

Vol. 1. No. 3.

February, 1927



Bulletin of the New Zealand Institute of Horticulture



PUBLIC LIBRARY
DUNEDIN

Reprinted from "The New Zealand Fruitgrower and Apiarist."

-6 SEP 1978

AUCKLAND, N.Z.
Brett Printing Company, Limited.—60-175.
1927

This copy is made for your private
study or for your research.
The Copyright Act 1994 prohibits
the sale, letting for hire or
copying of this copy.

No. 1. 1888

Bulletin of the New
Zealand Institute
of Horticulture



Published by the
New Zealand Institute of Horticulture

Printed and Published by the Government Printer, Wellington

Price 1/6

New Zealand Institute of Horticulture

(Incorporated)

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

Past President: DR. L. COCKAYNE, F.R.S., F.N.Z.Inst.

Dominion Secretary: MR. GEO. A. GREEN, 16, Aratonga Avenue, Auckland.

Dominion Treasurer: MR. L. A. JONES, 57, Creswick Terrace, Wellington.

Hon. Secretary, Dominion Executive: MR. WM. C. HYDE, Horticulturist,
Department of Agriculture,
Private Bag, Wellington.

DISTRICT COUNCILS.

Auckland: President, PROFESSOR W. RIDDETT.

Hon. Secretary, MR. N. R. W. THOMAS,
54, Campbell's Buildings, High Street, Auckland.

Canterbury: President, DR. CHAS. CHILTON, F.N.Z.Inst.

Hon. Secretary, MR. A. H. SHRUBSHALL,
659, Colombo Street, Christchurch.

Gisborne: President, MR. W. D. SHERRATT.

Hon. Secretary, MR. G. T. MAUNDER,
379, Stout Street, Gisborne.

Manawatu: President, MR. F. J. NATHAN.

Hon. Secretary, MR. J. J. STEVENSON,
High School, Palmerston North.

Nelson: President, MR. G. A. HARKNESS.

Hon. Secretary, MR. F. COLEMAN,
2, Collingwood Street, Nelson.

Otago: President, MR. T. K. SIDEY, M.P.

Hon. Secretary, MR. A. D. MILLER,
C/o. A. & P. Association,
Crawford Street, Dunedin.

Education Committee.

Chairman and Convener, PROF. H. B. KIRK,
Victoria College, Wellington.

Hon. Secretary, MR. H. BAILLIE, Public Library,
Mercer Street, Wellington.

Hon. Editor: MR. GILBERT ARCHEY,
Auckland Museum.

No. 1. 1888

Bulletin of the New
Zealand Institute
of Horticulture



Published by the
New Zealand Institute of Horticulture

Printed and Published by the Government Printer, Wellington

Price 1/6

Rose Cultivation.

BY W. H. RICE, SENIOR ORCHARD INSTRUCTOR, AUCKLAND.

Address delivered before the Workers' Educational Association, Auckland.

Roses are of the family Rosaceae. Throughout the vegetable kingdom there is no genus that commands and receives so much attention as *Rosa*. As a commercial proposition, it holds a place in the perfume markets unrivalled by any other plant, while the combined beauty and fragrance of the flowers have been immortalised from the remotest antiquity by authors and poets of all countries, and plants maintained as a favourite and universal object of culture among all civilised nations.

Repeated references are made to the rose throughout ancient Greek mythology. To Aurora it was dedicated as an emblem of youth; to Venus, of love and beauty. It was given to Cupid as a bribe to the god of silence, hence the common expression "under the rose" (*sub rosa*). The rose is the national flower of England, having been adopted by Edward I. Edward IV. was the first monarch to issue a coin adorned with the rose—the rose noble current at 6/8 and inscribed with the motto "*Rosa sine spina*" (a rose without a thorn); this example was followed by others, and the rose noble of Henry VIII. is held by collectors to be the most beautiful coin ever struck. The Wars of the Roses no doubt stimulated interest in this flower; indeed during the middle ages, roses were the most popular flowers in England, though only some six native varieties were grown in those days. The 15th century witnessed the introduction of the Provance and Damasc roses, which so stimulated the family that by Shakespeare's time there were some 30 varieties. About this time the rose was valued in the kitchen, being used to produce the home medicines—Tincture of Roses and Rose vinegar. Rose water also formed the base of a drink *Rosa Solis*, much appreciated by drinking men for the kick it contained. During the times of the Georges and Victoria, the pot pourri jar was in general use, roses being the foundation of the fragrance diffused throughout the house, while the ballads "She wore a Wreath of Roses"

and "The Last Rose of Summer" will no doubt persist as long as the English language.

