

VOL. IV.

DECEMBER, 1961.

NO. V.

NEW ZEALAND  
PLANTS AND GARDENS



THE JOURNAL OF THE  
ROYAL NEW ZEALAND  
INSTITUTE OF  
HORTICULTURE

(INCORPORATED)



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**Visitors to United Kingdom**

An enquiry has been received asking how members visiting Great Britain and Europe can be informed of matters of horticultural interest. The Royal Horticultural Society at Vincent Square, Westminster, London, S.W.1, has stated they are always pleased to welcome overseas visitors to the Shows held there throughout the year and to answer enquiries about places of importance to horticulturists, in Britain and in Europe.

If members become Fellows of the Royal Horticultural Society they receive individual tickets for all meetings, Wisley Gardens, and Shows of the Royal Horticultural Society, including the Great Spring Show, Chelsea, and other privileges. (£2/2/- a year).

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# NEW ZEALAND PLANTS AND GARDENS

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## THE JOURNAL OF THE ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE

(INCORPORATED)



Editor:

G. A. R. PHILLIPS

Volume III.

1958—1960

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*The Royal New Zealand Institute of Horticulture Inc.,  
Wellington, New Zealand.*

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# NEW ZEALAND PLANTS AND GARDENS

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

Volume IV.

DECEMBER, 1961.

No. V.

## . . Greetings . .

Soon we will take our leave of 1961, with all its joys and sorrows, and we face the New Year. May we have strength, time and opportunity always to correct what we have acquired, always to widen its domain. For knowledge is immense, and the spirit of man can extend unendingly to enrich itself with new requirements. Today he may discover his errors of yesterday, and tomorrow he may obtain a new light on what he thinks himself sure of today.

To all our members, I extend cordial Seasonable Greetings.

JOHN HOUSTON

Dominion President.



## WHITHER PERENNIALS ?

At a recent flower show I overheard the remark 'Plant breeders have brought their varieties to such a high standard they must find it almost impossible to know what to aim at next.' One can understand this point of view if advancement in plant breeding consisted simply in continuing to follow the same paths and aim at even larger dahlias or gladioli that had twenty flowers open at the same time !

A good plant breeder is a man with imagination. He can visualise the latent possibilities in various species and he does not play a game of 'follow my leader' as some self styled plant breeders have done. In a past editorial I suggested the possible future trends in the genus *Delphinium*, where breeders have concentrated almost entirely upon the tall and massive flower spike. Wind has ever been the bane of the brittle delphinium stem which makes it all the more desirable to concentrate upon some of the more dwarf species that would be free from this danger.

The Russell lupin was a great achievement but it by no means represents the 'be all and the end all' of possible lupin development. In California there are a number of fascinating miniature species of lupin that grow only a few inches high and are perfect miniatures of *Lupinus polyphyllus*. Surely here are species that offer valuable material for development? I remember seeing, at Baker's Nurseries, Boningale, Shropshire, in the years before the second world war, a most interesting and charming race of dwarf lupins. They were perfect miniatures of the tall ones, growing only about 15 inches high and producing freely spikes in a variety of colours. I have not seen them since but can only assume they became lost to cultivation during the war years of forced neglect. Had they reached the commercial stage of distribution they would have been in great demand.

*Mertensia virginica* is a charming plant and surely provides possibilities for development. There are also the true geraniums with nearly 200 species, containing many good perennials that should offer good nuclei for the hybridist. The smaller flowered species of *Paeonia*, the giant campanulad *Ostrowskia magnifica*, the lily-like *Crinum*, the taller herbaceous linarias, *Incarvillea* species, and many others still remain as unexploited as was the lupin, the phlox, and many other perennials a century ago. The future will, undoubtedly, cause more attention to be brought to bear on these hitherto unexploited genera and our gardens will be richer in consequence.

G. A. R. PHILLIPS,  
Editor.

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## CITRUS FRUITS AND THEIR CULTIVATION IN THE HOME GARDEN

By W. A. FLETCHER (*Fruit Research Division, Department of Scientific and Industrial Research, Auckland*).

Among the wide range of fruits which can be grown in New Zealand, there are probably none as popular with the average home-gardener as the citrus fruits. With their distinctive flavours and abundance of vitamins and other nutritive values, citrus fruits provide an excellent refreshing food for the family, and the trees, with their evergreen glossy foliage, fragrant white blossoms and brightly coloured fruits are always attractive and add beauty to any garden.

In common with most cultivated plants, citrus trees will respond well to good cultural treatment, but no great difficulty faces the amateur in growing these trees. They do not require expert knowledge on pruning, so desirable for deciduous fruit trees, nor are pests and diseases usually very troublesome. The main essentials for their successful culture are a warm sunny position sheltered from severe frosts and prevailing winds and adequate water during dry periods. They prefer a rich, deep rather light soil, but with good care they can be made to produce on any well drained soil.

Perhaps not the least of New Zealand's many natural advantages is that citrus fruits can be grown in home gardens over a large part of the North Island and some of them, in many warmer sheltered pockets in the South Island, even as far south as Christchurch.

### **Citrus trees for the home garden.**

Careful thought should be given to the selection of citrus trees for the home orchard. Points to consider are, space available, soil type, and climate, as these will influence the choice not only of variety but also of the rootstock for the trees.

Citrus trees are normally propagated by budding the required variety on to a seedling rootstock. Rootstocks which are recommended are seedlings of island sweet orange and of the trifoliolate orange, commonly called *trifoliata*. A few other rootstocks are in limited use and several more are under trial but as yet none of these has proved superior to sweet orange and *trifoliata* rootstocks for New Zealand conditions.

Sweet orange rootstock is suited to medium loam and sandy soils and is used for all kinds of citrus trees, although better quality oranges and mandarins are generally obtained with *trifoliata* stock.

*Trifoliata* rootstock also can be used for all the common kinds of citrus trees, including Lisbon lemons, but it is not recommended for other lemon varieties such as 'Eureka', 'Villa Franca', 'Genoa' and 'Meyer'. Trees on *trifoliata* exhibit several advantages that recommend them for home garden planting. They are more resistant to collar rot and root rot diseases and are therefore better than trees on sweet orange stock for heavier soils. They are hardier and can withstand lower temperatures and are more resistant to drought. Smaller trees are produced on *trifoliata*, a decided advantage in most gardens, but despite their smaller size the trees bear heavy consistent crops of superior quality fruit. Because of its influence on fruit quality *trifoliata* rootstock is especially suitable for orange and mandarin trees. Earlier bearing is another popular feature of trees on *trifoliata* stock.

Because of their heavy bearing and slow growing characteristics, trees on *trifoliata* must be liberally supplied with manures or fertilisers if good results are expected.

### **Varieties.**

Citrus fruits best known in New Zealand are lemons, grapefruits, oranges and mandarins, but familiarity with tangelos, hybrids of mandarin and grapefruit, is increasing. All these kinds of citrus can be grown successfully in the home garden.

Although susceptible to damage by heavy frosts, lemon trees have a relatively low heat requirement and can often be grown in localities which are too cool for other kinds of citrus to succeed. Normally one lemon tree is sufficient to supply ample fruit for the average family's needs and the choice of variety depends largely on



climatic conditions and space available. 'Eureka' types, including 'Villa Franca' and 'Genoa' lemons, are generally better suited than 'Lisbon' lemons to most gardens in warmer areas because the trees, especially 'Genoa', are smaller, more overbearing and thornless. If the 'Lisbon' variety is preferred it can be grown to advantage on the *trifoliata* rootstock which restricts the size of the tree and increases its hardiness and adaptability to heavy soils.

The 'Meyer' is the hardiest lemon variety available and is ideal for cooler areas. It is not a true lemon, but a natural hybrid, probably between a lemon and a sweet orange. The denser darker green foliage of this variety makes it a more ornamental tree than other lemon trees but its fruits, which are juicier and milder flavoured than true lemons, tend to ripen mainly during winter and early spring with little production during summer. The 'Meyer' is often propagated from cuttings and succeeds well on its own roots.

The true grapefruits, such as 'Marsh Seedless' and other varieties grown overseas, require a hot climate to attain good quality and they do not succeed in New Zealand. The only kinds of grapefruit which can be recommended for our conditions are the so-called 'New Zealand Grapefruit' and the 'Wheeny' grapefruit.

The 'New Zealand Grapefruit' is a natural hybrid possibly between a shaddock or sour orange and a mandarin or sweet orange which was first introduced into New Zealand by Sir George Grey at Kawau Is. in the Hauraki Gulf about 1855 and was originally known as 'Poorman's Orange'. A superior self-sterile strain of this fruit, known as 'Morrison's Seedless', is now commonly propagated. It produces seedless fruits when isolated from other citrus varieties but when grown close to seedy varieties of citrus such as lemons, some sweet orange and 'Wheeny' grapefruit in particular, cross pollination occurs and the fruit loses its seedless character. The New Zealand grapefruit is a hardy, vigorous, prolific, fairly large tree which can be grown to advantage on *trifoliata* rootstock. The fruit can be used for making marmalade from May till July and is suitable for dessert use from August to December.

The 'Wheeny' grapefruit is a late variety ripening from November to March, after the New Zealand grapefruit season. The fruit is somewhat similar in appearance and character to the true grapefruits but the variety is actually a natural hybrid, possibly of lemon and grapefruit, which originated in Australia. The 'Wheeny' is not as hardy as 'New Zealand Grapefruit' and requires warmer situations. The tree is vigorous and large, but on *trifoliata* rootstock its size is reduced and hardiness increased. A distinctive characteristic of this variety is the puckering of the leaves, which is a natural condition not caused by disease. The tree also tends to alternate a heavy crop one year with a light crop the next.

Oranges and mandarins are undoubtedly the most popular of the citrus fruits and more and more people are coming to realise that excellent flavoured fruit of these kinds can be produced in this country. This realisation has sprung, not only from the propagation and sale in recent years of selected varieties more suited to our marginal conditions, but also, in particular, to much greater use of *trifoliata* rootstock, which has such a marked influence in improving fruit quality.

A selection of orange varieties is available to spread their harvesting season from early August till beyond Christmas. The earliest variety, ripening in August, is the 'Washington Navel', and good strains of this orange, including 'Carter Navel' and 'Leng Navel' are recommended. Later ripening varieties suitable for the home orchard are, 'Best Seedless' (late August), 'Omana Jaffa' (late September), 'Ruby Blood' (late October), 'Valencia' and 'Harwood Late' (November). Fruit from all these varieties can usually be left on the tree for many weeks after they first mature, without deteriorating in quality.

The easy peeling and sectioning of mandarins are particularly appealing to children. By selecting several varieties the harvesting of these fruits can also be spread over several months, from as early as July till about November. The 'Satsuma' mandarins are the earliest to ripen and are ready in July before any other mandarin or orange. The trees are small, especially on *trifoliata* rootstock, and require good cultural treatment to succeed on this stock. On sweet orange rootstock the trees grow and crop well but fruit flavour is sometimes insipid and disappointing. 'Silverhill' is a good strain of 'Satsuma' mandarin which can be recommended. A more vigorous mandarin which ripens a few weeks later than the 'Satsuma' is the 'Clementine'. It generally does well on *trifoliata* or sweet orange rootstock and its fruits can be left on the tree longer than 'Satsuma' before deteriorating. The 'Scarlet Mandarin' is a rich flavoured mid-season variety ripening in September. It is a vigorous grower which performs well on *trifoliata* rootstock. The 'Kara Mandarin', ripening in October, completes the mandarin season at present. It grows well and produces excellent fruit on *trifoliata* stock but the variety tends to be a little more frost tender than the others and performs better in warmer situations.

Two varieties of tangelo are recommended for those interested in more unusual kinds of citrus fruits. These are 'Seminole' ripening about late September, and 'Tiniura' ripening about a month later. The former fruit is milder flavoured and is especially recommended, but both varieties are excellent juice fruits with interesting flavours reminiscent of both mandarin and grapefruit.

### Care in planting.

Citrus trees can be planted from April to September, or even later, if the trees can be kept adequately watered during summer

dry spells. In warmer localities, autumn or even mid-winter planting can be undertaken, but in colder areas planting should be delayed until after danger of frost has passed in the spring.

A sheltered, warm, sunny, well drained site is essential for the trees. In heavy clay soils, drainage must be improved by judicious use of open, tile, or scoria drains and it is an advantage with these soils to plant the trees in mounds raised several inches above ground level to avoid water logging of roots in wet weather.

Holes for planting the trees normally need only be deep enough to take the roots and wide enough for easy filling. In rocky soils the bottom of the hole should be probed and any large stones removed.

Before planting, 1 lb. of blood and bone thoroughly mixed with soil in the bottom of the hole will prove beneficial. Other fertilisers can be applied after the tree is planted.

