground and cover them with about two inches of soil. It is worthy of note, however, that if scales are removed late in the season they do not produce bulbs until the spring, but if they are taken off early they generally produce nice little bulbs before the winter.

From my experience, I find that lilies appreciate open soil conditions and do not grow well when the soil becomes hard and caked on the surface. For this reason it is an accepted practice nowadays to cover the top soil with sawdust. As well as providing cool conditions for the bulbs, the sawdust also assists in keeping down the weeds.

The aim of every enthusiast is to grow lilies really well, but it does not necessarily follow that because someone else is successful with a certain treatment or method that the same success will be attained in other gardens. There are quite a few factors to be taken into consideration, such as the soil, the position, the climate, etc., and the bulb. For instance, the soil in my garden is heavy loam, and it seldom dries out more than an inch or so below the surface, even in the hottest of weather, and so I am able to plant bulbs near the surface, with good results. For stem-rooters the usual depth is not more than 5 ins. from the base of the bulb. This is a very important point as far as my garden is concerned, but it does not apply to every garden.

Readers will see, therefore, that it would be useless for gardeners with a fine soil which dries out to a good depth to plant bulbs near the surface unless some protection is provided by ground cover. Heavy coatings of lawn clippings are not suitable, as they form a sticky mess and exclude the air. As well as having moisture, the bulbs must be able to "breathe."

No matter how careful one is, there is always the possibility of losing lilies at various times. Sometimes it is difficult to explain the reason, but I do know that if young bulbs are planted the gardener can be reasonably sure of success.

I have grown a number of lilies from the seed to the flowering stage and have been very successful with them. In this there is a lesson. In the first place lilies are very healthy, have all their roots intact and when shifted from pots, boxes or beds to their permanent quarters they are out of the ground for only a short time.

It is my contention that some lily bulbs do not get proper treatment after they are lifted until they are planted again. If the bulbs were treated in the same way as shrubs or plants, I am sure a lot more success would be attained. Lily bulbs are not like tulips or hyacinths in that they can be left out of the ground for a considerable time without coming to harm. If lilies are not to be planted immediately after lift-

ing, they should be stored in moist (but not wet) sphagnum moss and kept properly covered.

A point worth remembering is that the soil in which lilies are to be grown should be carefully prepared some time before the actual planting. The soil should be properly worked up and should be free of air pockets. And lilies should not in any circumstances be planted out when the soil is unworkable.

I am greatly in favour of the early planting of lilies, the sooner after flowering the better. If a bulb is dug up at this time, it will be seen that new roots are starting to grow. By planting lilies then there is less chance of the new roots being damaged. If these roots are broken, I cannot see how they can grow again, and this must affect the growth of the lily.

The task of going over beds and removing old stems, stem roots, etc., should be done as soon as convenient in the late autumn or early winter. If this work is left until the spring, one is liable to damage the growing shoots.

I find that the soil in which lilies grow best needs to be open and free, and, therefore, I transplant most of my lilies often to obtain this result. I find that the bulbs are all the better for it. Good results are not obtained from bulbs which have been left in the same place more than three or four seasons, as the soil becomes solid and should be worked frequently to keep it open.

Grass grubs can be a real nuisance to the lily grower, as I have found from experience. Some bulbs I had growing in pots were making good growth and then suddenly wilted, practically overnight. An examination revealed grass grubs to be the cause of the trouble. All the roots had been eaten, and even portions of one bulb had been consumed.

Cloches are very useful and make an excellent cover in the winter time for bulbs which do not like too much moisture.

The martagon type of lily does exceptionally well in my garden at Gore. Most of our stock was grown from a single pod of seed some years ago, and from this we obtained many different colours, also some with hairy buds. There were one or two extra good white varieties with large flowers.

Growing this seed and flowering the bulbs gave as a great deal of pleasure and satisfaction, and I cannot recommend too highly the growing of lilies from seed. If any grower follows this advice and obtains just half as much pleasure as we have had, he will not be disappointed.

One of the most beantiful lilies in our garden is *rubellum,* and as it flowers so early in the spring it is indeed a welcome sight after the drabness of winter. It is one of the last to come through the ground, and yet it is remarkable that it is usually the first lily in the garden to flower. It is not generally regarded as easy to grow, but in some seasons it does remarkably well here. The photograph shows a really fine head of bloom. The bulbs are planted about 3 ins. deep. *Lilium rubellum* sets seed readily. It is not necessary to hand-pollenate the flowers.

Some of the more uncommon lilies that have flowered outside in our garden include *rubellum, szovitsianum,* "Waxwing," *"cernuum,"* "Red Star," *parryi, tsingtauense, occidentale, browni colchesteri,* "Clarity," *philadelphicum, duchartrei,* "Talisman," "Margaret Johnston," *superbum,* etc.

Occidentale is a lily with very small flowers. It is yellow inside and out, with red tips, and is heavily spotted. Although it is a native of America, it is becoming very scarce, and I have even been asked for the seed of this variety by an American friend.

This brings to mind an experience I had some years ago. I sent to a friend in America to ask him if he could obtain for me some seed of erythroniums (commonly called Dog's-Tooth Violets, the bulb being like a dog's tooth and native to the U.S.A.). Why they are called violets I cannot say. He procured some seed from the Royal Horticultural Society in England and sent it to me!

CONTROL OF CARNATION DISEASES IN NEW ZEALAND

J. A. ROBINSON (Plant Diseases Division, Department of Scientific and Industrial Research, Auckland)

With the advent of newer varieties in a great assortment of colours, the carnation is growing in popularity as a florists' crop. The carnation needs careful attention to cultural details throughout the growing season, and the ravages of several diseases and pests can make the lot of a commercial grower an unhappy one unless he takes prompt measures to prevent them. In this article the symptoms of each disease are set out in the key (Table 1) to facilitate easier diagnosis, and are not further described. Control and preventive measures are given, and a spray schedule (Table 2) applicable to New Zealand, is appended; this schedule also includes suggestions for insect-pest control.

A. Diseases Causing Stem Rot and Sudden Death of Plants

RHIZOCTONIA ROT is caused by *Pellicularia filamentosa* (Pat.) Rogers, and is a very common disease. The causative organisms of SCLEROTIUM ROT and SCLEROTINIA ROT are *Sclerotium rolfsii* Sacc. and *Sclerotinia sclerotiorum* (Lib.) de Bary respectively.