About 250 species of roses have been enumerated, but the number specifically distinct is not more than 40. The genus is widely disposed over the whole temperate and sub-alpine regions of the Northern Hemisphere, rare on the American Continent, extending as far south as Abyssinia, the East Indian Peninsula, and Mexico; practically unknown on the Australian Continent; New Zealand native flora lacks a true rose, but the order is represented by the "Bush Lawyer." The evolution of the modern roses has passed through so many phases that it is difficult to trace the ancestry of the individual modern rose. China, Persia, Austria, France, Japan have all contributed their quota. *Rosa centifolia* (hundred leaved), the cabbage rose and its varieties, has been a prolific source of hybrids. *Rosa gallica* (French rose) has produced many beautiful hybrids; *Rosa indica* (common China or monthly rose) is also the parent of many varieties; *Rosa lutea* (Austrian briar) has been freely used for fertilising purposes, and is showing together with Persian yellow, a marked effect on the colour of the most modern roses. *Rosa rugosa* of Japan, *Rosa multiflora* of China, the Ayrshire rose, *Repens hybrida*, *Rosa abyssina*, have all given so many hybrids as to make classification difficult. Rarely are true strains of roses grown to-day, the hybrids giving more wealth of bloom, diversity of colouring and having considerably extended the flowering season from the short period of the parent's habitat to the almost continuous bloom to be found in very temperate gardens. So of recent years, culture, with fashionable and variable degrees of popularity, has been mainly devoted to Hybrid Perpetual Roses, varieties of which were most numerous prior to the introduction of Hybrid Teas. This is a rapidly dwindling class and is now only represented in catalogues by a very few varieties,

chief among which are Hugh Dickson and Frau Karl Druschki. Characteristics of this class are vigour of constitution, substance of bloom and purity of single colouring.

Tea-scented Roses were at one stage most popular as the range of yellow shades was confined almost entirely to this class. Plants grow well, though of tender habit, requiring sparse pruning, and their delightful fragrance is generally appreciated.

Hybrid Tea Roses have now superseded all others, being a combination of the most desirable characteristics of others, plus superior constitutions, free flowering habits, and wide range of adaptability.

Pernetianias.

Hybrids recently evolved by Pernot Ducher, possess most glorious colourings and are yearly becoming more popular. The first introduction of these, however, did not succeed well in this Dominion; later introductions have better constitution, but in the warmer parts an excessive amount of die-back is prevalent. Perhaps the use of a different stock will finally solve the problem of successful establishment.

Climbers.

During the past eight years great advancement has been made in the extension of this class. Strains of Hybrid Tea have been used so that now most of the good varieties are available with climbing habit.

Stocks.

These are members of the rose family more easily propagated from cuttings than the finer varieties of cultivated roses. The first essential of a good stock is ease of propagation and freedom of root action. The only root stocks known a few years ago were briars of the *Rosa canina* (dog-rose) type. The robust nature of this stock was used to advantage to increase the height of rose plants but was a slow means of increasing numbers. The procurement and growing of stocks of this class was at one time a special feature of nursery work of Europe and quite an elaborate method of culture was evolved. These methods are not of importance in this Dominion and need not be discussed here, other than to remark that where "standard" roses are grown the dog rose is still the most universal stock, though such rampant growers as Frau Karl and Crimson Rambler are

sometimes used. Some sixty years ago *Rosa manetti* was introduced from Italy, and to-day probably more roses are worked on this stock than any other. A free rooting variety from cuttings, a most rampant grower, a wide range of affinity to varieties, it has maintained the popularity so easily gained. Even with stocks as with more perfect flowers, selection of types towards perfection has been practised. W. E. Lippiatt, the renowned rosarian of Otahuhu, has given this Dominion the improved manetti, known to the nursery trade as Lippia's manetti, and much appreciated as an advancement beyond the original Italian stock. The only other stock in general use to-day is *Polyanthus simplex*, quite a suitable stock, but of late years it has given way to the easily propagated manetti.

Propagation.

Though roses may be propagated in a variety of ways the practical methods may be summarised as seeds, buds, cuttings. Propagation of roses from seed is seldom resorted to except for the raising of new and improved varieties. Except for the fascination of so doing, it is hardly worth while to raise rose plants in this way, but as most people like to assist nature in creation, this method of propagation may be touched upon.