It is generally wiser to remove the sacking from round the roots of the tree when planting, but care is necessary to disturb the soil round the roots as little as possible. After placing the tree in its hole, the roots should be carefully spread and the hole refilled with top soil tamping it firmly round the roots so as to leave no air pockets. It is essential to plant citrus trees high and they should be set so that the uppermost roots branch out at or even slightly above soil level. Trees planted too deeply are likely to be killed by collar rot, a fungus disease present in the soil.

Ample room must be allowed for citrus trees to develop. Spacing required varies from a minimum of 12 feet apart for orange and mandarins on *trifoliata* rootstocks to 18 feet apart for grapefruit and lemon trees on sweet orange rootstocks.

### **Feeding the trees**

The natural fertility of the soil in many settled areas is often poor and a common cause contributing to failure of home garden citrus trees is inadequate feeding.

A fertiliser suitable for citrus trees can be made up by mixing 5 lbs. of sulphate of ammonia, 4 lbs. of serpentine superphosphate and 1 lb. of muriate or sulphate of potash. A tree should receive about 1 lb. of this mixture for each year of its age from planting, up to about 10 lbs. per trees per year for a mature tree. Proprietary 'citrus mixtures' should be used at the same rate. Blood and bone is also a good fertiliser but it is less concentrated and should be used at 1½ lbs. for each year of the tree's age up to about 15 lbs. per tree per year. In some circumstances it may be wise to supplement blood and bone with dressings of muriate of potash, at 1 lb. for every 15 lb. of blood and bone used.

Poultry and other farmyard manures also provide suitable plant foods for citrus trees but the nutrients are much less concentrated in animal manures than in commercial fertilisers and must be applied



in much heavier dressings. Poultry manure can be used at 4-5 lbs. per tree for each year of the tree's age up to about 40 or 50 lbs. per tree and other manures such as horse or cow dung can be used at even double this rate.

If desired a citrus tree's nutritional needs can be provided by using a combination of chemical, organic and animal manures.

Animal manures and fertilisers should be spread evenly under the tree and to about 1 to 3 feet beyond the spread of the branches. Two dressings of fertiliser per year are best, one in August, providing about two-thirds of the yearly total and the other in February. Animal manures can be applied at any time as they become available.

Most home garden soils are acid in reaction and the application of manures and fertilisers tends to aggravate this condition so that it is usually good practice to sweeten the soil round citrus trees by applying lime each winter at about 6 to 8 ozs. per square yard.

### **Cultivation and mulching.**

Citrus trees are often planted in lawns, when it is best to cultivate a small area round the tree to obviate injury to the trunk with the lawn mower and to reduce competition for soil moisture and plant foods with the grass. This is particularly important with orange and mandarin trees on *trifoliata* rootstocks, which are less vigorous than grapefruit and lemon trees and are more prone to suffer from undue competition for water and nutrients.

Hoing to a depth of 1 or 2 inches is sufficient to control weeds round the tree. Deeper cultivation is unnecessary and destroys valuable tree roots.

Best results are obtained with fertilisers where there is an ample supply of decaying organic matter and moisture in the soil. Grass clippings, compost and other organic matter thrown under the tree can be beneficial as a mulch but great care is essential to keep the mulch away from the trunk, otherwise ideal conditions are created for bark diseases which are often fatal.

### **Pruning**

Citrus trees generally grow naturally into well shaped trees and the removal of healthy foliage or interference with the natural habit of growth of the trees should be kept to a minimum.

In the early years, shoots arising from the trunk below the main branches should be removed but once the trees begin to bear fruit they normally should require very little attention, other than the control of any strong, undesirably placed water-shoots, which sometimes arise, and the removal of dead and diseased wood.

In addition to this treatment, lemon trees, including the 'Meyer' and dense bushy varieties of mandarin, such as 'Clementine' and 'Scarlet', benefit from a moderate annual thinning of the fruit bearing wood which will reduce the crop but improve the size and quality of the fruit.

Pruning to raise the 'skirt' of a tree should not be excessive, as much of the best fruit is produced on this part of the tree, but it is desirable to keep the foliage clear of the ground.

Opening the tops of bearing trees by removing large branches to let in light is not recommended. This only causes the tree to use up plant food to replace the lost foliage and results in reduced crops. It also increases risk of injury by sunburn and frosts.

### **Controlling pests and diseases.**

A number of pests and diseases attack citrus trees and if control measures are neglected fruits can become disfigured and unattractive and tree health may decline seriously.

Only brief mention of the more common pests and diseases and their control can be made here but further information is available from horticultural officers of the Department of Agriculture.

Black aphids are small dark insects which commonly attack soft young growth in spring and autumn. Severe attack results in distortion of leaves and serious loss of new growth. Control is obtained by spraying with malathion at 6 teaspoons to 4 gallons of water.

The citrus borer grub is perhaps the most serious citrus pest. By boring in the wood the grubs kill twigs and can seriously damage the trunk and larger branches. Control is achieved by systematically pruning out all dead and dying twigs and by injecting petrol into holes and plugging them with putty.

Several species of scale insects can seriously injure citrus trees and fruit. Sooty mould which grows on 'honey dew' excreted by some scale insects and aphids is often associated with these pests. Spraying with summer oil (1 pint in 4 gallons of water) in February will control scale insects and sooty mould but if only hard wax scale is present spraying is best delayed until May.

Several fungus diseases attacking citrus trees and fruits can all be controlled with bordeaux or other copper sprays. Generally, spraying in November and May is sufficient to keep the trees healthy.

### **Harvesting and storage.**

Citrus fruits do not ripen, as do other fruits, after being cut from the tree so they must be of desirable eating quality at the time of picking or they never will be. In New Zealand citrus fruits may be fully coloured and yet far from mature so care is necessary to avoid picking the fruit too early. The correct harvesting season for various citrus fruits is indicated in the section about varieties but generally, the earliest sweet oranges and New Zealand grapefruit required for dessert are not properly ripe until late July or August. Other varieties ripen later and only 'Satsuma' and 'Clementine' mandarins are ready earlier.

After first becoming suitably mature for eating most citrus fruits continue to improve in flavour on the tree for considerable periods before becoming over-ripe and unpalatable and this is the best way to store the fruit. Lemons may be harvested throughout the year but if left too long on the tree they become over-sized and coarse. The juiciest, best quality lemons are obtained by picking them when about  $2\frac{1}{2}$  ins. in diameter, regardless of colour and allowing them to cure and colour in storage off the tree.

When citrus fruits are required for storing off the tree they must be handled with the greatest care as the slightest injury to the skin will open the way for decay. The fruit should not be pulled from the tree but clipped off carefully and the stalk trimmed close up to the stem button because protruding stalks are liable to damage other fruits during handling.

The fruit can be stored in clean boxes or cartons and should be held in a well ventilated, but not draughty place, with a cool, even temperature.

Only sound fruits should be stored. Wrapping each fruit in paper helps to isolate rots and reduces shrivelling of the fruit. Fruits stored in this way can be held in good condition for many weeks.

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## THE FLASH FLAME STERILIZER

### A New Approach to Soil Disinfection By Heat

J. A. HUNTER and A. J. OVER DE LINDEN

*(Plant Diseases Division, Department of Scientific and Industrial Research, Auckland.)*

In progressive nursery management the partial sterilisation of soil by heat or by chemical fumigants and disinfectants has become standard practice throughout the world. The object of such treatment is to control pathogenic micro-organisms, nematodes and insect pests and to kill outright or greatly reduce the germinating power of weed seeds.

Chemicals such as methyl bromide, chloropicrin and dichloropropene are widely used for the treatment of nursery soils, but the application of heat still holds premier place for efficient soil disinfection. Steam as a means of transferring heat from its source to the soil is widely used, especially now when it has come to be recognised that low pressure steam is just as effective and certainly more economical than high pressure steam for the purpose. The high cost of installing steam, especially if a mobile plant is considered, has always restricted its use by nurserymen so that an alternative method of using heat warrants consideration.

Some years ago a soil steriliser which used the flame of a large blow torch as the source of heat was introduced to the nursery trade



in U.S.A., Great Britain and this country. Fig. 1 illustrates an American model in use at Carew's Nurseries, Onehunga, Auckland. That part of the machine receiving the soil consists of a drum 8ft. long and 20ins. in diameter and hexagonal in cross section. Revolving when in use, this drum is adjustable to a varying degree of slope towards the delivery end. It is rotated by petrol engine or electric motor at a speed of about 40 revolutions per minute. The torch is mounted at the discharge end with the flame directed up the drum to meet the soil which, activated by the revolving action, tumbles through the flame, the flash temperature of which is given as ranging between  $500^{\circ}$  and  $1200^{\circ}\text{C}$  ( $932^{\circ}$  to  $2192^{\circ}\text{F}$ ). The motor which turns the drum also keeps up the required oil pressure on the blow torch. (The 44 gall. drum of kerosene with pipe leading to pump is shown in illustration.) The soil can be delivered to wheel-barrow or belt conveyor for transporting to stock-pile.

The final soil temperature is influenced by several factors: (1) moisture content before entering steriliser, (2) size of flame, which is adjustable, (3) slope and speed of drum, and (4) rate at which soil is fed into drum. With experience in operating these factors can be balanced to give a final soil temperature of between  $180^{\circ}$  and  $190^{\circ}\text{F}$ .

As shown by W. J. C. Lawrence of the John Innes Horticultural Institute and now generally accepted, most species of fungi, insect and animal pests, and the great majority of weed seeds are destroyed at  $170^{\circ}\text{F}$ . Bringing the soil temperature up to between  $180^{\circ}$  and  $190^{\circ}\text{F}$  by flame treatment should therefore ensure freedom from most soil borne pests and diseases. Corrected thermometers must be used to make certain that a minimum final temperature of  $180^{\circ}\text{F}$  is reached. The heat applied to the soil vaporizes a portion of its moisture into steam. This can be seen rising from the pile in the illustration. The residual heat of this steam assists in the partial sterilisation, and in fact acts similarly to steam applied to soil in the orthodox manner.

Different opinions have been expressed regarding the use of this type of equipment for treating soils intended for seedsowing and plant growing. It was therefore considered desirable to compare the effect on germinating seeds and growing plants of flame treated soil and soil treated by steam. The steam treatment was from a high pressure system which gives soil temperatures ranging between  $190^{\circ}$  and  $200^{\circ}\text{F}$  and has proved satisfactory for years.

The loam used in the test was a medium one with a pH of 6.5. The organic material mixed with the loam to form the prepared compost was made from spent hops and damaged hay which were broken down in a heap built and treated on orthodox lines. The heap was turned once during the 12 months allowed for the material to break down sufficiently to pass through a  $\frac{3}{8}$ in. sieve, at which stage it was considered suitable for use.

One cubic yard of loam and one cubic yard of this organic material were disinfected separately by steam. During the same day similar quantities of the loam and organic material were treated separately by the blow torch flame steriliser. These materials, when cool, were used to make a seed sowing mixture in the ratio of three loam to two of organic material, incorporating at the same time 1½oz. of superphosphate and ¾oz. lime per bushel.

Before sowing seed the moisture content of these prepared composts was tested and it was found that the flash flame method gave a soil moisture content of 21% while that from the steam was 33%. The moisture content of both was adjusted by applying water to bring them up to the 39% level.

The test plants were cabbage, lettuce and tomatoes, and 150 seeds of each were sown in 6in. pots containing the steam and the flash flame sterilised composts. There were three replications of each, making 450 seeds per treatment. The seed was sown on 31st May, the germination count of the cabbage and lettuce taken on 10th June and that of the tomatoes on 14th June.

## GERMINATION COUNTS FROM THE TWO SOIL TREATMENTS

	Steam sterilised soil		Flash flame sterilised soil	
	No. germinated	% of 450	No. germinated	% of 450
Lettuce	398	88.4	385	85.6
Cabbage	332	73.8	373	82.9
Tomatoes	301	66.9	260	57.8

The figures in the above table indicate quite clearly that the flash flame treated soil was just as good as the steamed soil for successful germination. If any toxic substance had been present as the result of the treatment it would have shown up in reduced germination and survival, as young newly germinated seedlings are very susceptible to any toxic substance resulting from soil treatment. It was however noted that the roots in the steam treated soil were more numerous and slightly longer, but that was the only observable difference between the seedlings from the two soil treatments.

To test for the presence of any delayed adverse effect resulting from the sterilising treatments, 36 standard seedling boxes measuring 16 x 12 x 3 inches were filled with the mixtures, 18 from the flash flame sterilised material and 18 from the steam. As in preparation for seed sowing, superphosphate and lime were added, but to encourage seedling growth the rate of superphosphate was increased to 3 oz. per bushel for pricking out.