In the event of an attack by one of these diseases all infected plants must be removed and burnt without delay. A soil watering of either Copper oxychloride (up to 10 lb. in 100 gallons) or Phygon XL (up to 2 lb. in 100 gallons) will help to check the spread of the disease. The solution is poured into the holes from which the diseased plants were removed.

To insure against another infection, carnations should not be replanted in infected soil before it has been carefully disinfected by steam or chemicals. The methods generally used are those described by Jacks (1953).

A few varieties seem fairly resistant to Sclerotium rot, especially the border varieties "Robin Thain," "Goldrey," "John Woodhead," and "Dusky Maid." Some strains of "Otaki Pink" are particularly susceptible. When suitable substitutes are available, susceptible varieties should be discarded.

B. Diseases Causing Yellowing of Foliage followed by Progressive Wilting and Slow Death

Fusarium dianthi Prill. et Del. and *Verticillium dahliae* Kleb. are responsible for the vast majority of the deaths in young carnation plants. They invade the vascular systems of the plants, and being inaccessible to sprays are very difficult to control. It is often difficult to distinguish between these two diseases without microscopic examination, but as the preventive measures are similar this need not affect the grower.

Table 1—A KEY TO THE IDENTIFICATION OF CARNATION DISEASES

A	*Diseases causing stem rot and sudden death of plants—*	
1.	Roots intact; soft decay at soil level, usually spongy and brown. No fungous threads visible in soil.	RHIZOCTONIA ROT
2.	Small (under 1/32 in. diam.), pale to dark brown, round sclerotia (firm, hard masses of hyphae), attached to a whitish net of fungous mycelium around the roots and in the surrounding soil; plants straw coloured.	SCLEROTIUM ROT
3.	Similar to 2, but sclerotia larger (over 1/32 in. diam.) and the mycelium compacted around the roots of the plant.	SCLEROTINIA ROT
B	*Diseases causing yellowing of foliage followed by progressive wilting and slow death—*	
1.	Reddish-brown discolouration of vascular tissue in the stems.	FUSARIUM WILT
2.	Similar to Fusarium Wilt, but discolouration brown to black and confined to vascular tissue.	VERTICILLIUM WILT
C	*Diseases affecting leaves, stems, and calyces—*	
1.	Elliptical, chocolate-brown powdery pustules on leaves and stems.	RUST
2.	Light coloured, sunken lesions, sometimes with darker margin, and containing clusters of tiny black bodies.	SEPTORIA SPOT
3.	Soft brownish bands across leaves and stems, drying greyish-white. Common on susceptible varieties in winter.	LEAF ROT
4.	Round or oval greyish lesions with purplish margin, usually on the leaves.	RING SPOT
5.	Stems girdled at base of leaves with greyish spots and black mould (visible under lens).	BLIGHT
6.	Leaves mottled, but not distinct lesions or spots on the surface. Flowers of dark coloured varieties often streaked white.	MOSAIC
7.	Calyces splitting, but no disease symptoms.	SPLIT CALYX

These organisms may be inactive in an attacked plant until conditions for the growth of the fungus are satisfactory, when they cause death. Sometimes their presence cannot be easily detected in a well-grown plant, but when cuttings from such a latently infected plant are taken, a seemingly new infection is initiated.

These fungi are soil-borne, and when plants are to be grown in soil known to be infected, soil-disinfection is essential. Bickerton (1942) reported satisfactory control of Fusarium Wilt by using the undiluted commercial concentrate of formalin at the rate of 3 ounces to every square foot, each dose being poured into a hole 6 inches deep.

Scrupulous hygiene in the nursery will go far in controlling wilt fungi. All stock plants showing even the slightest symptom of vascular disease ought never to be used for propagation and should be destroyed immediately. Overseas what is known as the "cultured-cutting technique" is being used by large-scale growers to build up *Fusarium*-free stocks of carnation plants. The technique is fairly involved, and the procedure has to be carried out under aseptic conditions. Cultures are made from the basal 1½ inches of each suspect cutting after cleansing. Only those stock plants corresponding to the cultures showing no fungus growth are used for propagation purposes, and these form the nucleus stock of each variety. The nucleus stock plants are grown in an isolated area and are handled with care to avoid reinfection. Tammen *et al.* (1956) have demonstrated the commercial feasibility of the programme, but point out that since culturing is rather a specialised technical operation calling for meticulous care, commercial growers have not always achieved maximum success with its use.

Guba and Ames (1953) report that the perpetual-flowering varieties "Mrs. E. F. Guba," "Waltham Pink," and "Spicy Rose" are resistant to Fusarium Wilt. In New Zealand few varieties have shown marked resistance to the wilt fungi, but "Rose Clove" and the border varieties "Robin Thain," "Apricot Bizarre" and "Royal Mail" are fairly resistant. The border varieties "John Woodhead" and "Commr. H. A. Haynes" are particularly susceptible; so are some strains of "Otaki Pink."

C. Diseases Affecting Leaves, Stems, and Calyces

1. RUST is caused by *Uromyces dianthi* (Pers.) Niessl., and can be a very difficult disease to control. The planting of resistant varieties is the best means of prevention. The popular "Rose Clove" and "Otaki Pink," and most modern varietiess, are fairly resistant to rust. Whenever possible susceptible varieties should be discarded.

Spraying is often necessary and should be carried out prior to infection and at regular intervals throughout the growing season. Zineb (2 lb. of Dithane Z-78 in 100 gallons) is the best material to use. Whenever carnations are sprayed it is advisable to include in 100 gallons of the spray-mix up to 6 ounces of P.E.P.S. (poly ethyl poly sulphides).

This material does not damage foliage and is an excellent "sticker," which is what is required for the shiny leaves of the carnation plant.

2. SEPTORIA SPOT (*Septoria dianthi* Desm.).

These spots greatly disfigure carnation stalks and calyces, and sometimes are responsible for calyx-split. Overhead irrigation facilitates the spread of the disease, and must be avoided.

The control of Septoria Spot is made difficult by the shiny surfaces of the calyces, and also because of the rapid growth of the flower stalks and buds; this quickly exposes unprotected areas for the spores to infect. Thiram (2 lb. in 100 gallons) plus P.E.P.S. (6 oz. in 100 gallons) as a spray affords reasonable control, but only if applied at regular fortnightly intervals.

A very few varieties seem fairly resistant, including "Rose Clove," "Barridale," "Crimson Clove" and "Dainty Bride."