Independent of any efforts at cross-fertilisation, towards the end of the season hips will be found on quite a large number of plants—these, by the way, enhance the value of rose cultivation by extending the decorative season into the autumn berry class of ornamentation. For propagating purposes, these should be gathered as soon as ripe and placed aside in a dry, sunny place to dry. When dry, break up the hips, clean the seeds, and sow at once, or keep in a dry place until spring, though autumn sowing is to be preferred, as the rose is included in the class of seeds which germinate most freely when fresh. The seed may be sown outside in rows sufficiently wide apart to allow weeding. Rose seeds are notorious for their lack of uniformity in germination. Some few come away and make nice roselets first season. Others germinate at various periods up to two years, and many never grow. This lack of uniformity of germination is matched by the erratic growth of seedlings. Some germinate only to stagnate for quite a period, during which many wither and die off; others quickly make good plants and then perish, as though all energy had been expended and the young rootlets were not happy in the

soil conditions. There are, however, many which, from the start, grow in quite a robust manner and continue to do well, but it is noticeable that the more robust seedlings usually develop single blooms of the least desirable type. During autumn the roselets of suitable size are planted into rows as trial flowering quarters. Under ordinary cultivation flowers could not be expected until the second year, though more will flower at three years, old and some not till five years. Many disappointments will be experienced, and five per cent. of the flowers may be single, and a large proportion will be worthless—during evolution of the modern rose so many factors have been introduced as to make very uncertain the progeny of any particular cross—these often revert to a very primitive type. Nevertheless, most of the finest roses of to-day have been secured by rosarians well versed in the science of cross-fertilisation along definite lines, but this work requires specialisation over many years in order to determine with intelligent forethought the cross most likely to succeed. This work is also considerably retarded owing to the sparse seeding habit of many good roses. First flowers rarely indicate any other definite character than colour. Substance and form is not early pronounced or fixed under a year or two. It is important to note this, otherwise a perfect rose may be lost through hasty elimination. Where it is desired to hasten flowering, this may be done by using the bud wood of the seedling for working on older stock. The production of roses from seed is a lengthy process, but quite a fascinating branch of horticulture, being full of pleasant expectation—hardly any two seedlings are alike in habit, foliage, thorns or flowers, and at any period a wonderful new rose may open.

Buds.

This form of vegetative reproduction is based on the principle of each dormant bud being endowed with like characteristics to the plant from which it is taken, and is the surest and best method yet devised for the rapid multiplication of existing varieties. Single buds may be rooted into the soil, though this method of propagation is less desirable and more uncertain than even cuttings. Budding of roses, as generally practised, consists of inserting a single bud of the desired variety into a plant with a well-established root system, so that the bud shall form the head and use the root force of the established

plant immediately union takes place. The first consideration as to stock is that the stock shall be in good mechanical condition to receive the bud, that is to say, the bark should lift freely from the wood. Not only is this necessary to ensure a free entry for the bud, but a movement of sap is very necessary to heal the union. The circulation of sap is not all that is desired in this connection, but also well elaborated sap. Buds inserted with the first flush of sap in spring rarely take freely. Usually a gum is formed which prevents union. The most desirable period to insert buds is after the plants have made full foliage and prior to the hardening of the bark tissue. Some little judgment is required to select the best period for maximum results, but the deciding factor is that the bark should lie freely about mid-summer.

As might be expected, there is a condition of the bud most favourable to propagation. Buds from flowered wood should be chosen rather than from sappy or rank wood growth. Of the various qualities of buds available, the plump round buds are to be preferred to long, thin buds; the former have a greater reserve of food supply to enable them to bridge the period of self-maintenance prior to union. Well matured buds, but not showing growth, should be selected—these will usually be found on the lower part of the season's growth.

The practice of budding consists of making a slit in the bark of the stock (in the case of bush roses some three inches above ground), gently raising the bark so as not to lacerate the tissue—this is facilitated if the perpendicular slit is crossed as the letter "T" and the bark gently loosed from the upper corners. The bud of the desired variety is then prepared by cutting with a shield-like bark attachment, gently inserted under the bark of the stock and bound into position with raffia or similar tying material. Some of the points most essential for success are: Sever from the parent body only sufficient wood for immediate requirements and keep moist. Use a sharp knife and handle the bud carefully to prevent bruising. Half an inch or so of attached leaf stalk provides a good handle, and also a separator for the tying material. Cut the bud from the stick only when the stock has been prepared to receive it and insert without delay. The bud should be placed centrally in the cut bark, and the top portion cut so as to abut up to the firm bark. Tying should be done as soon as the bud is in position,