Seedlings from the pots used for germination were used to plant these boxes, transferring seedlings from either soil treatment to the

corresponding treatment in the boxes. The planting rate varied, 63 cabbage, 54 lettuce and 35 tomato plants per box being used; the boxes were randomised throughout the available glasshouse bench space.

All seedlings established well and made good growth, there being no visible difference between seedlings from the two soil treatments. On 16th July alternate rows of plants in the boxes were removed and weighed, while on 26th July all remaining plants were harvested, weighed, and the test terminated.

WEIGHTS PER 100 SEEDLINGS IN OZ. AT FIRST AND FINAL HARVESTS

Crop	Steam sterilised soil	Flash flame Sterilised soil
Lettuce		
1st weighing .....	6.0 oz.	5.1 oz.
2nd weighing .....	15.9 oz.*	12.8 oz.*
Cabbage		
1st weighing .....	6.4 oz.	5.0 oz.
2nd weighing .....	14.9 oz.*	12.7 oz.*
Tomatoes		
1st weighing .....	1.9 oz.	1.7 oz.
2nd weighing .....	6.9 oz.	6.0 oz.

\* Statistical analysis of the data showed that only the differences marked were of significance.

The figures for the final harvest in the case of lettuce and cabbages showed increased growth of seedlings in steam sterilised soil and must be interpreted to mean that the steam sterilised soil was slightly superior. However this difference could not be detected by visual examination of the plants, both authors agreeing that the flash flame treated soil produced plants which from commercial standards, were quite satisfactory.

Weed control in treated soils is of considerable economic importance to growers, and with many nurserymen is the chief reason for soil disinfection because of the high cost of weeding boxes by hand. This aspect of the flash flame soil treatment in the present test was therefore observed with interest. As the test was of a practical nature, to find out if seeds would germinate and seedlings grow satisfactorily in flame treated soil, it was considered that the time consuming work associated with a survey of the weed seeds present in the loam before treatment was not warranted. However inspection of the stack showed a complete covering of a plant community composed of the following species: *Poa annua*, *Stachys arvensis*, *Veronica agrestis*, *Senecio vulgaris*, *Helminthia echinoides*, *Achillea millefolium*, *Hypochoeris radicata*, *Sonchus asper*, *Modiola caroliniana* and seedlings of *Rumex obtusifolius*. As the stack had been formed from an 8in. layer of loam ploughed from



a pasture, the distribution of weed seeds throughout its contents was no doubt fairly constant. Only two species appeared in the soil from both treatments, *Modiola caroliniana*, the bristly mallow, and a species of clover. Six mallow plants appeared in the 18 boxes of steamed soil and 34 in the flash flame treated; the number of clover plants was 18 for steam and 60 for flash flamed soil, a rate of weed infestation which is negligible in both cases.

Previous observations have proved that steam kills *Oxalis* bulbs, and to test the efficiency of the flash flame method in this respect soil containing bulbs of *Oxalis latifolia* was passed through the machine. This treated soil was placed in boxes and kept under observation in a glasshouse for five months. During that time not a single plant emerged.

Some of the advantages in using these flash flame sterilisers should be noted.

- (1) They can be used when soil is too wet for treatment by steam, and therefore the need for providing perfectly dry soil storage facilities is not so important as when a steam plant is employed.
- (2) With the soil not too wet, and the slope and speed of the machine adjusted to suit the existing conditions, temperatures ranging between 180° and 200°F can be achieved when treating at the rate of 5 cubic yards per hour. Under perfect conditions this rate of treatment can be exceeded but the operator must ensure that the minimum temperature of 180°F in the soil is being reached.
- (3) Being mobile these machines can be taken to wherever the soil to be treated is stacked.
- (4) As the machine can be prepared for soil treatment very quickly, small or large quantities can be run through as required.
- (5) The rotary action ensures that all the ingredients of the compost are thoroughly mixed during the operation.
- (6) Kerosene consumption of the equipment shown in Fig. 1 is in the vicinity of 6 gallons to treat 5 cubic yards of soil.

These advantages are being recognised by growers, with the result that a number of these machines are now in use. Fig. 2 illustrates a modified model in use in another Auckland nursery where it was constructed. Note the flame shooting up the barrel of the machine. (In Fig. 1 this is hidden by the conveyer).

This test has shown that, when properly operated and care taken to ensure that a minimum soil temperature of 180°F is reached, these flash flame soil sterilisers are perfectly satisfactory for treating nursery soils.

## MESEMBRYANTHEMUM A HORTICULTURAL REVIEW OF THE GROUP

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

I have an urge to tell my New Zealand fellow gardeners something about that truly South African group of succulents, the *Mesembryanthemum*.

In recent years our botanist friends have very wisely split up this genus. In the older books only one genus is mentioned, then N. E. Brown, the world renowned botanist of Kew and Dr. Louisa Bolus of Cape Town got busy and have cleverly split up the genus.

I notice that H. Jacobsen in his book *Succulent Plants* lists 84 genera under *Mesembryanthemum*. Dr. Bolus, in a preliminary but useful book *Notes on Mesembrianthemum and some Allied Genera* (1928) (Note the *y* now becomes *i*) lists well over 50 genera. In a later publication (1958) she has listed 137 genera with well over 700 species, including *Ruschia*,—75, *Lampranthus*—105, and *Conophytum* 100 species.

Realizing this formidable subject that really needs a botanist to understand, I decided to approach it from a horticulturists' angle and to give you some details of a few genera from a grower's standpoint. I hope this will enthuse our readers in New Zealand to grow at least a few of this little known group. They are, without exception, beautiful in flower, weird in growth and many extremely showy.

I am dividing my subject into three sections. But please understand, only from a grower's point of view with no botanical backing.

First then is the 'Stone,' 'Sphaeroid' and 'Cone.' In this section, I include, *Lithops*, *Conophytum*, *Gibbaeum*, *Pleiospilos*, *Titanopsis* and *Dinteranthus*.

In the second section I have classed the thickened succulent stem species, such as *Glottiphyllum*, *Psammophora*, *Bergeranthus*, *Hereroa*, *Faucaria*, *Nananthus* and *Punctillaria*.

Finally, in the third section, the showy ones, I include *Ruschia*, *Delosperma*, *Echinus*, *Cryophytum*, *Trichodiadema*, *Dorotheanthus*, *Cephalophyllum* and *Lampranthus*.

Be it understood, that this grouping is a gardener's idea and has no botanical significance. I have grown them all at one time or another and now want to pass on my experience to other growers.

### HABITAT AND CULTIVATION.

Almost all of the plants mentioned are confined to South Africa. They are lovers of warm sunshine, well drained sandy soil and some like lime, such as *Titanopsis*. Many are only found in the dry Karroo, South West Africa, Bechuanaland, Namaqualand, etc.; this means real desert conditions with meagre rainfall.

As a general cultivation rule therefore, use a good loam, coarse sandy loam, with broken rock, a little well decayed leaf mould and practically no manure. There are, of course, exceptions, but stick to this mixture and you will not go far wrong.

All may be raised from seed but it is not always easy to obtain seed. Most are adaptable to division, also cuttings, particularly those included in my third section. In the case of cuttings, these should be well dried off for a day or so to prevent rot after the knife has done its work. Avoid over watering following the first application after inserting in almost pure coarse river sand to root. If grown in pots, never be afraid of letting them dry out as many will enjoy extreme dry conditions for months on end. Be sure to give ample drainage.

Some years ago I had the good fortune to visit the Kenhardt area in Namaqualand, Northern Cape. They had had no rain at all for 2 years but 6 weeks before my visit the first good rains had fallen. The veldt was brilliant with all sorts of flowers including *Mesembryanthemum* and many bulbs. My niece, then 2 years old and brought up in the district, had never seen flowers and she went wild picking flowers here and there at great speed; it was a delight to watch her. This will give some idea of the climate that some of our South African succulents enjoy.

It is important to know the habitat of our plants. For instance many *Conophytum* come from the Western Cape with its winter rains but dry summers and autumns. Some *Lithops* on the other hand come from the Transvaal, such as *L. lesliei* with summer rains and dry winters. Watering must therefore be based on these natural conditions.

**Section 1.** *Lithops*. Going back to my very early visit to Kenhardt, I had only known *Lithops* in pots at Kew but I knew more or less (or thought I did) what to look for. A friend told me, when he knew I was making the trip, to look out for *Lithops fulleri*—growing on the edge of the local golf course. Well, my wife and our two children went every morning to the spot and searched right and left. On our fifth visit my wife spread out the morning tea and as we squatted down, she said 'What's this little stone we are sitting upon?' I looked down and there were thousands of *Lithops*, just like pebbles at ground level, beautifully camouflaged; they were not in flower. We must have walked over them for days! This genus has two leaves only (see illustration of *L. turbiniformis*), that are swollen, bearing the flower between the joint. They are at ground level growing in sand and small gravel stones. Needless to say I gathered a few and transported them to Port Elizabeth to add to our fine Park's collection. I have collected *L. terricolor* fairly near at hand at Miller, C.P.

*L. lesliei* found in the Transvaal, were in their thousands when I was constructing an aerodrome during the last war, near Vereeniging. They were in their thousands and my heart bled when I had to level the ground and so destroy them.

*Conophytum*. There are now over 100 species of this delightful and colourful genus. The cone-like or sphaeroid growths appear in bunches above ground but each growth consists of two swollen leaves as in the *Lithops*, the flower appearing in the crack or joint. All have beautifully coloured flowers and must be ranked among the gems of South African succulents. Many are found growing in the cracks of rocks, the roots penetrating at depth, in exposed outcrops.

Next in interest are *Dinteranthus*, *Gibbaeum* and *Juttadinteria*. I have also included *Titanopsis calcarea* in this section. Here is a gem with unusual foliage arranged in rosettes that grows in lime-stone and found in Great Namaqualand — a real treasure.

The 'Living Stones,' *Pleiospilos* spp. are perhaps the most fascinating. Here are large 'stones,'  $2\frac{1}{2}$  to  $3\frac{1}{2}$  inches long by  $1\frac{1}{2}$  inches tall as in *P. nelii*. These leaves are in pairs and look like lumps of sandstone. The new growth or second pair of leaves grow at right angles, the original gradually withers up and disappears. The flowers are of a brilliant golden colour, the size of a half crown. *P. simulans* occur in the Eastern Cape and is rare. My first find was at Miller, C.P. As I was gloating over this beauty, along came two youths with a sack full! I remonstrated but they said they were to be sold in Cape Town! I eventually reported the case to the provincial authorities who pounced on the local school master. The species was then protected and it is now a crime to gather this and many other succulents without special authority.

**Section 2.** Whilst on this subject I would like to acknowledge all the sound work that the provincial administrations of the four provinces of South Africa have carried out in preserving our unique wild life.

And so I pass on to my second section which, whilst not in the 'Stone' class, have swollen thickened succulent stems. Many of these are found on and near the coast, such as *Bergeranthus*, *Rhombophyllum*, *Faucaria*, *Glottiphyllum*. These are easy to cultivate and do not require excessively dry climate. On the coast is found *Bergeranthus multiceps* and *B. scapigerum* and in the same area *Rhombophyllum rhomboideum* with rhomboid shaped leaves.

This is a group of small, pretty, growths with yellow flowers growing amongst grass but in an open position. They make delightful subjects for a rockery or pot culture.

The *Faucaria* is yet another fascinating genus. There have been several new discoveries and so the one and only species *F. tigrina* as formerly known has now several relations. *F. tigrina* has leaves which resemble the open jaws of a tiger for it has two rows of long teeth on either edge. It is free flowering, mostly yellow in colour. A friend of mine discovered a new species, *F. candidissima*, having white flowers, growing in the Cradock area. The same person has also found nine others in this district new to science.

*F. militaris* is a more robust species and *F. felina* is another, all easily grown withstanding lots of inattention in the rockery. *F. felina* I found on the coast near Port Elizabeth with aloes and *Portulacaria* as protectors.

*Hereroa (dyeri) dolabriformis* is a strong grower with fat juicy leaves and yellow flowers. It makes a good cover for the rockery. This may be increased by cuttings but be sure that the cut is well dried out before inserting into very sandy soil, otherwise they will quickly rot. Do not be afraid of drying the cutting out for a day or two. Seed is perhaps the better method by which to increase one's stock. *Hereroa* is taken from the native race Hereros of S.W. Africa.

*Nananthus* should be included in this section. One *N. rubrolineatus* has a yellow flower with a red line down the centre of the petals and is most attractive. Another *N. schooneesii* has apricot coloured flowers. These and most of those mentioned above may be raised from seed.