3. LEAF ROT is caused by *Heteropatella valtellinensis* (Trav.) Wollenw. In the wet winter of 1956 this disease proved particularly persistent. Like most of these diseases it survives from one season to the next on diseased leaves, and it is an excellent policy to remove and burn all infected tissue periodically, and to destroy all badly infected plants.

Before spraying is begun, all infected leaves and stalks must be removed from the plants. Two applications of Thiram (2 lb. in 100 gallons) plus P.E.P.S. (6 oz. in 100 gallons) gives satisfactory control.

Varietal susceptibility is marked. In a mixed planting in 1956 the perpetual-flowering varieties "Gypsy" and "George Allwood" were severely attacked. "Dainty Bride," "White Sim," "Pink Sim," "Crimson Clove," "Rose Clove," and "Heather Pink" were all fairly resistant.

4. RING SPOT (*Heterosporium echinulatum* (Berk.) Cke.)

This is just as destructive a disease as Leaf Rot, and is fairly prevalent in New Zealand. During a bad attack the infected plants have sometimes to be destroyed, but even a fairly mild attack can debilitate the plants.

The spray materials suggested for Leaf Rot are applicable here, but again it is essential to first remove all infected foliage. Measures for control must include prompt and regular disposal of carnation debris.

5. BLIGHT (*Alternaria dianthi* Stev. et Hall).

Alternaria Blight is the most prevalent and serious disease in parts of the United States (Bickerton, 1942B.), but this disease is not so economically important in New Zealand. Infections are frequently initiated during porpagation, and infected carnation debris serves to carry the disease over from one season to the next, although a severely cold winter can kill out the pathogen. Overhead watering serves to spread this disease, and should be avoided.

Bordeaux Mixture (4-4-50) plus a spreader was found to be suit-

able against Blight, but it is possible that Zineb (2 lb. in 100 gallons) plus P.E.P.S. (6 oz. in 100 gallons) would give satisfactory control; Zineb is not phytotoxic to carnations, whereas several growers have reported severe plant-damage with Bordeaux Mixture. An application before planting out is advocated if the disease was prevalent the season before.

6. MOSAIC is a virus disease. The symptoms are more easily seen if the leaves are held up to a light source. Mosaic tends to debilitate the plants, and the mottling and streaking of the blooms lessens their market value considerably.

According to Brierley and Smith (1955), two distinct viruses of carnation have been termed mosaic. One of these viruses is transmissible by mechanical means and by the green peach aphid (*Myzus persicae* Sulz.). The other is transmitted by mechanical means only. It is therefore advisable, if for this reason alone, to keep aphids under control throughout the growing season.

Hygiene at propagating time is a good safeguard against the spread

Table 2—SUGGESTED SPRAY SCHEDULE FOR CARNATIONS

Time of Application	*Material*	*Concentration*		*Specific for:*
		100 gal.	4 gal.	
At propagation time, prior to taking cuttings or layers	Thiram (50% active)	2 lb.	1½ oz.	Septoria Spot
	+			
	P.E.P.S. (80%)	6 oz.	¼ oz.	
After propagation, when plants are being established	Zineb (65% active)	2 lb.	1½ oz.	Rust Blight
	+			
	P.E.P.S. (80%)	6 oz.	¼ oz.	
At regular 2- or 3-weekly intervals through to late spring	Zineb (65% active)	2 lb.	1½ oz.	Rust
	+			
	Thiram (50% active)	2 lb.	1½ oz.	Leaf Rot Ring Spot
	+			
	P.E.P.S. (80%)	6 oz.	¼ oz.	
When calyces are forming. Repeat every 2 weeks until flowering ceases	Thiram (50% active)	2 lb.	1½ oz.	Septoria Spot
	+			
	20% DDT Emulsion	5 lb.	3¼ oz.	*Thrips tabaci* Lind.
	+			
	P.E.P.S. (80%)	6 oz.	¼ oz.	
At first sign of infestation	Lindane Emulsion (20% active)	1 pt.	⅜ oz.	Green peach aphid

of mosaic, and if the knife used to trim cuttings is frequently cleansed in methylated spirits the transmission of the virus can be checked to a certain degree.

Overseas, large-scale growers are using indicator plants to test all their stock for mosaic. *Dianthus barbatus* L. ("Sweet William") is used, and several thousands of plants of this species, and also of *D. superbus* L., are raised from seed for this purpose. Gasiokiewicz and Olson (1956) state that by annual indexing of stock plants by means of these indicator plants it is possible to maintain all stock completely free from mosaic.

Mosaic is not transmitted by seed, and all seedlings are free of this disease. However, without further precautions it is not possible to maintain these varieties virus-free. Continual roguing, reselection, insect control and rejection of susceptible varieties by all growers will play a big part in preventing this disease from assuming major importance.

Streak is a virus disease which has not yet been recorded in New Zealand. It is transmitted by green peach aphids, and in combination with mosaic produces the very debilitating trouble known as "yellows" (Jones, 1945).

7. SPLIT CALYX is a physiological disease. Although some varieties split more than others there are few which never burst their calyces. The number of petals in a split bloom is usually greater than in a normal flower; this indicates that splitting is due to mechanical pressure inside the calyx-cup. It has been shown that cool temperatures cause an increase in the number of petals in a carnation. If this is followed by a warm period conducive to rapid development of the blooms, splitting is inevitable. In a glasshouse the trouble is much less severe than in the open ground, as a more constant temperature can be maintained.

Beach (1952) came to the conclusion that fluctuation of the soil nitrate level accounted for a large number of split calyces, and found that 18 per cent. of the flowers were split when the nitrate level was lowest, whereas only 6 per cent. split on a high nitrogen diet. Potash addition was advantageous only when the nitrate level was fairly high.

Varietal tendencies for the blooms to split are often very obvious. In appraising a variety attention should be given to the characteristics of the calyx. A supple, large, long, "clawed" calyx is the ideal, as calyx-splitting is common in varieties with thin, large, round calyces. Small rubber rings and thick-wool ties certainly reduce the number of split calyces, but on a large scale these are laborious to apply. It is more practical to see that the plants have a balanced diet, and that all inferior varieties are discarded.

ANTHER SMUT—Since this article was submitted for publication another disease of carnations has been recorded (Robinson, 1957). This is anther smut, caused by the fungus *Ustilago violacea* (Pers.) Roussel. Anther smut is easily recognised in an infected carnation bloom, which has

a sooty appearance due to copious masses of purplish fungus spores produced from infected anthers. The variety "Otaki Pink" is particularly susceptible.