the drying effect of air seriously interfering with rapid union. Begin at the base, pass the tying material several times under the bud, and then a few times above. The function of the tie is to render the parts immovable and exclude air. Wrapping should therefore be firm, but not so tight as to injure the bark; always leave the eye of the bud uncovered. Within two or three weeks after insertion buds will either have become united or have died out. When union has taken place there is a risk of the ties causing damage equal to strangulation; it is therefore advisable to cut through the tying material to allow expansion. Throughout the following winter these buds should be allowed to remain dormant; if, however, some start into growth they should be pinched back to within three leaves of the base and not allowed to grow weakly shoots, as would be the case if un-stopped. The following winter the whole of the stock above bud union is cut away, and the resultant growth comes from the inserted bud. The young shoot should be kept well staked or tied to prevent breaking off, as a considerable length of tender growth is made very rapidly. From this onward the plant should be treated as a rose, and any suckers or side growth arising from the stock should be properly suppressed.

Cuttings

This is the general method adopted to propagate Rambler and Climbing roses. Cuttings of current season's wood are selected in late autumn. The best type of cutting is well matured wood about one foot long. All the buds are removed from the lower half, a clean, straight cut made under a node, and the cuttings inserted into well firmed but sandy soil.

Site.

The site and aspects on which roses may be grown exceed the range of most other cultivated plants. The natural home is so diverse and the native roses of so many countries have been mixed that there is hardly a place in the world to-day where this flower cannot be successfully grown. It may be found as a summer bloom in Greenland, and blooms quite well in the short summer there. It is at home in Central Asia and Mexico, but is generally acknowledged to attain perfection in England and France. Under the climatic conditions of the warmer parts of this Dominion the rose is in almost a constant state of vegetation, which, as might be expected, shortens the

life of the plant. With the ease of propagation and low cost of new plants, this, after all, is not a serious drawback, though more general satisfaction would be secured by rose growers if plants were more frequently renewed. Soil most conducive to success is heavy loam to clay loam, well drained, though if attention is paid to preparation of the land and more frequent renewals, a great profusion of bloom, though probably of lesser quality, may be grown on the lighter volcanic soils.

Preparation of Land Important

The modern stocks have such a free rooting habit of a rather fibrous nature that deep preparation of land is necessary to encourage root run and develop the stronger roots. With very shallow soils the majority of the roots are near the surface and so subject to climatic changes of which drought causes most damage, though on very heavy close land, sour sap condition of the roots is found unless well drained. The land should be dug at least two spits deep, and a liberal amount of rough vegetable refuse or stable manure mixed with the subsoil. It is preferable that the whole area be worked over, not merely the working of a pothole where the plant is to be planted. An even distribution of the manure over a wide area encourages root run and gives more vigour to the plant by increased feeding area. Autumn is no doubt the best time to prepare the land. At this time the heavy lands are more easily broken up and the risk of consolidation not so great as when worked in winter. Early preparation is also an advantage for light soils, allowing better settlement of the land. On no account should the land be worked when sticky, as the soil must be well turned, which is impossible when sticky. When turning over the land the heavier subsoil mixed with manure should be replaced at the bottom and the surface soil left in as rough a state as possible to allow thorough aeration. Use is sometimes made of artificial manures at time of preparing the land. These are rarely necessary if a liberal application of decayed stable manure is made. If however, owing to any special poverty of the soil, artificial manures are used, they should be thoroughly mixed with the soil and not used to excess owing to the risk of burning the young rootlets, basic slag, 1lb. per square yard, being preferable.

Planting.

The first care is to look over the root system of the plant and cut back all

broken roots. The hole to receive the plant should be made sufficiently large to allow the even distribution and wide spacing of roots without cramping. The depth of planting should be as near as possible that at which the plants were previously grown in the nursery. The commonest error is that of planting too deep—following deep planting the roots are slower in activity, and frequently function very poorly indeed. When bush roses are planted to an equal or greater depth than the bud union, the plant often makes root independent of the stock—by some growers this is held to be desirable, but in the main it is not in the best interests of the plant and is to be avoided if possible. By addition of mulches which the rose bed or plants receive each year, the land is gradually built up, so that if originally planted deep it becomes necessary to remove soil from time to time to prevent partial submergence of the bush. Soil should be placed in among the roots at planting time and firmed to ensure close contact with the roots—air pockets in unevenly worked soil are very detrimental to establishment as also is the gathering of roots together in a ball. As the hole is filled up the top soil should be allowed to remain rather open though the plant should stand quite firm in the well-trodden under soil.