**Section 3.** I now come to my third horticultural section of *Mesembryanthemum* which I shall call the Brilliant Creeper for they all, with few exceptions, make wonderful displays of flowers of many hues, red, crimson, orange, yellow, pink, purple, white and shades thereof.

*Dorotheanthus criniflorus* and *D. bellidiformis* opens this section. They are brilliantly flowered annuals. I call them the winter *Portulacca*. Seed is stocked by most South African seedmen and should be sown broadcast in February to flower in July and August. The soil should be poor and sandy; avoid rich loams. The colours are really staggering. I recently sowed some beds at a large factory and I was inundated with queries from the staff as to its name and habitat. It comes from the sandy coastal regions to the north of Cape Town and is known as 'Bok Bai Veijsje.' Its growth is similar to *Portulaca*.

Next we come to the creeping succulent *Mesembryanthemum*, namely *Delosperma*, *Cephalophyllum*, *Lampranthus*, *Drosanthemum* and *Ruschia*. What a galaxy of beauty to be sure! All are of easy growth, I say, all, quite casually but I see 25 species are listed in the free issue of seed to members of the National Botanic Gardens of South Africa. When once a single plant is established from seed the stock may be increased quite easily by cuttings.

As a routine practice I took cuttings of *Lampranthus*, *Ruschia* and *Delosperma* every autumn, say, at the end of February. The resulting plants were planted out in April and these would give a show of plants the following spring and summer. They should be replaced every second or third year.

The genus *Lampranthus* has species that yield masses of white, yellow, orange, crimson, red and magenta flowers. Often the flowers are of one solid mass to the exclusion of the leaves. They are most attractive. A visit to the wild garden of Caledon in the Cape would soon convince one of this real asset, giving beauty in colour in many



of these species. There is one upright, shrubby species namely *L. haworthii* (2 - 3 ft.) with magenta flowers but the majority are low creeping species.

Many of these spreading mesembryanthemums, to use their older and popular names, no doubt are well known to the gardeners of New Zealand. *Lampranthus amoenum*, *L. aureum*, *L. blandus*, *L. glaucus*, *L. speciosum* and *L. roseus* are some of the outstanding kinds. There are bushy ones as well as spreading ones.

Two genera I mentioned above, namely *Trichodiadema*, covered with crowns of small spines, and *Echinus* are two well worth growing mesembryanthemums, if not so spectacular.

A plant often found on the roadside that attracts attention is the large, spreading *Cryophytum crystallinum*. If one can imagine a rampant New Zealand spinach with crystal edges, like ground glass sparkling on the edges of the leaves, then I think one would have some idea of this weed (?). It is certainly a grand filler for the rockery and is only an annual, but at the same time, it is unusual.

I hope I have tackled this very exclusive group intelligently from a gardener's point of view. I cannot help being on the catalogue side but in doing so I trust I have not presented my subject as being all names and little cultivation.

I would strongly recommend that readers join the National Botanical Society, Kirstenbosch, Newlands, Cape Province, South Africa. Ordinary members (30/- per annum) are given 15 packets of seeds every year and there are over 600 species of Succulents alone, besides Bulbs, Annuals, Shrubs and Perennials to choose from, all indigenous to South Africa. These are set out in a convenient booklet every year.

The following books are recommended:—

- (a) *Mesembrianthemums and Some Allied Genera* (1925). (Speciality Press of S.A. Ltd., Cape Town) illustrated in colour.
- (b) *Mesembrianthemums and Some Allied Genera* also illustrated (1958). (Issued by the University of Cape Town (38/-) both by Dr. (Mrs.) H. M. Louisa Bolus).
- (c) *Succulents for the Amateur* (1939) by J. R. Brown, Alain White, Boyd L. Sloane & G. W. Reynolds. (Issued by Abbey Garden Press, Pasadena, Cal., U.S.A.) well illustrated.
- (d) *Succulent Plants* by H. Jacobsen, translated into English by Vera Higgins M.A.—well illustrated.

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## THE CHEESEMAN MEMORIAL SHOW, 1961

*M. C. GUDEX, M.A., M.Sc., A.H.R.I.H.(N.Z.).*  
(By permission of 'Waikato Times'.)

The eighty or more Waikato enthusiasts who attended the opening of the 21st Cheeseman Memorial Show were amply rewarded, because hundreds of species and thousands of individual native plants were displayed to great advantage.

Organised by the Auckland Institute and Museum and the Auckland Botanical Society, this memorial show was supported by a score of groups and societies and hundreds of individuals, mainly school children.

The New Zealand Forest Service had a comprehensive and very interesting display, illustrating kauri research and development. It included seedlings still in the seed-leaf stage, plants one, two and more years' old, wrenched and unwrenched plants with different rooting and branching systems, morphological variations, and sections of adult trees showing annual growth rings.

Three grafted kauris excited much interest, for they indicated the feasibility of planting only pedigree trees. A photograph of Tane Mahuta seemed to suggest to the young plants what they might hope to be in the centuries to come.

Native trees for the farm was the topic chosen by the Lower Northland Farm Forestry Association. Some that were represented by specimens of foliage were the ordinary podocarps and conifers (totara, kauri, Hall's totara, miro, tanekaha, rimu (kahikatea), puriri (frost tender), titoki).

The Tree Society showed specimens of trees and shrubs for the seaside garden. Some of these were kowhai, broadleaf, lancewood, kaka beak, kumarahou, akeake, kohekohe, flax, cabbage-tree, three *Pittosporum* species (*tenuifolium*, *eugenioides*, *crassifolium*) and the variegated pohutukawa.

### Botanical Displays

The Auckland Botanical Society excelled all its previous performances by staging a number of displays, really a series of courts.

One depicted water plants, another showed many plants that have been renamed recently, and another showed a collection of native pines and podocarps. It had 19 out of the possible 20, the only missing one being *Dacrydium intermedium* (yellow silver-pine).

A number of members of the Botanical Society staged separate displays that were remarkably interesting and helpful to advanced students as well as to beginners and amateurs.

One was a collection of ferns and fern allies set up by the well-known authority, Miss M. Crookes. Next came a display of grasses, sedges and rushes by Mrs. M. Ringer. Another specialist, Mr. E. D. Hatch, of Laingholm, Auckland, used drawings and specimens to distinguish various orchids that puzzle even advanced botanists.

The Herbarium of the Auckland Museum provided a series of lichens, mosses and liverworts, and Miss J. Dingley, of the Mt. Albert Research Station, had a large collection of fungi. These had their devotees, of all ages and walks of society.

### Hybrids on Show

Mr. A. Farnell, of Auckland, had a large collection of hybrids of native plants. Some were the result of planned crosses, but most had occurred naturally in the field or in extensive gardens.

Some of the genera were *Plagianthus* (ribbonwood), *Melicope*, *Coprosma*, *Corokia*, *Pittosporum*, *Pseudopanax*. A box of seedlings raised from the seed of one *Pseudopanax* showed a very great diversity of foliage — a botanist's dream (or nightmare!).

### Plant Communities

The flora of New Zealand was splendidly exemplified by the Whangarei section of the Forest and Bird Protection Society and the Whangarei District Council of the Royal New Zealand Institute of Horticulture. Toru (*Pseudopanax ferox*), large-flowered white rata, *Quintinia*, mairehau, kumarahou, *Libertia ixioides*, nikau, northern *Weinmannia (sylvicola)*, rare *Pittosporum* species, *Ackama*, grass orchid (*Pterostylis graminea*), dwarf cabbage tree, *Xeronema*, large-leaved toa-toa, a newly discovered cabbage-tree (*Cordyline kaspar*), *Hibiscus*, creeping *Fuchsia (F. procumbens)*, whau (*Entelea*), hutu (*Ascarina*), rare forms of *Leucopogon* and *Pomaderris* — those were some of Northland's treasures.

The Auckland Natural History Club had a good display of plants of the gumland. Few except the kumarahou and some orchids were beautiful, but all were interesting and claimed attention in their own right.

The Auckland branch of the Forest and Bird Protection Society illustrated the plants and birds of the sea-coast, and Hobson Bay plants were staged by the junior section of the Botanical Society.

Beautiful drawings of Alpine plants by Miss N. Adams, the well-known illustrator and artist, and by Miss Jean Livingstone, of Manurewa brought out many features that are so readily overlooked or misunderstood even by keen students of our unique flora.

### Unusual Displays

A series of great geological interest, set up by Mr. E. J. Searle, included plants buried sixteen millions of years ago in what is now the Auckland Harbour. We in the Waikato can go much father back — some of our fossil plants were buried more than 160 million years ago!

Mrs. O. Barr staged a large series of wools to show the colours that our native trees, shrubs, lichens and mosses can produce.

Details of the mordants used, length of boiling, and other information interested many of the ladies, and we can look forward confidently to seeing colour that never was on sea or land.

### Decorative Displays

Many groups and individuals had set up various exhibits to show the decorative possibilities of our native plants. The largest and the medium-sized were the most effective, for miniatures were almost wholly neglected by adult workers.

The children had done better in this respect, probably because they were limited in some classes to sand trays, dish gardens, buttonholes and posies.

Other classes that attracted much attention were for fabric design, drawing and painting, native timber trees, collection of native plants, flower arrangements, and collections of 20 dried and mounted specimens. Some of these were beautifully done. Thin strips of white gummed paper were sufficient to hold the specimens on the paper securely but unobtrusively.

A perusal of the prize list for the school section discovers that Whangarei, Helensville, Huia and other outlying districts were able to compete successfully with the Auckland schools. In the senior division Epsom Girls' Grammar School, Auckland Girls' Grammar School and St. Cuthbert's proved conclusively that our native flora is a very real part of their curriculum.

### Other Sections

New Zealand bookplates and photographs of Cheeseman and other botanists were contributed by the Library of the Auckland Institute and Museum.

A very sobering note was struck by two exhibits. The Soil Conservation Service showed the effects of erosion, largely caused by the indiscriminate destruction of the native bush.

Dr. J. T. Salmon, of the Victoria University of Wellington, displayed copies of his very forthright booklet *Heritage Destroyed*, viewing the same subject from different angles.

Much more cheerful was a series of photographs of the native plants of the Waitakeres, taken by Mr. Ian MacLaren, staff photographer of the Auckland City Council. Auckland is surely one of the most fortunate cities in the world because it has on its outskirts wooded hills and valleys and a beautiful coastline.

Once again as on a dozen other occasions, congratulations are offered to the botanists of the Museum, the Botanical Society and all the other groups and persons who contributed to the success of the Cheeseman Memorial Show.

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## THE TRUMPET VINES

### A Race of Gorgeous Climbers

DOUGLAS ELLIOTT (*New Plymouth*).

I wonder if the Abbe Bignon feels mad at the botanists. He certainly has cause to; for they have treated him roughly. Linnaeus honoured the abbe, who was court librarian to Louis XIV., by giving his name to the bignonias, a genus that at one time included about 100 species of beautiful flowering plants; but in recent years the botanical

name-changers have been at work and have left the poor Abbe with only one or two of his former foster-children while they have given the rest completely different names, which must confuse the Abbe, if he still takes an interest in such things, as surely as it does the average gardener.

If Abbe Bignon refers to Bailey's *Manual of Cultivated Plants* he will find only one species bearing his name — *Bignonia capreolata*, which the Royal Horticultural Society's *Dictionary of Gardening* calls *Doxantha capreolata*. Just by way of adding to the complication, the same dictionary also lists only one bignonia, *B. unguis-cati*, which Bailey calls *Doxantha unguis-cati*. The other erstwhile bignonias have been put under a dozen or so of the 100 genera in the family.

The family itself — and this must be some comfort to the Abbe — still commemorates his name, an honour indeed when we realise that it includes some of the most gorgeous of all climbers as well as many other fine ornamental plants ranging from trees such as *Catalpa* and *Jacaranda* down to herbaceous perennials such as *Incarvillea* and *Amphicome*.

These notes are confined to the climbing members of the family, loosely referred to as the Trumpet Vines on account of the shape of the flowers. Some are tender, but most of them can be grown in the warmer parts of New Zealand.