The fungus grows through the tissues of an infected plant, and persists from one season to the next, causing in due course an abnormal bushiness in the plant. This bushiness is due to a greater than usual number of spindly axillary growths. [The accompanying photograph shows this symptom quite clearly.]

As spraying is useless against anther smut a system of roguing will have to be devised by any grower unlucky enough to number anther smut among his carnation troubles. Roguing should be carried out as soon as the disease is recognised, and the peculiar bushiness associated with this disease is a useful guide. Infected plants should be burnt as soon as possible.

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VON HAAST OF CANTERBURY

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

Before we can know anything about the plants growing around us we must get to know their names and it has been most truly said that the only reason for troubling to know the names of a plant is because the name is the key to its literature. We may label the plants in the garden but when it comes to the native trees and flowers of the countryside we have to be able to recognise them on sight.

Names are not easy to remember at the best, and my experience has been that so many native plants bear complimentary names that they mean nothing to the plant-hunter until he knows something of the people concerned. It is only when they emerge as personalities when we know something of the lives of the collectors and their work that the complimentary names become something of a help rather than a hindrance in the identification of plants.

On a rough check over I find that Colenso has no fewer than thirty species bearing his name; Lyall has eighteen, and that is just about all the plants he collected in this country; Sinclair and Travers each have fourteen, and there are about a dozen collectors each of whom have six or more species. Haast has nearly twenty. If we can bear in mind that Colenso was a missionary in the North Island who fell into disgrace; that Fraser was curator of the Sydney Botanic Garden and spent only one day at the Bay of Islands; Buchanan confined his efforts to Otago and that Haast was a somewhat overbearing German who discovered the Franz Josef Glacier, their names are not so likely to be muddled or forgotten.

Some of Haast's Plants

Haast collected extensively for a period of about 10 years and did much to make the beautiful alpines of the Southern Alps known by the copious collections he made. Unfortunately most of his material was sent to Kew and other botanical institutions in the Northern Hemisphere and he had not sufficient forethought in retaining duplicates in this country. The plants that bear his name include the genus haastia which embraces three very striking species of which the most notable is the "Vegetable Sheep", *H. pulvinaris,* from the hills of Marlborough and Nelson where it ascends to about 7,000 feet forming remarkable cushion-like masses of woolly growth, pale yellow in colour and, although looking soft and mossy, are in fact so hard and closely packed that it is impossible to put a pencil in between the crowded masses of inch-wide stems with their minute leaves. When these plants flower they are covered with a rash of tiny dark florets.

Raoulia haastia is an attractive creeping plant that spreads its carpets of pleasing dark-green foliage over the shingly riverbeds where they form seed-beds for epilobiums, wahlenbergias and a host of other small plants that seek to colonise these places. Found only on the bare shingle slips that are always on the move, *Ranunculus haasti* is a fleshy grey-green plant that is very difficult to see unless it is in flower. It is a very striking plant worthy of a place in the scree garden as it is not difficult to grow. The only other species bearing Haast's name that I shall mention is *Olearia haasti,* so popular in southern England as the New Zealand Daisy Bush on

account of its neat habit and mantle of white blossoms appearing in late summer when most other shrubs have long finished flowering. Widespread among the misty gorges on the eastern side of the Southern Alps, it is nevertheless rare and is never seen in quantity.

Haast was a geologist and plant-hunting was merely a side-line, but strangely enough he is far better known on account of the botanical work, which occupied a comparatively small part of a very busy life, than for all the many other activities on which he spent himself.

Arrival in New Zealand

Johann Franz Julious Haast was born at Bonn in 1822 and was educated at the local university and, according to family tradition, saved the young man, who was to become the Prince Consort, from drowning in the Rhine. He failed to graduate but became a competent draughtsman and this accomplishment stood him in good stead on his arrival in Auckland in December, 1858. Next day the Austrian frigate *Novara* arrived upon the scene in the course of her voyage of research and discovery around the world.

Coal had been discovered at Drury and the authorities in Auckland asked Dr. F. von Hochstetter, geologist of the expedition, to report on the matter. They were so impressed by his ability that they made arrangements for the young geologist to get leave of absence in order to find out if there was any substance in the persistent rumour of deposits of coal, lead and copper in the interior of the North Island.

Hochstetter was very glad to secure the services of a competent draughtsman and it was not long before the two young Germans became fast friends. They explored the thermal region and found the going very hard. "The slender paths of the natives," said Hochstetter, "lead over hills and mountains, always in steep ascent and descent, rarely in the valley, nearly along the ridge of mountain heights. Where they cross the bush the clearing is just broad enough for one man to wind himself through. An eye used to European paths will scarcely recognise these Maori trails. . . . "

Later they undertook some work in Nelson and when Hochstetter's leave was up he departed, leaving his friend Haast to carry on the work. Haast was still in Nelson when he was asked to report on the projected Lyttelton tunnel, and in 1861 he was appointed Provincial Geologist for Canterbury with a salary of £500. He had profited by his brief association with Hochstetter.

So far as I have been able to discover he took little interest in plants until the ill-fated expedition to the upper Rangitata, when his companion was drowned in the river. After the tragedy he sent Dr. Sinclair's specimen together with some of his own to Hooker and began an association that continued until the end of his life.

Trials and Tribulations

Gold had been discovered in Otago and Canterbury was madly jealous. Some citizens were not above saying that their geologist must be a pretty poor effort if he could not find coal, gold or any other mineral in the province. Then again he went exploring and came back with tales of mountains and glaciers but seemed unable to find any worth-while "country"—sheep country, any other sort was not worth mention.

But Mr. Haast was not one to hide his light under a bushel and if he found no gold in the hills he scented the possibility of some profit in creating "a kind of Pantheon or Valhalla for my illustrious contemporaries amongst those never-trodden peaks and glaciers". So he named glacier, range and river, after the distinguished scientists of the day and wrote and told them so, very often including a sketch map or watercolour drawing. Thus Sir William Hooker of Kew was commemorated in the Hooker Glacier and River near Mt. Cook, while the younger Hooker's name was given to a range near the Grey River and later to Mt. Hooker near Haast Pass. Even scientists are human and those great men wrote acknowledging the compliments. Yes, Mr. Haast had found a very nice way of telling the world of his activities, a way that brought many honours as he progressed to Dr. Haast, F.R.S., and to that great day in August, 1886, when Queen Victoria said, "Arise, Sir Julius".