During the transfer of the plant from nursing bed to permanent quarters, a good deal of the root-system has been destroyed; in order to restore balance between root and top rather severe pruning is advisable. At least two-thirds of the failures to establish may be attributed to the lack of sufficiently severe cutting back at planting time; leaving only 4-6 inches of growth, has been found to give best results, though cutting back to two buds only is sometimes resorted to. As to where to plant, there are roses for most purposes—climbing, bush and trailing. One of the most prominent features of the history of rose culture is that for some reason they have been most generally recommended for planting in a strictly formal manner, generally in a special rose garden—usually in beds where nothing else is grown. With a plant so accommodating to any situation this centralisation has been gradually abandoned, more particularly in colonial gardens, and the rose is now found adding its brilliancy and diffusing fragrance in every part of the garden.

Manurial Treatment.

The roots of this plant thrive best in a cool, moist soil; in order to procure this condition as much as possible dur-

ing summer, a mulch covering of several inches is laid on the soil surface. Litter of many descriptions is used for this purpose, but the best results are obtained by using half decayed stable manure, which besides providing the necessary mulch has also a decided manurial value. This should be dug in during autumn and the land dressed with basic slag, 6ozs. to the plant. Just prior to the commencement of growth in spring the land should be well forked over to work in 4ozs. superphosphate and 1oz. of sulphate of ammonia. During the flowering period if stimulants are needed a quick-acting liquid manure is made by dissolving: 1oz. Nitrate of Potash and 1oz. Sulphate of Ammonia to 1 gallon water.

Pruning.

Though there is great diversity of opinion on this subject, the rose is a most accommodating plant and generally succeeds in flowering regardless of treatment. Pruning of the rose for training purposes to such stiff-formed plants as adorned the gardens of the Victorian age, need little consideration as they are rarely applied to the modern garden. Ramblers, climbers, and bush roses are the three classes of plants most generally grown to-day.

Ramblers.

The Wichuraiana class present the least complication in pruning. Each season new canes are made from the base of the plant. During the next season short laterals grow from these canes and on this growth the bloom is carried. The only form of pruning required is the entire removal of these canes after the flowering period is over, after which the new shoots may be trained in their stead. Unless all old canes are cut out each season this class of rose soon becomes stagnated and decrepit.

Climbing Roses.

The strong rods of this class are of a rather permanent nature, usually along the full length of these rods side laterals are formed which carry the bloom. These are dealt with by winter pruning, being cut back to within three or four buds of the base of the season's growth. By a continuation of this practice a constant supply of new wood is maintained. A common fault with this class of rose is undue extension and excessive growth towards the end of the rods, causing die-back of shoots nearer the base, which results in the lower parts being unfurnished. In order to correct this rather severe pruning of extensions is required. Renewal of main wood in climbing roses

is usually possible by fostering any good strong shoot which comes from near the base which may later be used to replace the aged rods. Whenever such a shoot appears which can be used for this purpose it should be adopted for replacement purposes, as by far the better blooms are carried on such young wood. Some varieties, particularly the most modern introductions, respond well to a light summer pruning. If the flowering shoots are cut about half way back when removing dead blooms or picking flowers, a continuation of flower is secured well into the autumn.

Bush Roses.

These constitute the greatest bulk of the roses grown. In pruning these the chief object should be to produce, as far as possible, new wood. As seen at winter pruning time these bushes will consist of strong shoots grown the previous summer and older wood with side branches. All of the older wood should be removed to the base or to a strong young growth near the base; the previous season's growth should then be shortened back to approximately one-third its length, though there is no hard and fast rule in this—the class of rose and vigour of growth decide each plant on its merits according to condition. In the main, the more robust the variety and plant the lighter it may be cut, and rather heavy pruning of the lighter growers. During the following growing season side shoots will appear which carry the first bloom and strong new shoots are made which usually terminate in a cluster of bloom—these when cut back are all that are allowed to remain after the next winter pruning.

When to prune is a most debated point, but the consensus of opinion is towards the end of July for the main pruning, and lightly pruning flowered shoots during early summer, after the bloom is over, will produce quite good autumn blooms.

Rose Mildew.