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*Lithops turbiniformis* (see page 225)



*Glottiphyllum longum* (see page 226)



*Hereroa dolabriformis* (see page 227)



*Podranea ricasoliana* (see page 234)

(Douglas Elliott)



*Worsleya rayneri* (see page 235)



Fig. 1.—Flash-Flame Soil Sterilizer being used at Messrs. Carew's Nurseries, Erson Avenue, Onehunga, Auckland. Note steam rising from the stock pile being delivered by conveyor. (See page 220). (S. A. Rumsay)

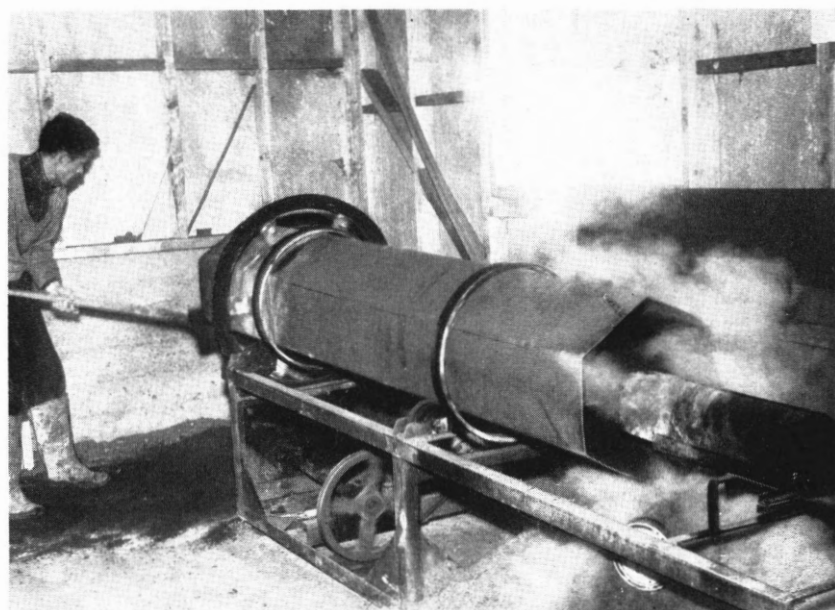


Fig. 2.—Modified Flash-Flame Soil Sterilizer in use in another Auckland Nursery. Note the flame shooting up the barrel of the machine. (See page 223). (S. A. Rumsay)

One of the most popular and spectacular is a *Campsis* called 'Madame Galen,' which belongs to a group of hybrids between *Campsis grandiflora* (a native of China) and *C. radicans* (a native of North America). The way these hybrids came about is interesting. The two plants, growing so far apart in the wild, were side by side in the Washington Botanic Garden and were flowering at the same time when along came some humming-birds, the natural fertilisers of trumpet-shaped flowers. The director of the garden noticed them in action and later saw that seed had set on the plants.

Several good forms resulted, which have been given the name of *Campsis x tagliabuana* and 'Madame Galen' is generally considered the best. Towards the end of summer it bears huge clusters of brick-red trumpets with rich yellow throats. As a climber on a wall or post it needs no tying because it is self-supporting, clinging by aerial roots like ivy. This habit extends for a limited height, after which the stems branch out and make a bushy head. Before spring-growth starts, the branches should be cut back to within a few buds of the main stem; otherwise the plant will get top-heavy, possibly to the extent of breaking away from its support, and will also lack the vigour necessary to a good display of bloom.

With severe pruning in spring this plant may be grown as a shrub. The mass of young shoots coming out from the stumpy trunk (about 18 inches high if trained this way from youth) produces a mound of leaves about 5 feet across capped with flowers.

*C. radicans* is sometimes seen in gardens but it is not worth growing compared with the hybrid; the flowers are smaller and much less showy. Both are easy to propagate from cuttings and this may in part account for so few nurserymen offering them.

Other species bearing flowers of similar colouring — orange or yellow — are *Bignonia unguis-cati*, *Pyrostegia ignea*, and *Tecomaria capensis*.

*Bignonia unguis-cati*, which used to be *B. tweediana*, is an evergreen that is native of an area extending from the West Indies to the Argentine. In its early stages at least it is a much lighter plant than *Campsis*, not making such woody stems and having smaller leaves. The leaves have two normal leaflets but the third has evolved into a three-pronged tendril, each prong terminating in a small but very sharp claw. As these claws will cling to your clothing or your skin as you pass, the plant is well named Cat's Claw, which is not merely its common name but also the translation of *unguis-cati*. Unlike all the other trumpet vines, it bears its flowers singly instead of in clusters. The tube is clear yellow with orange lines in the throat; the petals are orange-yellow. It flowers profusely in warm dry districts.

The Chilean climber, *Eccremocarpus scaber*, is a soft-wooded thing that is in some New Zealand gardens although I don't know of it still being offered by nurserymen. It is a ragged thing as a rule and



probably they thought it not worth keeping. The inch-long orange-coloured flowers are borne in long racemes. I have seen it romping through the branches of tall trees and choking them.

*Pyrostegia ignea*, which used to be known as *Bignonia venusta*, is an evergreen from Brazil. The flowers, in clusters at the end of the stems, are a vivid crimson-orange and are borne so profusely on a well grown plant that they present a solid wall of colour. This is a popular arbour and roof vine in the southern United States and it is also grown very successfully in Australia.

The Cape honeysuckle, *Tecomaria capensis*, much better known simply as *Tecoma*, is a very rampant evergreen climber from South Africa. It is used as a hedge in the southern U.S.A. as well as in the warmer parts of this country where it is commonly grown on wire-netting or a temporary host-plant such as *Escallonia exoniensis*. The *Tecoma* eventually takes complete charge and makes a thick dark-green mass that would be an ideal hedge if only it didn't grow so fast. I once had it as a front boundary to my garden and found it needed trimming about six times a year! Unfortunately this constant clipping prevents the development of the pretty orange-red flowers. There is said to be a rich yellow variety but so far as I know it has not come to New Zealand yet.

A change of colour comes in with the blood-red or purple-red racemes of *Phaedranthus buccinatorius*, which used to go under the name of *Bignonia cherere*. This Mexican evergreen is very like *Bignonia unguis-cati*, but the leaves lack the sharp claws and have instead a three-pronged tendril that clings to its support. The trumpets are 4 to 5 inches long with yellow throats.

Still farther away from the oranges and yellows are the pinks of *Pandorea* and *Podranea*. *Pandorea jasminoides* the Bower Plant of Australia, is a slender evergreen climber with rich green, glossy leaves and clusters of broad-lipped trumpets that are pale pink with deeper throats. There is also a pure white variety. Both make good pergola or archway plants with most of their flowers on the highest branches.

Another Australian, which is also a native of Malaysia, is *Pandorea pandorana* (*Bignonia australis*), the wonga-wonga vine. Though the small yellowish or pinkish flowers are of little value, the plant is useful as a quick cover for screening out undesirable views with its handsome glossy leaves.

The semi-deciduous *Podranea ricasoliana* used to be called *Tecoma mackenii*. A South African, it is a very beautiful quick-growing climber with large showy panicles of pale pink frilled flowers. It needs hard pruning to keep it within bounds and, like the *Campsis*, may be grown as a shrub. The name *Podranea*, as Bailey points out, is an anagram of *Pandorea*, which indicates that the name-changers, for all their sins, do at least have a sense of humour; so perhaps the Abbe Bignon will forgive them after all.

**WORSLEYA RAYNERI, THE BLUE AMARYLLIS**

*W. R. STEVENS (Wanganui).*

In 1949 I received by air mail two small offsets of *Worsleya rayneri*. These were sent to me by the late Major Albert Pam, of Wormley Bury, who was probably the most successful cultivator of this beautiful plant, and flowered it regularly where others failed. He informed me that the plant grew naturally in the Organ Mountains of Brazil, where it occurred in crevices, always facing north. To quote his words: 'It rains there as if it were poured out of buckets, but then the sun comes out, and it is so hot that you can hardly walk over the rocks. The holding roots run into deep crevices where there is probably a lot of decaying vegetable matter'.

In his directions for the potting medium Major Pam emphasised the point that drainage was the all important factor, and this should be so sharp that a bucket of water poured on to the pot should drain through immediately. Ever since I first potted up the two offsets I have endeavoured to carry out these directions as faithfully as possible, and over the past twelve years the plants have slowly increased in height and girth. In winter the pots were given bottom heat and less water; in summer no bottom heat but plenty of water, particularly at night. I must confess that for the last couple of years I began to think I never would flower this very rare bulb, and it was with real surprise that in late January of this year I noticed a bud appearing between the leaves at the top of the long neck of the larger of my two bulbs. The flower stem grew very rapidly and inside a week the first bloom opened to be followed the next day by the second flower.

Since the flowering of *Worsleya* is such a rare event in the world of horticulture I thought it would be of interest to give a description of both flower and plant.

From a bulb 4 ins. in diameter the long neck, heavily clothed with the brown scarious layers of old leaves, reaches a height of 15 ins. to where the 9 ins. falcate leaves are produced. These leaves are from 1¼ ins. to 1½ ins. wide and are from 15 to 18 ins. long.

The stem is flattish, and is produced some 8 ins. out of the bulb neck. At first the outer spathes of the flower scape are green, but as the flowers develop both this outer spathe and also the twin-segmented inner spathes 4½ to 5 ins. long, which surround each individual flower, become a pale tan colour.

The flowers, borne on 3 ins. pedicel tubes, are just over 6 ins. across, the flower trumpet from petal point to base 6 ins. in depth. On opening the colour is a bright lavender-blue, lightening somewhat at maturity, but deepening again as the flower ages. Inside the trumpet the blue colour merges through a finely dotted blue on a white ground to become pure white in the throat. Both the filaments and stigma are white, the former  $2\frac{1}{2}$  ins. long, and the stigma 3 ins. each recurving upwards for the last 1 in. of their length. The pollen is light yellow. The sepals are  $1\frac{1}{4}$  ins. in width, and the petals  $1\frac{1}{8}$  ins.

An interesting development of the form of the flower is that the edges of the sepals and petals are straight and smooth cut when first open, but as the flower develops the edges become first undulate, and then deeply crisped, the points of the sepals twisting sideways, the petal points backwards. The individual flowers last in perfect condition about eight days.

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**1962 ANNUAL DOMINION CONFERENCE**  
of the  
**ROYAL NEW ZEALAND INSTITUTE OF HORTICULTURE**  
(Inc.)

**Thirty-Ninth Annual Meeting and Conference of Delegates**

NOTICE is hereby given that the Thirty-Ninth Annual Meeting and Conference of Delegates of the Royal New Zealand Institute of Horticulture (Inc.) will be held in the Concert Chamber, Opera House, Palmerston North, on Wednesday, February 14th, 1962, commencing at 9.30 a.m.

Members of the Institute and delegates from affiliated organisations are specially invited to attend the Dominion Conference and the Banks Lecture. Tentative arrangements have been made for afternoon bus trips on the Tuesday afternoon to Pohangina Valley and Thursday afternoon to Massey College.

Those who have not yet made hotel bookings are advised to contact Mr. D. C. MacKenzie, Superintendent of Reserves, P.O. Box 614, Palmerston North.

K. J. LEMMON, Dominion Secretary.

**1962 BANKS LECTURE**

The 1962 Banks Lecture will be delivered in the Concert Chamber, Opera House, Palmerston North, on Wednesday, February 14th, 1962, at 8 p.m. The lecturer will be Mr. A. E. Esler, of Massey College, Palmerston North, and the subject of his address will be:

**'Forest Remnants of the Manawatu Lowlands'**

## NOTES FROM THE CHRISTCHURCH BOTANIC GARDENS.

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

After a somewhat fitful start the weather finally settled down to give a very good spring. August started off cold and wet and then the last three weeks were fine and sunny with temperatures and sunshine, in particular, above normal. In September conditions were somewhat variable with south-westerly conditions and cool night temperatures which slowed down spring growth and helped to bring the displays on to perfection, while October turned out to be a fine dry month with both temperatures and sunshine well above normal and marked absence of winds. For the whole month only 0.09 inches of rain fell and only one previous October has had a lower rainfall. During the month air temperatures exceeded 70deg. F. on seventeen days and 80deg. F. on two days. Altogether conditions for the spring displays were very good, the lack of strong winds in particular favouring the displays of tulips, daffodils and other more easily damaged flowers.

This last spring was really glorious and, no doubt due to growth made during the somewhat cool and moist conditions of last summer, most plants flowered exceptionally well. The various forms of Kowhai all flowered profusely and they make quite a feature in the gardens, flowering, as they do, over a period of almost three months. The first plant of *Sophora microphylla* usually opens its first flowers about the end of July and from then on various forms of the same species carry on the flowering until late September. *Sophora microphylla* var. *longicarinata* commences flowering about that period, as do the first plants of *S. tetraptera*. The large-leaved form of *S. tetraptera* is the last to flower and this year some were still flowering quite well at the end of October. Not a showy garden plant, but nonetheless interesting is *S. prostrata*. Under garden conditions it loses the tight divaricating form which characterises it in the wild and becomes a twiggy upright shrub from 6-10 feet in height. The flowers are borne singly or two or three together, each flower being carried on a curiously twisted pedicel. The flowers are from  $\frac{3}{4}$  - 1 inch long, the keel being yellow and the wings and standard orange. Unlike the other species the keel never opens to form a tube, but always remains closed. *S. microphylla* var. *fulvida* which comes from the coastal regions west of Auckland has not yet flowered with us. However, it has very attractive foliage and should make a good garden plant.