Moa Bones

Full use was made of the discovery of a deposit of moa bones at Glenmark. They were exchanged far and wide for material to build up the collections until the Canterbury Museum was the finest in the country. In 1872 Haast determined to excavate the Moa Bone Cave at Sumner and collected money for the purpose. He engaged two men, including Alexander Mackay, who was paid £2 to do the work, and naturalists throughout New Zealand were interested because it was hoped that the excavation would solve the mystery of the moa and the moa-hunters. The job took seven weeks and was visited by Dr. Hector, head of the Geological Survey Department, to whom Haast, a friend of many years' standing, explained what was being done.

Haast seems to have been very busy with his many activities and failed to publish the report all were waiting for until August, 1874, when he was "staggered and indignant" to see in the public press a resume of a paper written without his knowledge and consent by Mackay and read by Hector to the Wellington Philosophical Society. Then the fat was in the fire and we get one of those rows in scientific circles that enlivened the peaceful days of Victoria's reign. Space does not permit my going into all the details and ramifications which animate many pages of the "Life and Times of Sir Julius von Haast", but I am afraid the great man does not come out of it quite so well as he should. They tried to get Hooker to arbitrate but he skilfully dodged the issue, gave an innocuous report "not for publication" and privately told Haast, in the nicest possible way, not to be a big baby, but the whole thing took about 10 years to simmer down.

Probably no one in his day did so much to bring a knowledge of the nature and distribution of our mountain plants as Sir Julius von Haast, to whom Hooker paid the following tribute in his Handbook of the New Zealand Flora. "It is difficult to imagine how, with so many and such arduous duties as surveyor and geologist, Mr. Haast can have personally effected so much for botany as he has done, and I anticipate that his method of making complete collections on each mountain and on each line of march will eventually do much to develop the extremely curious subject of variations in New Zealand plants."

SOME NEW PLANT NAMES

L. J. METCALF (Assistant Curator, Botanic Gardens, Christchurch)

Nowadays all but the most conservative of gardeners have become used to the changes in botanical nomenclature, which from time to time affect many of the plants they grow. However, frequently it is often many years before such changes become generally known. The reason for this is that the findings of many overseas botanists are published in journals and as separate papers which generally get no further than one or two specialised libraries in this country, and there they lie until somebody working on some aspect of botany or horticulture requires that particular piece of information and discovers, for example, that the plant he knew as *Crocus zonatus* is correctly *Crocus kotschyanus.* Sometimes the changes are those made in the revision of a family or genus where one botanist lumps several genera together and a few years later another decides to split them up or, as frequently happens, the name must be changed in order to conform with the International Rules of Botanical Nomencluature. The changes brought about by the latter are mainly due to the "law of priority" which requires the acceptance of the oldest legitimate binary name for each species, or the "homonym rule" which requires that a name be considered illegitimate and be rejected if previously the same name has been published properly and used for another plant. Also disidentification on the part of some early botanist is sometimes to blame.

In this article it is intended to bring to the attention of the reader some of the more outstanding changes of name affecting some commonly cultivated plants. The one which will probably surprise most people concerns *Amaryllis belladonna.* In the Gentes Herbarium 8, 17-18 (1953) G. H. M. Lawrence, in a paper on the botanical names of cultivated plants, points out that the plant commonly grown in gardens as *Amaryllis belladonna* is now known as *Brunsvigea rosea* (Lam.) Hannibal. Briefly the steps leading to this change are (1) the name *Amaryllis belladonna* originally bestowed by Linnaeus to an American species was later misapplied to the South African plant. (2) This error was not corrected till over a century later by Uphof in 1938 (Herbertia V. 101-109). The name *Amaryllis belladonna* correctly belongs to a West Indian plant known as *Hippeastrum equestre* which is the plant to which Linnaeus originally gave the name amaryllis. The South African plant then had to be assigned to another genus in order to conform with the Rules of Nomenclature and so the name of *Callicore rosea* was revived for it. However, it was pointed out that this name was antedated by *Amaryllis rosea,* Lam., and so finally it became *Brunsvigia rosea* (Lam.) Hannibal, which is the valid name for this plant.

Cephalotaxus. The plant grown in gardens as *Cephalotaxus drupacea* has been subjected to investigation and its position now straightened out. It was named in 1846 by Siebold and Zuccarini and is, according to Wilson, native to Northern Japan. This Japanase plant, however, is not the one commonly cultivated. The plant commonly grown was first named in 1839 as *Taxus harringtoniana* and is not known in the wild but is probably of horticultural origin. Siebold and Zuccarini named it *C. pendunculata* in 1846 and later Miquel treated it as *C. drupacea* var. *pendulata* and botanists and horticulturists have since so recognised these two plants.

It was pointed out by Koidzumi in 1930 and later by Rehder that when two entities are combined as elements of a single binominal it is required by the Rules that the oldest available legitimate binary name be used. Therefore *Cephalotaxus harringtoniana* (based on *Taxus harringtoniana*) is the valid name. As this name has been applied to the plant treated as a variety the variety now becomes the type (*Cephalotaxus harringtoniana*) and the plant that was treated as the typical element now becomes the variety known as *Cephalotaxus harringtoniana* var. *drupacea* (Sieb. & Zucc.) Koidz.

Phoenix loureiri. Kunth. This is a dwarf palm which is very popular for glasshouse decoration. It has previously been known variously as *P. roebeleni, P. humilis* var. *roebeleni,* and *P. humilis* var. *loureiri.* However, recent studies have placed it as being *P. loureiri.*

Chlorophytum capense (L.) Kuntze. Commonly known as anthericum this plant is more commonly grown as a variegated form and is a popular subject for glasshouse and house decoration. Van Vostroom has recently worked out the correct name of this plant showing that the earlier Linnaean name of *Asphodelus capensis* (1759) has priority over *Anthericum elatum,* Ait. (1789) and therefore Kuntze's combination of *Clorophytum capense* is the valid name for the plant.

Arabis caucasica. Willd. This is the correct name for the plant grown in gardens as *A. albida.* Steven ex Fisch. Fischer was the first to publish Steven's name of *A. albida* but he did so without any accompanying description. Therefore, this name becomes a nomen nudum (a name published without description or an illegitimate name) and Willdenow's name of *Arabis caucasica* which was published with a description of the plant therefore becomes the valid name.