This disease is apparent by the mildewed deposit on foliage buds and wood. The first attack usually takes place early in the summer, but the severity is not noticeable as there is only a light growth of downy mould—nevertheless this is the stage which gives rise to the innumerable summer spores which in turn cause the more general epidemic and serious form of late mid-summer. This later attack is more noticeable owing to the thick grey felt-like growth. Though more damage is done by the late attack it is important in control to deal with the early summer attack, as by so doing the severity of later infection is decreased. As with most plant diseases some

varieties are so prone to attack that growth is interfered with to the extent of causing death of the plant. From the very early history of mildew control, sulphur in some form or other has given best results. Flowers of sulphur 2 parts, lime 1 part, used as a dust, gives quite good results, when well continued during the season. Commercial Lime Sulphur—1 part to 80 of water—is also good, but is considerably improved by the addition of sulphur paste—1lb. to 5 gallons. Masee, the world renowned authority on fungous diseases, places his faith in sulphuric acid 1-1,500 as a cure, but whatever be used, the important point to remember is—prevention is more to be relied upon than cure, so start dusting or spraying early in the season.

There is the also to be feared black mildew which is not readily seen except as reddish black spots, but nevertheless does considerable damage among cultivated roses. The chief symptoms of this disease are, young vigorous leaves droop and fall off at the slightest movement of the branch, the shoot also becomes limp and dies back.

Rose Rust.

The spring infection arises from resting spores which have wintered over on fallen leaves. First indications are spots of deep orange colour on young shoots and leaves which destroy the parts affected and change from dark brown orange spots to dusty black on the undersides of the leaves. Control consists of destroying all fallen leaves during autumn, and spraying the plants with Bordeaux mixture 8-6-40, or sulphate of copper—1lb. to 15 gallons, during winter.

Rose-leaf Blotch.

This is often confused with rose rust, though it is really a distinct disease; typical purple blotches are formed which are even more distinctive to foliage. The control is, however, the same, and no other special precautions are necessary.

Insect Pests.

Of the insect pests Aphis is the most troublesome, usually becoming most plentiful as young buds are showing on the plants. These green flies multiply so rapidly as to cover all the young growth unless the early brood is killed. Each of these insects draws on the sap of the plant for food, and with countless numbers living on the plant, no wonder the plant is devitalised and prevented from growing well developed blooms. Apart from the damage done to the plant the presence of these insects gives rise to the black sooty deposit so disfiguring to foliage and opening bloom. To ensure thorough control, it is necessary to deal

with this pest early and frequently; early, because the few first generations, if left undisturbed, multiply to millions before the season is over; and frequently, owing to the overlapping broods and the rapidity of multiplication of the few unkilld by spraying. The modern nicotine concentrates give excellent results, even when used as dilute as 1 part to 1,000 parts of soapy water. Since the introduction of tobacco, nicotine in water has been the standard specific for aphid. Tobacco dust, leaves or stems, are steeped in water, the general recommendation being to use the colour of weak tea—this is a variable colour according to the individual user. Modern extracts of nicotine are, however, concentrated to a standard strength of 40 per cent., giving more definite strength in dilution, and consequently more uniformity of control; though Gishurst's compound—the old remedy—is still used extensively by professional gardeners.

Rose Scales.

The most common of these is White Rose Scale, usually found on old wood—particularly very old wood—of climbing roses. During winter the scale insect deposits eggs under the scaly covering which hatch in early spring and travel to the newer wood growth—once a suitable location is found the minute insect inserts its beak and lives on the plant juices. At this stage a moult takes place—the insect loses its legs and commences to secrete a waxy substance which forms the visible scale. When a heavy infestation is present the drain on the plant is sufficient to cause a serious setback, and whatever blooms develop are of poor quality owing to under-nourishment.

The life cycle of Black Scale is very similar, so for all practical purposes the

same control measures will apply. Possibly the most difficult scales to deal with are those established on old wood in the semi-permanent framework of climbing plants. The most desirable way is to remove all scale-infested wood at the time of winter pruning; while this is a comparatively easy matter with bush roses, there are plants where it is not possible. Prepared red spraying oil—1 part to 15 of water—applied during early winter, will kill scales which are covered. Plants grown alongside painted buildings where spraying is undesirable, may be dressed with this mixture, using a rather stiff paint brush. As this insect is at one stage of its life history uncovered by scale, it follows that at such a time the pest is more easily killed. Gishurst's Compound or Nicotine, as used for green fly, will deal with most of the young unprotected insects.