In the Cockayne Memorial Garden, some of the early flowering alpine did exceptionally well and foremost amongst them were the species of *Ranunculus*. The most handsome of those that flowered was a hybrid (*Ranunculus lyallii* x *sericophyllus*) which was collected in the Dingwall Mountains near the head of the Seaforth River in Fiordland. Embodying the best characters of both parents it turned out to be a magnificent plant and remained in flower for about one month. It has the tufted habit of *R. sericophyllus*, but grows to a height of about 9 inches. The foliage is thick, glossy and deeply cut around the edges.

The flowers which are carried in large panicles are from  $1\frac{1}{2}$  to 2 inches across and they have the semi-doubling of *R. lyallii*. Their colour is a pale lemon yellow which is quite distinct from most of the New Zealand *Ranunculi*. Equally spectacular was *R. lobulatus* the Kaikoura buttercup. It is of interest to note that there are several forms of this species found in different parts of Marlborough. The inland form which was collected on the Chalk Range near the head of the Waima River was the first to flower; however it is not such a fine plant as the coastal form from Woodside Creek. The first is a rather smaller plant with black stems and petioles whereas the latter is much more robust and has green stems and petioles. The Woodside Creek form also has more and larger flowers and remains in flower for more than twice as long as the plant from the Chalk Range. *R. insignis* is an equally variable plant with large, handsome, glossy foliage and large panicles of yellow flowers. As yet none of our plants are big enough to give their best, but plants collected from Mt. Owen and the Victoria Range show considerable variation. Of the smaller species, *R. enysii* is quite charming and an easy plant to grow. It is a rather slender plant with three to five foliate leaves and the flowers are carried singly on stalks up to 6 inches high. *R. monroi* var. *dentatus* is a sturdier-looking plant with rather fleshy leaves which are covered with a ferruginous pubescence. The flowers are up to 1 inch across and carried one to several on stout black stalks.

By mid-summer most trees and shrubs have finished flowering. However, early in January the linden trees or lime flower and along Beswick's Walk their scent hangs in the hot summer air while countless bees are attracted to the nectar. Beswick's Walk runs through the gardens from north to south and for the greater part of its length it is planted as an avenue with *Tilia europaea* the common linden or lime. Some of the trees are now starting to meet overhead and during the summer it makes a very pleasant walk beneath the shade of the trees. It is in the autumn however that it is seen at its best for then the whole avenue is a mass of bright gold. While *T. europaea* is quite a satisfactory tree in the gardens there are several other species which are very beautiful and have grown into fine specimens. On the Archery Lawn there is a large specimen of *T. cordata* the small-leaved linden. It is now a tree 70 to 80 feet high and of very stately proportions. *T. cordata* is one of the presumed parents of *T. europaea* and the foliage is rather similar to, but smaller than the common linden. It is a native of Europe. Growing on the Paulownia Lawn there is a specimen of *T. platyphyllos* the large-leaved linden. Although at present only a small tree about 30 feet high, it will eventually grow into a tree of the largest size, 100 feet or more. The leaves are very large and frequently measure more than 6 inches long by as much wide. It is the other presumed parent of *T. europaea* and has the typical heart-shaped leaves which are densely downy beneath. It does not produce the suckers which characterise *T. europaea* and altogether it is a more shapely and cleaner tree.



In the playground there are three species of *Tilia* which are quite distinct from those already mentioned and which deserve greater attention in parts and other places where large trees may be required. The largest is *T. tomentosa* which is now a tree about 90 feet high. *T. tomentosa* or the silver linden has large leaves up to 5 inches long which are oblique across the base and underneath they have a dense, silvery-white tomentum. When the leaves are lightly ruffled by a breeze the flashing patches of white are most effective. It is a native of south-eastern Europe. Nearby is *T. petiolaris*, the pendent silver linden which is almost as large. It grows into a large round-topped tree with pendulous branches and a very graceful habit. The leaves vary from roundish-cordate to almost straight across the base, usually they are oblique, and they are dark green above with a dense tomentum beneath. They are somewhat smaller than *T. tomentosa* being only about  $4\frac{1}{2}$  inches long. It is also a native of south-eastern Europe. The last to be mentioned is *T. x euchlora*, which has rather pendulous growth and heart-shaped leaves which are rather oblique at the base. The leaves are glabrous except for tufts of hairs in the axils of the veins beneath. *T. x euchlora* is of doubtful origin and is presumed to be a hybrid between *T. cordata* and *T. dasystyla*.

There are several other species of linden trees planted in the Botanic Gardens; however, it is too early yet to assess their merits. *T. americana* var. *macrophylla* was planted recently by Mr. J. A. Abey, the visiting president of Rotary International and should make a promising addition to the collection.

**NEW PLYMOUTH CITY COUNCIL**  
**ASSISTANT-CURATOR and DEPUTY-SUPERINTENDENT**  
**OF PARKS AND RESERVES**

APPLICATIONS are invited up till noon on 31st January, 1962, for the position of Assistant-Curator at Pukekura Park and Deputy-Superintendent of Parks and Reserves to the Council.

This is a new position which combines work at renowned Pukekura Park with that of work on the great variety of passive and active reserves under the Council's control. There is excellent scope in all fields of horticultural activities.

The salary offered is up to £1,100 per annum, depending on qualifications and experience.

A roomy house is available at a rental of £2 per week.

Schedule of Duties and Conditions of Appointment may be obtained from the undersigned, addressed to P.O. Box 246, New Plymouth.

**J. W. GOODWIN,**

Curator and Superintendent of  
Parks and Reserves.

## NOTES FROM THE DUNEDIN BOTANIC GARDENS.

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

This spring and early summer have proved to be a particularly good season for the flowering of rhododendrons and azaleas in the Dunedin district, both for mass display and for the quality of individual blooms. As the area devoted to these shrubs in the Botanic Gardens is steadily increasing year by year and with greater attention being given to the acquisition of good species and modern hybrids, to manuring, mulching, labelling and the elimination of the poorer types, the display from August to December has been full of interest for lovers of the genus, as well as the general public. A display of rhododendron blooms at the Dunedin Horticultural Society's Spring Show during the first week in October by half a dozen enthusiasts among which the Botanic Gardens was represented, created a great deal of interest. It is hoped that this will encourage people to plant them more freely in Dunedin's private gardens where the climate and soil conditions are so conducive to success.

Earliest to flower of the large leaved species this season was *Rhododendron grande*, a 10 feet high specimen covered for most of September with large handsome trusses of creamy-white flowers with a purple blotch. With its large shining leaves, silver underneath, and attractive silvery-red young shoots, it is a most desirable plant for the larger garden, although in common with most of its series it does not flower at an early age. *R. falconeri* 15 feet in height with even larger leaves with a rich brown indumentum beneath, produced some very fine trusses of pale yellow flowers with a purple blotch during the latter three weeks of October, but was not quite so floriferous as on other occasions. Every shoot of an 8 feet *R. ficolacteum* bloomed, creamy-white flowers with a crimson blotch. The early-flowering *R. sutchuenense* with rosy-lilac bell-shaped flowers bloomed exceptionally well during September. Others of the large leaved group such as *R. sinogrande*, *R. giganteum*, *R. macabeum*, *R. protistum* and *R. calophytum*, although growing well have yet to reach the flowering stage. The more shaded, moister positions are chosen for these species where *R. sinogrande* with the largest leaves of all rhododendrons is now 7 to 8 feet high with leaves 18 inches long and 6 inches wide. When choosing sites for rhododendrons, it is generally true to say that the larger the leaf the greater overhead shade is needed. Those with the smaller foliage will often flourish in full sunlight providing they have a cool moist root run. When planting beneath or in the vicinity of trees to obtain diffused sunlight it is essential to ensure that there will not be undue root competition as well as shade and shelter. Far too many rhododendrons are weak and stunted because the trees which should be guarding them are actually robbing them of food and moisture. The very fact of enriching the soil for a newly-planted *Rhododendron* means that every tree root that has been cut in the process is going to extend into the freshly prepared plot far more

vigorously than the new plant can do. As well as manuring and mulching young rhododendrons regularly it is very necessary every winter for several years to dig a circle a spit deep round each young plant just beyond the limit of its root system to cut all incoming foreign roots.

Of the taller species with medium-sized leaves those of the *arboreum* series have been outstanding. *R. arboreum* itself, trees up to 20 feet in height, ranging in colour from white through all shades of pink to red have been clothed from ground level to their crowns with a wealth of bloom. Good forms of the blood-red Chinese *arboreum*—*R. delavayi*, of the narrow leafed *arboreum*—*R. peramoenum*, scarlet and very early flowering and of the form from Ceylon—*R. kingianum* (syn. *zeylanicum*), a fine red, have all been most conspicuous. Other choice reds have been *R. thomsonii*, a favourite parent for the hybridist, and *R. elliottii* 'K.W. 19083'. This latter species grown from seed collected by Captain Kingdom Ward on his 1949 expedition to Assam with up to twenty-three scarlet flowers to the truss is very free-flowering and much superior to the original form with only fourteen or fifteen to the truss. A 6 feet *R. barbatum* which was becoming smothered between *R. grande* and a large *R. arboreum* has been moved to a better position where it is hoped it will produce its handsome scarlet trusses in greater profusion. Other good species in this group which have all flowered well are *R. vernicosum*, *R. campanulatum*, *R. maddenii*, *R. griffithianum*, *R. diaprepes*, *R. decorum* and *R. griersonianum*. Many of these tall growing large flowered species, although magnificent plants in their own right, are also of particular interest because they are the parents of many of the best of both the older and newer hybrids.

Many of the smaller leafed and lower growing species are charming plants and have also been much admired for their mass of flowers this season. Some of them are very useful for the more open and sunnier parts of the garden as they do not require the shelter and semi-shade that are looked upon as essentials for successful *Rhododendron* culture. In their natural habitat they are found growing high up in alpine meadows. The low growing ones in particular are often quite happy in the rock garden providing they do not dry out in hot weather. Some of the best which flowered well this season were *R. racemosum*, *R. scabrifolium*, *R. spiciferum*, *R. hemitrichotum*—all upright growers with small pink flowers with prominent stamens. Many of this type can be kept bushy if desired by cutting back the longer shoots when in flower or immediately afterwards. The lavender blue of *R. chasmanthum* and *R. augustinii* and the clear primrose yellow *R. lutescens* of graceful arching habit were especially pleasing. White flowered species, tinged pink, which have been conspicuous are *R. johnstoneanum*, *R. bullatum* and *R. ciliatum*. The always popular *R. burmanicum*, the round-leafed rose-pink *R. orbiculare* and the bright scarlet *R. sperabile* and *R. neriiflorum* have all bloomed well. Two of the choicest low growing, spreading species with pink flowers are *R. williamsianum* and *R. moupinense*. Unfortunately

they both tend to die out here without warning for no apparent reason which suggests that they require particular conditions of some sort. If only they could be seen growing in their natural environment we might be able to give them what they desire.

Before mentioning some of the more spectacular hybrids it will be obvious by the space devoted in these notes to species that they are considered to be of the utmost importance in any collection of rhododendrons. Probably in no other genus of decorative plants are there so many good garden plants among the species, which is all the more remarkable when the tremendous amount of hybridisation, which has been done, is taken into account. A hybrid rhododendron has to be very good indeed to compete in overall effect with the form, foliage, flower and truss of a good species.

For dependability, constitution, floriferousness, colour, hardiness and general landscape effect some of the older hybrids are still hard to beat. During the month of October, passengers in aircraft to and from the north when passing over or near the Botanic Gardens may have glimpsed great blocks of colour among the green of the surrounding bush on the hillsides of the Rhododendron Dell. It is old favourites such as 'Cynthia', 'Pink Pearl', 'Alice', 'Lawsoniana', 'White Pearl', 'Charles Lawson', 'Mrs. Thistleton Dyer', 'Fastuosum flore pleno', 'Mrs. R. S. Holford', 'Countess of Haddington', which give this massed effect. Some individual specimens which have contributed largely to the general display were 'Marquis of Lothian', 'Kewense', 'Fragrantissimum', 'C. B. van Nes', 'Britannia', 'Cornubia', 'Alarm', 'Loderi', 'Earl of Athlone', 'Sappho', 'Loder's White', 'Ivery's Scarlet'.