The African Violets. In the same publication it is pointed out that the species of saintpaulia in cultivation have been mixed up and that B. L. Burt of Kew published the results of his studies in the "Gardeners' Chronicle" (CXXII, 23, 1947). It is shown that the plant described by Clarke in 1906 as *S. kewensis* was identical with the one named thirteen years earlier by Wendland as *S. ionantha,* and also that many of the plants grown as *S. kewensis* are one species and that grown as *S. ionantha* a second species but not the one known to botanists by that name, but an undescribed species. In the resulting shuffle around the plants known as *S. ionantha* were left without a name and were renamed by Burtt as *S. diplotricha.* He also disclosed that there is a third species in cultivation in England which he has named *S. tongwensis.* In order to simplify matters I have reproduced below the key which accompanies the article.

Leaves with dual indumentum of both long and short hairs intermixed: caps. cylindrical, 1-1.3 cm. long. *S. diplotricha.*

Leaves with hairs uniform in length. The leaves orbicular to broadly elliptic, obtuse: caps. short, subglobose, to 0.8 cm. long. *S. ionantha.*

The leaves elliptic to ovate-elliptic, subacute: caps. cylindrical, 1.5-1.8 cm. long. *S. tongwensis.*

The correct names for the saintpaulias are below, the old names in parentheses.

Saintpaulia ionantha, Wendl. (*S. kewensis.* Clarke).

Saintpaulia diplotricha. B. L. Burtt. (*S. ionantha,* Hort. not Wendl.).

Saintpaulia tongwensis. B. L. Burt.

In this article I make no claim that any of the findings are my own work but merely wish to bring to the attention of readers some of the more recent changes in the botanical names of cultivated plants with which in the normal course of events the average reader probably would not become acquainted for a considerable time.

NOTEWORTHY PLANTS

Azara Species

The azaras are attractive evergreen shrubs and trees from Chile. Of the dozen or so species known to botanists, at least three are available in New Zealand where they grow well. They do not require any special treatment except that in very cold districts they may need some shelter as they are not completely hardy.

Hardiest of them all and the one most commonly seen in this country is *A. microphylla* which has been grown here for many years. It makes a very attractive small specimen tree usually not more than about 12 feet high with small leaves arranged on frond-like branches. It is sometimes mistaken for a native beech. The flowers, which open late in the winter, are so small that they are insignificant but they have a strong scent of vanilla. Probably the best of the three is *A. lanceolata,* a slender shrub or small tree that is said to be capable of reaching a height of 20 feet. Its flowers have the double attraction of brilliant colour and strong scent. Opening in October, they are rich deep yellow and though the individual flowers are small they are borne in dense clusters that are quite showy. Like the native pohutukawa, the azara flowers have no petals and depend for their beauty upon their numerous stamens.

The first time I saw this azara I was impressed by the flowers but not by the habit of growth, which was scrawny; however, it must have been a poor specimen because I have since seen it doing well in one of the New Plymouth parks where it has a graceful and almost feathery appearance and flowers profusely. I have not seen the fruit but according to Bean it is attractive in various shades of mauve to white and like porcelain.

An interesting point in the history of this azara is that it was originally found by Charles Darwin at the Cape Tres Montes, well down the coast of Chile, in December, 1834, on the voyage of the Beagle. Nearly a century passed before it was introduced to cultivation in England where it first flowered in 1931. *A. integrifolia,* though catalogued as reaching a height of 12 feet, may grow to 40 feet. The glossy green leaves are smooth and, except on small plants, not serrated like those of *A. lanceolata.* Again the flowers are yellow and fragrant.

—Douglas Elliott.

Gypsophila paniculata fl. pl. var. Bristol Fairy Perfecta

This recently developed form of the popular and well-known double-flowered *G. paniculata fl. pl.* var. "Bristol Fairy", is identical in habit and growth, except that the individual flowers are quite twice as large. Whether "Perfecta" will entirely replace "Bristol Fairy" remains to be seen. Some florists and growers seem to prefer the smaller-flowered type as claimed to be daintier in habit and thus more suitable for certain floral arrangements. Personally, I consider that as the old *flore plena* was quickly displaced by the introduction of "Bristol Fairy", so will "Perfecta" be very soon regarded as the only double-flowered form worth growing. It is a pity though that every improvement on a plant or shrub necessitates an added name. The full and correct name will be *Gypsophylla paniculata fl. pl.* var. "Bristol Fairy Perfecta."

—R. E. Harrison.

Beaumontia grandiflora (apocynaceae)

Named after Mrs. Beaumont, Bretton Hall, Yorkshire, England. Probably blooming for the first time in New Zealand, this magnificent indoor climber has tough leaves over 8 in. long and blooms during the winter months. The white flowers are tube shaped and veined with green. It requires plenty of root room, and after flowering should be cut reasonably hard back to permit of young growths blooming the following winter. The photograph was taken in the Auckland Domain Winter Gardens, and the plant, which is a native of Java, reached the Auckland City Parks Department via Fiji.

BOOK REVIEWS

BACKGROUND TO GARDENING, by W. O. James. (Published by George Allen & Unwin Ltd., price 18/-.)

Scientists are sometimes accused of being unable to speak the language of the ordinary person when they are discussing their own specialist interest.

Dr. James does not come into this category as he has described in a pleasant, interesting and accurate manner, many aspects of plant life in the garden. He bridges the gap between the botanist or soil scientist and the gardener, describing in a readable way the background not only to gardening operations, but also to plant life and the soil.

This book is in the tradition of Sir E. J. Salisbury's "The Living Garden", and it can fairly be considered complimentary to this classic. It does not describe the exact way to sow seeds, but it does give the reasons why seeds require air and water when sown.

"Background to Gardening" does show the very wide field of modern botany and gardening and yet does not cover every aspect; rather it picks out common garden operations and discusses their implications as a Botanist looks at them.

It is well printed in very readable type and generously illustrated with line drawings. "Background to Gardening" is essentially an armchair book, and once picked up, the reader will browse through with interest and profit.—J.P.S.

OUTDOOR CARNATIONS AND GERBERAS IN NEW ZEALAND, by John ROBINSON. (Published by A. H. & A. W. Reed, Wellington.)