Control measures for pests and diseases of the rose are very naturally assisted by good healthy growth of the plant; judicious pruning, good cultivation and liberal manuring are therefore part of the programme. With plant diseases of all kinds, prevention is rather to be aimed at than a cure. In order to guard as much as possible against expected visitations, the following spray schedule is recommended:—

After Pruning.—Bordeaux mixture—8-6-40.

Spring.—Lime Sulphur—1-100, plus Nicotine, 1-1,000.

Early winter.—Spraying Oil—1 part to 15 parts water.

Summer.—Sulphur and Lime Dust, with occasional sprayings of Nicotine 1-1,000, and Lime Sulphur 1-80.

Autumn.—Thorough distribution of all fallen leaves.

A National Garden Project for Preservation of Native Flora.

SUGGESTED ESTABLISHMENT IN WELLINGTON OR DUNEDIN.

A NEW ZEALAND NATIONAL BOTANICAL GARDEN.

At a conference of the New Zealand Institute of Horticulture, held in Dunedin on January 26, the Hon. G. M. Thomson, M.L.C., moved the adoption of the following remit, which had been forwarded by the Dunedin Horticultural Society: "That it is desirable that a

New Zealand national botanical garden be established."

Mr. Thomson said that the primary object of such a garden would be to collect and cultivate as large a collection as possible of the plants of the whole world, particularly those remark-

able for the beauty of their flowers, foliage and form, and also those which were of commercial value. The main consideration, next to finance, was climate. Suitable soils could be found to suit the needs of the various plants, but climate could not be controlled, and its variations could be met only to a limited extent artificially. In a cold climate the plants of warmer regions could be cultivated under glass and by means of artificial heat, but in a warm climate it was impossible to cultivate successfully the plants of a colder region.

"Every large centre of population should have its botanical garden as an educational institution for old and young like, contributing not only to the aesthetic tastes and enjoyment of the people, but furnishing a continual object-lesson to all interested in horticulture and in the beautifying of their own homes and of their home towns," continued Mr. Thomson. "The wise custodian of such a garden will carefully limit his efforts to the production of those effects most suited to the climate and conditions of the locality. The ideal botanical garden of the world is Kew, where plants from all parts of the world are collected together, where every appliance of horticultural skill is employed, and where everyone can go and learn at first hand what is known of the possibilities of plant growth. But the object of the resolution which I desire to commend to your notice today is not the formation of such a universal garden. Its aim is to gather together a collection of all the indigenous plants of New Zealand, and is exclusive of all exotic species. The reasons for the establishment of a purely national New Zealand botanical garden are very good and sufficient.

"New Zealand is the most distant from any other land area of the large island areas of the world. In one direction only it comes within about 1200 miles of Australia, the nearest large land area. Northwards it lies still further from some small island groups in Melanesia and Polynesia; towards the south it is more than twice as far from the Antarctic Continent, where practically no plant life exists at the present era; while to the east are thousands of miles of deep ocean. This isolation of New Zealand from all other land surfaces took place long ago—how long I cannot state either in years or in terms of geological age. For, while the flora is more allied to that of the Australian than any other region, the separation of the lands certainly occurred

before Eastern Australia received its eucalypts or its acacias and other characteristic forms, and also before it received any of its mammals. Similarly there are Melanesian and Polynesian elements in our flora, and more puzzling than any are the South American and Antarctic elements; but all these imply long periods of isolation. The period which has elapsed has given time for the development of many special types of vegetation.

"It is outside the scope of my resolution to go into this subject; but I may just mention such genera as *Myosotidium* in the Chatham Islands, *Pleurophyllum* and *Stilbocarpa* in the Southern Island and *Haastia* on our South Island mountains, as examples of plants which must have taken very long periods to develop their peculiar and distinctive characters. Now, it is to study all this interesting and fascinating flora that a national botanical garden should be established. Here every type of native plant should, if possible, be cultivated; many of the problems of development could be studied, not only by cultivation, but by experiment. For example: In the new edition of the 'Manual of the New Zealand Flora,' the late Mr. Cheeseman enumerates and describes 1584 species of flowering plants. It is quite certain that a considerable number of these so-called species—e.g., of *Veronica*, *Celmisia*, *Epilobium*, etc.—are either merely varietal forms or are hybrids between well-defined species. It will be possible by artificial crossing to establish what are and what are not specific forms; and it is certain also, that by such crossing many new and interesting varieties will be raised, of great value from a horticultural point of view. Such a national garden would become to New Zealand what Kew is to the Empire—a place of reference for all sorts of native plants, and a centre of distribution of desirable forms. The possibilities of usefulness are great, and the opportunity should now be taken of impressing on the Government the advisability of establishing such a garden. The expense would be relatively small, especially at the outset, and the station would soon justify its foundation and continuance.