Of the more modern hybrids the New Zealand raised varieties, 'Ilam Violet', 'Loderi Irene Stead' and the Scarlet Kings—'Red Glow', 'Orchard', and 'Kaka' have all been much admired. Among the distinct *Lapageria* flowered types, 'Royal Flush', 'Lady Rosebery', and in particular its variety 'Exbury', were really eye-arresting. The red-flowered *griersonianum* hybrids—'Ibex', 'Laura Aberconway', and 'Fusilier', though as yet young plants, flowered well. The early flowering reds—'Barclayi Helen Fox' and 'Barclayi Avicé' were good but especially so was the 'Barclayi' hybrid 'Cardinal'. The large cream trusses of 'Mari-loom' caught the eye of every passerby.

Groups of seedlings of crosses, made at the Botanic Gardens itself and raised in the nursery, which produced some very interesting flowers were *burmanicum* crossed with *bullatum* and *dalhousiae*. 'Cornubia' with *grande*, *neriiflorum*, *arboreum* and 'Treasure' and 'Margaret Dunn' with *griersonianum* and *kingianum*.

To really appreciate the genus, *Rhododendron* gardens should not be visited when the sun is strong and bright. It is early on dewy mornings, or in the evenings when the flowers are crisp and fresh, the colours clear, and the scented varieties filling the air with their various perfumes, that the true atmosphere is felt.

**NOTES FROM THE AUCKLAND PARKS.**

*G. F. FILLMORE (Auckland City Council).*

The absence of high winds and heavy rains has enabled Auckland gardeners to obtain the best out of the many flowering trees, shrubs, perennials, and annuals which are such a joy at this time of the year. Flowering cherries and apples in particular have never looked better, due to the fact that more settled weather was experienced during the flowering period. In the parks, stocks, ranunculus, anemones, iris, tulips, pansies, etc., have also played their part, and at time of writing, planting for the summer season is well under way.

Last year at this time I made mention of some of the more notable flowering shrubs which are found mainly at the northern end of New Zealand and do so well here, such as the leucospermums, the strelitzias, the luculias, and so on. These have again made magnificent displays, but it is my intention this time to deal a little with the history of parks in Auckland and I will start with one which is in the public eye at the moment, namely Parnell Park.

Parnell Park has very close associations with early Auckland inasmuch as it was the home of some of Auckland's leading citizens of the day, namely Sir John Logan Campbell, Judge Gillies and Judge Swainson, the last-named being Auckland's first Judge. Adjoining Parnell Park is St. Stephen's Cemetery—again one of the oldest in Auckland—a burial of interest here being that of the housekeeper of Bishop Selwyn in 1854.

In 1915 the whole of Parnell Park as it is today was acquired and opened to the public. From that time onward the park was maintained as an open space, but in 1934-35 following representations from the Auckland Rose Society a Rose Garden was formed. The initial planting consisted of some 3,000 roses, the garden later being extended to accommodate 4,500 roses. In this planting which was mainly donated by nurserymen and public-spirited citizens were many of the fine old roses which today are truly things of the past. The only variety still going from that initial planting, and to which a whole bed is devoted, is that old favourite 'Frau Karl Druschki', although other old roses in the form of 'Marie Dot', 'Elizabeth of York', 'Comtesse Vandell', 'Warawee', 'Hugh Dickson', 'Mdme Eugene Pickard' and 'Padre', are still doing and flowering well.

Over the past few years extensive replanning of the garden has been undertaken with a view to improving general vistas throughout, to making the beds of a more manageable size, and to introduce new varieties. As a result of this replanning, roses in the garden now number some 4,000 comprising 260 varieties. Among the best at Parnell, both from a growth and flowering point of view, we have 'Queen Elizabeth', 'Mission Bells', 'First Love', 'Peace', 'Sutter's Gold', 'Carrousel', 'Virgo' and 'Josephine Bruce'. Also during this period many of the floribunda types have been

tried the best of the earlier varieties being 'Cocorico', 'Geranium Red', 'Poulsen's Supreme', 'Salmon Perfection', 'Ma Perkins', 'Permanent Wave' and 'United Nations'. This year beds of some of the newer floribundas have been planted, namely 'Firecracker', 'Korona', 'Sweet Rest', 'Brennende Leibe', 'Dickson's Flame' and 'Orangeade'.

During the period of the development of the Rose Garden, a vote was taken at one of the rose shows on the most popular rose for the Auckland district and it is interesting to note that 'Shot Silk' won by a big margin. A bed of this rose was subsequently planted just inside the main gates and it is still looked upon as one of the most showy in the garden.

However, besides roses, Parnell Park is noted for the many fine trees which were no doubt planted in the early days when the area was under private ownership. Pride of place must be given to a magnificent specimen of *Metrosideros tomentosa* (Christmas Tree). This tree is approximately 60ft. high and has a spread of just over 90ft. It is one of the best specimens of pohutukawa in Auckland and during the early part of December is a magnificent sight, being completely covered with its red flowers.

Other trees worthy of note are *Araucaria bidwillii*, *Callistemon salignus*, *Cedrus deodara*, *Fagus sylvatica* 'Purpurea' (Copper Beech), *Eucalyptus citriodora* and *Sterculia acerifolia*. Running through this list, the genus *Araucaria* comprises, I suppose, some of the most prominent trees on the Auckland landscape due, no doubt, to the fact that many of the early settlers called at Norfolk Island on their way to New Zealand, collecting plants of *Araucaria excelsa* which were ultimately planted on most of the high ground round the city. The genus *Araucaria* consists of about ten species of which the Monkey Puzzle and the Norfolk Island Pine are the best known. *Araucaria bidwillii*, commonly called the bunya bunya, comes from the coastal districts of Queensland where it grows to a height of up to 150ft. The large edible seed nuts which the tree produces are much prized by the aborigines.

The genus *Sterculia* (syn. *Brachychiton*) is another genus which is well represented in Auckland parks and gardens, *S. acerifolia* being the most prominent. The name *Sterculia* is derived from *stercus* meaning dung, being a reference to the odour of the flowers, and leaves of some of the species. The genus contains about 250 species of deciduous and evergreen trees distributed throughout tropical Asia, South America, Africa and Australia. *S. acerifolia* or Illawarra flame tree, as it is commonly called, forms a handsome tree ultimately reaching 50ft. to 80ft. in height. It has deeply lobed, shining deep green leaves 6 to 12 inches across on 9 to 12-inch stalks. When the tree reaches the flowering stage, it becomes almost deciduous, the flowers being carried in panicles up to a foot long, crowded in the terminal leaf axils. The flowers are rich scarlet, shallow-lobed, with bell-shaped calyxes being about 1 inch across. Trees do not bloom consistently year after year but have peak



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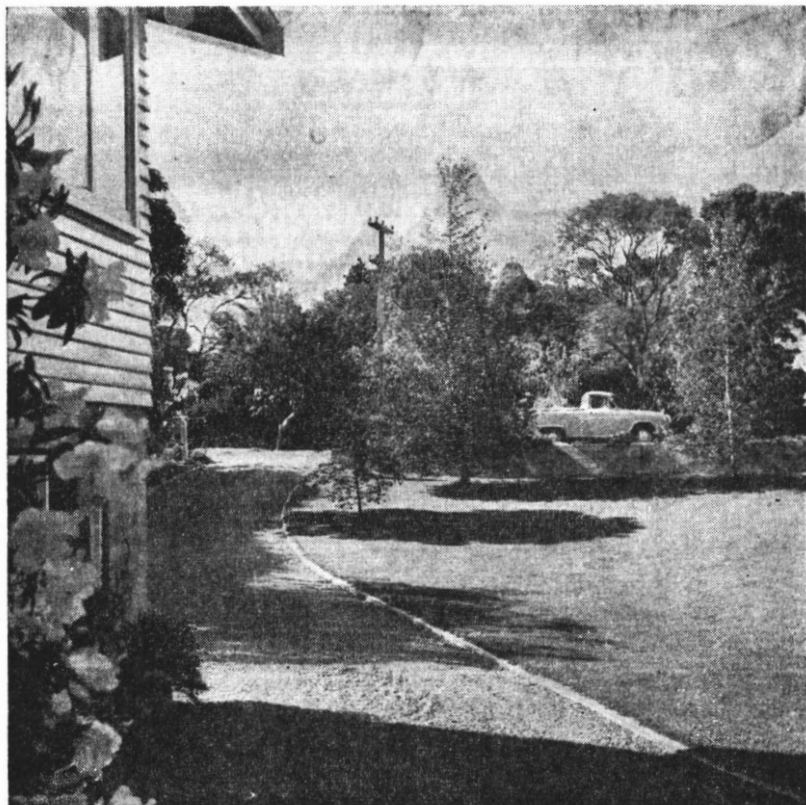
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— JOHNSONVILLE

years with spasmodic flowering in the years between. There are a number of good flowering specimens round Auckland and when in full flower they present a sight which would be hard to beat anywhere.

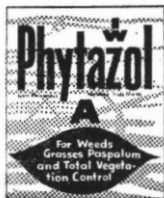
Lastly, mention must be made of *Eucalyptus citriodora*. The genus *Eucalyptus* consists of about 300 species nearly all of which are found in Australia. It is a most accommodating genus as species are now to be found growing in most parts of the world under a wide range of conditions. The name *Eucalyptus* is derived from *eukalupto* meaning well-covered, and refers to the cap of the calyx which covers the flower stamens before they open. The most prominent of the species here is, of course, *Eucalyptus ficifolia* or scarlet-flowered gum, which is very popular with the home gardener. However, for sheer beauty of form, *Eucalyptus citriodora*, or lemon-scented gum, takes a lot of beating. This stately Queensland species forms a long straight trunk, absolutely smooth and silvery white. The oblong-lanceolate leaves 4 to 6 inches long are lemon-scented, hence the common name. Flowers are white, borne in terminal corymbs of 3 to 5 flowered umbels.



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## DISTRICT COUNCIL REPORTS

## NORTH TARANAKI

Mr. O. J. Wilson gave a talk on "Some Impressions and Comparisons of New Zealand and English Gardens, and Gardening". Mr. Wilson is the holder of the English National Diploma in Horticulture, and the Royal Horticultural Society's Certificate in General Horticulture, but he now resides in New Plymouth, and is employed as gardener for the New Plymouth Boys' High School.

Some notable differences were:—New Zealand winter is not so definite: The atmosphere is so much clearer in New Zealand: Tree growth is much faster in New Zealand: Unusual to find hydrangeas growing like weeds as in New Plymouth gardens except in the western counties: New Zealand bush is dark and sombre in comparison with English woods (where many trees are deciduous): Strange to see Citrus trees growing out-of-doors here: Hedges in England not cut flat on top as they are here: He considered all in all, that home gardens were better in New Zealand, and one amusing remark made was he had never seen a long-handled shovel before he came to New Zealand—Herbaceous borders and lawns were considered better in England, and most plants that appreciate a long winter's rest did very well over there. During his residence in England, he had seen no rotary mowers: More trained gardeners were to be had in England than in this country.

Mrs. C. J. Ward spoke on 'Cacti Culture', preparing her talk by stating: 'Of all the household plants, Cacti probably stand more abuse than any others she knew—dust; lack of watering; full sun, etc.—even Grandma's *Aspidistra* wouldn't stand that.' The soil mixture recommended was, one-third compost; one-third ordinary soil, and one-third sand, plus a sprinkling of blood and bone manure. For true cacti, some lime was necessary and this could be applied in the form of crushed egg-shells. The whiter the spines on the plant indicated the need for lime requirements.

Good drainage was necessary and when potted, crocks and charcoal were a 'must' to ensure this. Although as stated, these plants were tolerant and appeared to grow in any position; some do prefer semi-shade and most dislike over-watering. Water only if extremely dry.

A special open meeting was held on September 9th, when Dr. J. S. Yeates, of Massey Agricultural College, Palmerston North, spoke on Horticultural Impressions in America. Dr. Yeates illustrated his address with coloured slides taken on his recent visit to America.

The following notable differences were evident in comparison with New Zealand gardens:—The lack of hedges: Very little formal bedding—mainly trees, shrubs and lawns—and in the main the landscaping extended to the roadside: the absence of telephone and power poles and lines on the sides of the streets: Dr. Yeates would definitely like to see the same idea carried out in New Zealand.

October 7th was devoted to a trip round New Plymouth gardens, and approximately seventy members and friends spent a most enjoyable day.

This year our Labour Day weekend trip was to Rotorua, and many attractive gardens were visited through the kind assistance of Mr. A. B. Figg, President of the Rotorua Horticultural Society.

Rotorua's gardens and parks were seen to advantage with fresh spring growth, and blossoms on all sides. An evening trip to Mokoia Island, a Maori Concert attended by some members made this a memorable trip for all.