This well illustrated booklet admirably fulfils its purpose of stimulating interest in Carnations and Gerberas, and many plant lovers will turn to it for guidance, particularly with it having been written specially for this climate. Short historical backgrounds preface the individual discussions on Border Carnations, Perpetual Carnations, and Gerberas, which include descriptive lists of reliable garden varieties. The cultural practices and propagation methods are treated thoroughly and leave the reader in no doubt as to the way to success. However, the author, in his enthusiasm for these plants, fails to give the same careful attention to basic horticultural principles. One cannot feel satisfied with the statement that layerage is simply an improved version of cuttage. The same carelessness is displayed in the brief introductory remarks relating to soils. Mr. Robinson, after stating that soils are classified according to the size of each particle proceeds to describe them according to a clay-sand ratio. Also the soil acidity range recommended for Gerberas of pH5 to pH7 is too wide to be classed as slightly acid. The author makes no secret of his wide knowledge of plant pathology and the inclusion of a simple spray schedule helps the gardener over this otherwise depressing section. The valuable stimulus of the show bench is presented in an encouraging manner and supplemented by a list of suitable varieties. The lucid explanation of hybridization with these plants completes a booklet which many gardeners not only will find interesting but also useful.—P.J.J.

OFFICIAL ANNOUNCEMENTS

ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE THIRTY-FIFTH ANNUAL MEETING AND CONFERENCE OF DELEGATES

Notice is hereby given that the Thirty-fifth Annual Meeting and Conference of Delegates of the Royal New Zealand Institute of Horticulture (Inc.) will be held in the AMATEURS' HALL, Guyton Street, WANGANUI, on Thursday, 13th February, 1958, commencing at 9.30 a.m.

K. J. LEMMON,
Dominion Secretary.

1958 BANKS LECTURE

The 1958 Banks Lecture will be delivered in the Amateurs' Hall, Guyton Street, Wanganui, on Thursday, 13th February, at 8 p.m. The Lecturer will be Mr. W. R. Stevens, of Wanganui, and his subject, "The Influence on New Zealand of the Introduction of South African and Australian Plants".

Members, and delegates from affiliated organisations, are specially invited to attend both of these annual functions. The Wanganui District Council has a full programme of events of distinct horticultural interest arranged for the period from 12th to 14th February.

Programme

Wednesday, 12th—

2.30 p.m.: Official Opening of Flower Show at Spriggins Park.

7.30 p.m.: Official Welcome to delegates and social evening in Amateurs' Hall.

Thursday, 13th—

9.30 a.m.: Conference of Delegates.

8.00 p.m.: Banks Lecture.

Friday, 14th—

Visits to places of local interest.

All members and delegates attending who will require hotel accommodation are advised to reserve without delay. A list of hotels and any other information will be supplied by the Wanganui District Council. Write to their Secretary, Mr. M. R. Boothby, Great North Road, Wanganui. (Phone 7871.)

Membership Subscriptions

Members can greatly help in the administration of the affairs of the Institute by paying membership subscriptions promptly when they become due. Subscriptions became due on 1st October last. Have you paid yours?

DISTRICT COUNCIL REPORTS

SOUTH TARANAKI DISTRICT COUNCIL

Following the general business of the Annual Meeting at Hawera, Mr. Ian Mayo, Plant Quarantine Officer for Taranaki, gave an address on therapeutants. Many questions were asked and answered. Mrs. J. Stevenson and Mrs. Gamlin spoke about specimens displayed. Camelias are one of Mrs. Gamlin's specialities.

A circuit meeting at Mangatoki had Mr. Percy Thomson of Stratford as guest speaker, his subject being "Nomenclature". Names are given to plants so that when they are spoken or written about there may be no confusion as to the particular plant referred to.

Mr. E. B. Cox, Hawera, screened excellent coloured slides of gardens, land and seascapes of New Zealand. There were the usual sales table, and specimens displayed, together with a long table of floral arrangements and cacti gardens made by the Garden Circle.

Manaia Circuit Meeting was well attended and the floral arrangements and specimens were of a high standard. Mr. Ward showed talkie films, "Rival Worlds", "Garden Friends and Foes". Mrs. L. Marsh gave a floral demonstration. Mr. Reader gave answers to gardening questions.

Labour weekend was spent in entertaining 30 Institute members from Masterton. Also Sunday morning Mrs. F. Palmer and Mrs. J. H. Anderson went to Kaponga to Mr. B. Hollard's garden to welcome members from North Taranaki D.C. with their visitors from Waikato. They were visitors to our territory while making numerous visits round Mount Egmont.

On Saturday and Sunday evenings socials in the Carlton Hotel were attended by visitors and local members. Films were shown by Mr. J. H. Ward, and travel and horticultural slides by Messrs. E. B. Cox, G. Walker and D. Reader.

The film of the White Heron was most interesting. Another, of the islanders reaping the harvest of cocoa beans, was instructive. This product is from the fruit, a yellow or reddish ovoid-oblong pod, 6-8 inches long, containing 50-100 bean like drupes. The seeds are enveloped in pulp and when podded are laid on banana palm leaves to dry, before being graded and packed. The tree is *Theobroma cacao* (theos: god, broma: food).

Visitors spent a whole day seeing points of interest in South Taranaki. They visited the beautiful home and garden of Mr. G. Williams, Ohangai, being shown en route the historical reserve, Turuturu-Mokai, now showing signs of becoming a beautiful park, after much work and planning by Hawera hosticulturists. Native bush on Mount Egmont was viewed on a drive to Dawson's Falls. Rhododendrons and azaleas in full bloom, including New Zealand raised seedlings, plants from many countries, together with many other choice plants were viewed amidst native flora in Mr. B. Hollard's garden in Manaia Road. The growth of plants such as rhododendrons, ericas, etc., was phenomenal. One plant not seen very often and enquired about was *Aphelexis humilis* (*humilis*: dwarfer than most of its kind), one of the helichrysums (*Compositae*). It is a shrub not much more than 8 inches high. Each plant covered an area 18 inches diameter. The slender shoots, often unbranched, have leaves one-sixth to three-quarter inch long, alternate, subulate and appressed to the stem. They are cottony beneath. The flower head terminal is egg-shaped while closed, about 1 inch long, and about an inch wide when open. It is formed of an involucre of rosy pink bracts with an insignificant cream disc of florets in the centre. When dried, the flowers retain their form and colour for years.

Daphne burkwoodi was one of the best seen. *Tricuspidaria lanceolata* is another plant which flourishes in this garden.