## WHANGAREI

## AUGUST:

The programme for the August meeting consisted of a series of coloured slides of parts of the Floral Festival held in Christchurch in February of this year. The Festival consisted apparently of a Flower and Vegetable Show held in Hagley Park, and a series of Garden and Street competitions held in the City and Suburbs. The most impressive pictures were those of the Lily display staged by the Lily Society in a large tent. This was most effectively laid out, and we would have liked to see something of the layout of other sections in the Show. Floral Art was much to the fore with good photography, of beautiful and in some cases, expensive backgrounds and accessories. The small gardens were very gay with masses of bright annuals and small foliage plants, but except in one or two cases we missed the spaciousness and contrast of green lawns. Our thanks are due to Mrs. Logan for the loan of the slides, and we hope we may be privileged to see something more of the other features of the Christchurch Floral Festival.

## DISPLAY TABLE

Although fewer flowers than usual were displayed, there were a number not often seen. Among natives there were specimens of two orchids—*Pterostylis trullifolia* and *P. graminea* shown by Miss M. Madden. *Grevillea lavandulacea* 'Black Range' form was the centre of admiration for its lovely sprays of scarlet flowers. This is a plant for a warm, dry, and well-drained situation. Scoria, gravel or coarse sand may be used to ensure requisite drainage. Another good plant for winter blooms was a South African, *Bulbinella robusta*, with poker-like spikes of clear yellow, long-lasting in the garden. A good specimen of the West Australian Wax Flower was shown—*Chamaelaucium uncinatum*, another relative of our tea-tree and one that needs warmth and good drainage.

## SEPTEMBER:

Mr. J. Say, of the Department of Agriculture, Auckland, was our guest speaker at the September meeting. His subject, 'Plant Propagation', is always of interest to the home gardener as well as to the specialist, and information on this and on all the newer techniques is constantly sought. Mr. Say's lecture covered the main fields of reproduction by seed, cuttings, layers, and of lilies by scales. When setting out to sow seeds three essentials must be provided—moisture, air and warmth. If the soil is heavy and wet, two of these essentials will be absent. So first prepare your soil. A suitable mixture for your seed boxes is: 2 parts loam, 1 part leaf mould (or good compost or peat), 1 part coarse sand (or fine scoria or perlite), plus 1½ ozs. superphosphate and ¼ oz. of garden lime per bushel of the mixture (about 1 apple box full). The soil and leaf mould or peat should be put through a ½-inch sieve. Mix thoroughly and make moist but not sticky. Then put some rough rubble in the box for drainage, fill to overflowing with the mixture, press down firmly with the fingertips, pushing the soil into the corners. Level off with the hands, and then with a short length of 4 x 2, press the soil down to a smooth level ½ to 1 inch below the top of the box. Then sow your seeds evenly and thinly, large seeds on the surface and lightly pressed in with the board, but for very small seeds such as *Begonia*, sift a layer of fine soil over the surface before sowing, and do not press down. The soil cover should equal the diameter of the seed. Cover the box with a sheet of glass and newspaper and place in a level, warm position. Turn the glass daily to get rid of condensed water. Lift the glass about an inch when the seeds have started to germinate, and remove it when all the seeds are up, but protect from sun, frost and rain. All watering both before and after germination should be done with a can having a very fine rose. Mr. Say here recommended the use of Haws watering can which, though costing £5, was a good investment. With this attention to soil preparation, careful

sowing and watering, success should follow, and complaints of poor seed would lessen. Failure was more often the result of heavy, cold soil and bad sowing methods. However, there were certain seeds, particularly those from cold climates, and those which grew in desert conditions, which needed special treatment to obtain germination. Cold-country subjects such as alpine needed to pass through a very cold period before starting into growth. Many lilies took a year or more to germinate, but with auratum the process could be speeded by putting them in a plastic bag with perlite or sphagnum moss, then into the hot-water cupboard for six weeks, into the refrigerator for three weeks, and back to the hot-water cupboard until germinated. Kowhai seeds should be picked green and sown at once. *Corokia* needed planting in wet sand in a cold place. Sturt's Desert Pea, from Central Australia, notoriously difficult to grow in New Zealand, had been reared successfully by planting on hard clay between a concrete path and the house wall, where it first received a good soaking, and then grew in heat and dryness.

Some seeds, such as grass seeds and *Streptocarpus*, need more light, whilst others, such as *Nigella* and *Amaranthus*, need darker conditions.

*Cuttings:* These are of three kinds, each for particular times of the year. Tip, or softwood cuttings, taken from the tips of actively growing shoots, 2 to 4 inches in length, are cut just below a node with a very sharp knife or razor blade, and the lower half trimmed of leaves. These are taken in spring or early summer, and must not be allowed to wilt before planting. The best rooting medium is coarse, moist river sand, but equal parts of sand and soil may be used, or fine scoria, pumice or perlite. It is important to have the material firmly packed down, especially if it is sand. Whether pots or boxes are used, drainage should be provided as for seeds, and covered with some coarse leaf mould to prevent the rooting material washing through. The cuttings should be put in firmly with a dibber, and watered at once, and placed in the shade. If pots are used they may be enclosed in a polythene bag kept some inches above the level of the cuttings, but must be hardened off for a few days by partially releasing the bag. Begonias, pansies, dahlias, hebes, fuchsias and delphiniums may be so increased.

*Semi-hardwood Cuttings:* These are made in later spring or early summer of firm wood of the current season's growth. They may be cut from just below a node, or if side shoots, may be pulled off with a heel and trimmed with a sharp knife, or razor blade. These may be planted in a shady, sheltered place in the garden in well-worked soil, and not allowed to become dry. *Ericas*, *azaleas*, *photinias* and *pittosporums* are suitable subjects.

*Hardwood Cuttings* are made in the late summer and autumn. They should be about 9 inches long, trimmed of half their leaves if evergreen, put in a sheltered place in well-drained soil, and left for a season before transplanting. Suitable subjects are *hibiscus*, *grapes* and *roses*.

*Root Cuttings:* Many herbaceous perennials can be rooted by this method. Cut roots into 1 or 1½-inch lengths, place on surface of a box of sand and soil mixture, and cover with a half-inch of soil. Put glass and paper over the box. The cuttings may be made in spring, or when the plants are lifted for division. *Phlox*, *achillea*, *verbascum* and *oriental poppies* may be so increased.

*Leaf Cuttings:* Many choice and beautiful plants may be increased from leaves. Succulents such as *Echeveria* may be grown by breaking off leaves and setting them upright with just their bases in dry sand. *Bryophyllum* leaves laid on sand will make new plants around the edges. *Lachenalia* leaves cut about flowering time and planted with their bases ½-inch deep in sand will make bulbs along the cut. Leaves may be cut into sections about 2 inches long. *Saintpaulias*, *gloxinias*, *Streptocarpus*, *Gesnera* and

*Peperomia* leaves should be cut off with a stem of 1 to 1½ inches, which should be inserted in sand, or a mix of sand and soil, and treated as for the softwood cuttings. Gloxinias do not shoot immediately but make a small corm which makes leaves the next spring. *Begonia rex* is easily propagated from leaves. The main veins of fully mature leaves are cut about an inch from the stem, and the leaf laid flat on sand, and pegged down with wire pins. Young plants will arise from each cut.

*Lily Scales*: Remove scales from healthy bulbs only, just after flowering. Set upright in sand to about half their depth. This is best done in a box with about 2 inches of sand over the soil, covered with glass and put in a cool, shady place. When growth starts they can be put in the open, hardened off and planted out the following season.

*Layering*: This is the method used for rhododendrons, *Azalea mollis*, camellias, daphnes, magnolias, *Hoya* and carnations, and is done by bending down a branch or twig to the ground, and making a sloping cut on the under side at the point of contact with the soil. The cut is made to about half the thickness of the branch and 2 inches long. Peg down the shoot in the well-prepared soil, which may be mixed with sand. Cover with an inch of soil.

## WELLINGTON

### JUDGING COURSE.

During May a preliminary meeting was held to explore the interest and support of Wellington horticulturists with a view to the possibility of conducting a School for Judges. This meeting, which was addressed by a panel of well-known local judges and speakers, confirmed a great interest in such a course for judges of floral art, and some interest in a course on judging cut flowers. In August, the Executive commenced a course of ten lectures, covering all aspects of floral art, with an enrolment of 58 candidates, which will be completed by the end of November. It is hoped to have a full report available at a later date, but mention can be made now of an excellent booklet produced by the Wellington District Council for use in the Course, and available from the Dominion Secretary at a charge of 2/6 (plus postage 3d.). The booklet entitled *Floral Art Definitions and Judging Points* is aimed to set an acceptable standard and a common basis from which all floral art judges can work. Members from other District Councils would find this booklet helpful.

### TREES IN TOWNS.

In May, Mr. J. C. Short, recently transferred from Auckland District Council, spoke on Trees in Towns, relating how trees may be used in small gardens for street beautification and in relation to architecture or along modern highways. Slides from the School of Town Planning, Auckland, illustrated some of the important aspects of the use of trees which are often neglected in New Zealand. At this meeting a table display of cotoneasters assisted members to recognise this genus and appreciate its qualities.

### TONGARIRO NATIONAL PARK.

At our Annual General Meeting in July, members heard with interest a talk by Mr. P. G. H. Bennett, of Waikanae, on the alpine garden at Tongariro National Park. Mr. Bennett said that at least one-third of Tongariro National Park's 160,000 acres would always be kept undisturbed. Access to the 50 or 60 thousand acres of wilderness area would not be restricted, but what people were able to do in it would be strictly controlled.

The Park Board had asked the Botanical Committee, of which he is chairman, to take control of general botanical matters in the Park, and the Committee was tidying up bush tracks, preparing a booklet on the flora of the Park and would establish a herbarium.



For three miles round the park headquarters, near the Chateau, the tracks would be suitable for old people to walk over, but most of the park would be left in its natural state and not tracked.

The Committee was trying to establish co-operation with road construction workers to co-ordinate the interests of road construction and preservation of plants. It was intended to cover with native plants the debris resulting from the new road construction between Ohakune and Mt. Ruapehu.

Mr. Bennett said the Board had asked the Committee to undertake work throughout the Park after the Committee had successfully established the alpine garden near the Chateau. The garden, which would contain only plants which are native to the Park, showed specimens of vegetation that grew at the various altitudes.

To illustrate this address, Mr. F. Bodley, of the Wellington Botanical Society showed slides of alpine plants in the Park Area and discussed some specimen plants of that area.

### **ARBOR DAY.**

On Arbor Day several members of the District Council assisted the City Council by providing speakers at school plantings throughout the area.

### **CACTI LECTURE.**

Mrs. G. O. Deldyck showed specimens and slides of cacti and enthused members concerning the growing, culture, flowering and mode of life of these plants. It is unfortunate that more people were not there to develop an appreciation of these plants.

### **'THE ETERNAL TRIANGLE'.**

On November 2nd, Mr. H. W. Johnston, Lecturer in the Botany Department of Victoria University of Wellington, spoke on 'The Eternal Triangle', the stimulating play, embracing man, his plants and their diseases and pests, and the struggle which man has been forced to undertake to provide food for sustenance. Mr. Johnston contended that despite the great advances in the development of new chemicals, man would never beat insects which attack the plants. In concluding, Mr. Johnston challenged members to play their part in observing plants carefully and selecting plants which show special resistant characteristics to pests and diseases. This was a most stimulating address.

### **GARDEN VISITS.**

Although postponement reduced the numbers, a crowd of almost fifty people travelled to Waikanae to visit some local gardens. One of the gardens with graceful trees, lawns and shrubs had been developed in recent years and incorporated many interesting specimens carefully placed. The viewing of slides showing the development of this garden encouraged members with similar problems. Rose growers from Wellington looked with envy on the luscious growth of garden roses and enjoyed the unusual species also planted. The garden of Mr. P. G. H. Bennett was of a different but complementary nature. A wide range of fascinating rock and alpine plants mostly grown from seed had been nurtured in this tiny garden. A southern rock face, a shaded dell and open sunny rockeries provided a wide range of climatic factors allowing the growth of plants from most areas of the world. Mr. Bennett's generous distribution of plants, seeds and cultural knowledge was deeply appreciated by plant enthusiasts. It is encouraging to meet true plantmen. Members are indebted to these people for the privilege of enjoying their gardens.

### **CO-OPERATION.**

Throughout the year we have co-operated with the Wellington Horticultural Society and shared responsibility for organising lecture evenings.



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NORTHERN WAIROA: Mrs. J. L. Russell, Waihue R.D., Dargaville.

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WAIKATO: Mr. J. R. Turnbull, P.O. Box 4048, Hamilton East.

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