Afternoon tea was provided for some 80 guests at the home of Mr. and Mrs. J. H. Anderson, Mangatoki. Bulbs were the chief topic of conversation. *Clematis montana* draped over a coprosma and tree ferns provided a study for camera enthusiasts.

Daphne cneorum (Garland Flower) on the rock work was evidently new to many of the visitors, who went away with quite a few rooted slips. The dense terminal clusters of rosy red flowers make a lovely show when the rockery is otherwise dull. *Myosotidium nobile,* a genus of a single species of perennial herb, is a native of the Chatham Islands. With its basal leaves 15 inches in diameter, and small ones up the stem of the inflorescence (terminal clusters of blue flowers edged with white), this makes a handsome plant. I have grown it for about 17 years and have a large number of young plants this year. Germination is quite good but seedlings are rather hard to bring on. A cool, sheltered, moist position, is best, where leaves from creepers or shrubs do not fall on to the large leaves, causing decay. The last daffodil of thousands, "Rose of Tralee", with its pink cup, used in an arrangement, was taken for some plastic manufacture!

Visits were made to Mr. and Mrs. H. W. Swinburn's old established garden of trees and bush walks, and Mr. and Mrs. R. Chamberlain's garden (winner of H.W. Hort. Soc.'s spring garden competition), which is of less than three years' development.

In the absence of our President, Mr. J. Houston, Mr. Reader (secretary) welcomed and escorted our visitors. Mr. J. S. Leitch, Vice-President, Masterton Horticultural and Industrial Society spoke in appreciation of the hospitality of all who had contributed to the enjoyment of a memorable visit and the cementing of new friendships.

Mr. J. Houstin is still recovering from his illness but was able to receive representatives from Masterton. Members wished him a speedy recovery and hoped he would soon be able to resume his attendance at meetings.

MRS. J. H. ANDERSON, F.R.N.Z.R.I.H.

CIRCUIT MEETING FOR DISTRICT HORTICULTURISTS AT MANAIA

Some 90 members from an area bounded by Opunake, Te Kiri, Awatuna, Mangatoki and Hawera, attended another of the circuit meetings of the South Taranaki District Council, Royal New Zealand Institute of Horticulture, held in St. Patrick's Hall at Manaia.

Local enthusiasts had prepared a most impressive display of floral arrangements using seasonal material which filled both ends of the hall and provided a very attractive setting for the evening's programme of talks, films and demonstrations.

Two films were "Rival Worlds," depicting man's war on teeming insect population and "Garden Friends and Foes."

Garden questions were answered by Mr. T. H. Reader, council secretary, and Mrs. J. H. Stevenson, Pihama, discussed specimens of flowering shrubs and trees.

The meeting expressed sympathy with the council president, Mr. John Houston, of Hawera, in his illness and conveyed to him good wishes for his speedy return to health.

Manaia ladies were thanked for their hospitality at supper and for their management of a sales table.

DISTRICT COUNCIL SECRETARIES

AUCKLAND: Mr. T. G. Short, 2 Judges Bay Road, Parnell, Auckland.

CANTERBURY: Mr. G. Henderson, 330 Linwood Avenue, Linwood, Christchurch.

MANAWATU: Mr. M. R. Koehler, 314 Fitzherbert Avenue, Palmerston North.

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1. To encourage, foster and improve every branch of horticulture.
2. To exercise all the powers and functions of a horticultural nomenclature and certificating board, including the making of decisions and reports in regard to the nomenclature of plants, and to issue, in the name of the Institute, certificates, medals or diplomas for novetlies of merit or new varieties.
3. To assist and promote horticultural education in every way possible.
4. To promote legislation having for its objects the advancement or protection of horticulture.
5. To assist research work in connection with any or all branches of horticulture.
6. To endow or assist any chair, lectureship, or horticultural teaching in New Zealand, in colleges, universities or other educational institutions the Institute may decide upon.

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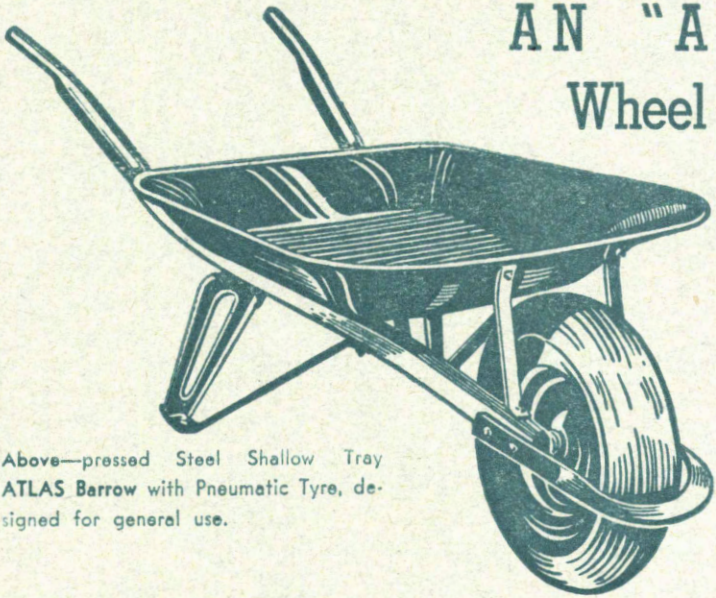

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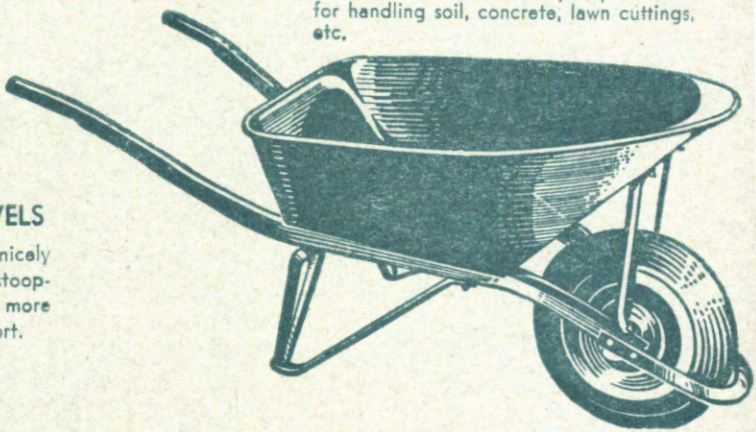

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