"The next question is one of location. A national garden should be situated near one of the main centres, preferably near one of the university colleges. In considering this question, it is all important to know the composition of our flora. Of the 1584 species described in the Manual, 192 (or a little over 12 per cent) are confined to the North Island,

and do not extend to the South Island. On the other hand, 536 (or nearly 34 per cent are confined to the South Island), This is due to the fact, no doubt, that geologically the South Island is much older than the north and its vegetation has had much longer time to develop distinct forms and races. Again, 300 species (or nearly 22 per cent) are only met with at or above an elevation of 2000 feet on the mountains. Such mountain plants are always more or less difficult to cultivate at low levels, and are liable under altered conditions to undergo important modifications. Lastly, 109 species are only found in the outlying islands, and of these, about one-half come from the sub-antarctic islands. This great preponderance of southern and mountain forms rules Auckland out at once. Its climate is too warm for these plants. Christchurch is almost equally out of the running; its climate is too cold in winter, and its hot no-westers make it very difficult to keep many plants alive throughout the season. I am looking at the question solely from a botanical point of view when I affirm that the national garden should either be in Wellington or Dunedin.

"The mean annual temperature of Wellington is 55.3deg F., and the rainfall 48.9in on 168.8 days. The corresponding figures for Dunedin are 50.6deg F., 36.85in on 159.2 days. There is not much to chose between them, but Dunedin has less sunshine and more drizzling rain than Wellington. From a gardener's point of view these are not disadvantages. Wellington suffers much more than Dunedin from high winds and gales, but these can be countered to some extent.

In conclusion, Mr. Thomson stated that Dunedin had the land available for such a purpose as that proposed, and that the 65 acres on the Town Belt, above the Botanic Gardens, controlled by the Domain Board, would suit admirably. The city had also a valuable asset in the number of resident botanical and horticultural enthusiasts, several of whom had collections of native plants, especially the mountain varieties, which were not equalled anywhere outside of Otago. From all these points of view, and eliminating all parochial and sentimental reasons, he thought it must be admitted that Dunedin was the most suitable place for such a national botanical garden.

Mr. J. G. McKenzie (curator of the Wellington Gardens), in seconding the motion, said that there could be no two opinions regarding the necessity of establishing national botanical gardens.

Sir George Fenwick supported the motion, and stated that Mr. Thomson had very truly stated the position when advocating a centralised collection of native plants. He seconded the motion on broad lines, and did not propose to advocate the selection of either Dunedin or Wellington as the centre in which the national garden should be established. He agreed that conditions were more favourable in Dunedin and Wellington than in any of the other centres. He would not specially urge that Dunedin be selected, but he would stress the care given in the cultivation of native plants in this city, and he knew that equal care could and would be given in Wellington. Continuing, Sir George said that the common opinion was that New Zealand native plants were not sufficiently highly coloured to be attractive. He, too, had more or less subscribed to that opinion, but after having for the past three or four years given a good deal of attention to the cultivation of New Zealand's native flora, he was convinced that beyond the mere attraction of colour, the average man would find a great deal of interest in the cultivation and study of these plants. Veronicas alone afforded a wide field for observation, as did also ranunculus and olearia. In his own garden he had an olearia which was a picture, and many other native plants did most decidedly show a great deal of colour. He thought that it was time that a move was made towards the establishment of a national botanical garden which would stimulate public interest in the cultivation and care of native flora.

Mr. Tannock (director of the City Reserves), in supporting the proposal, said that as a "Kewite" and as one who appreciated the value of a national garden, he thought it advisable that we should set about the establishment of a national botanical garden in which the Government would take an interest. It was important, however, that it should be a collection of living plants, most of which could be grown without the least trouble. He would not say definitely that the garden should be established in Dunedin, but there could be no doubt that Dunedin was specially favoured, for the growing of native plants. It had been found that there was no difficulty in acclimatizing Alpine plants in Dunedin, and though the idea was prevalent that a rock garden was essential for their successful cultivation, these plants could be grown quite easily without a rockery. It was a mistake also to suppose that Native plants could be grown

only in botanical gardens. He could instance some splendid shows of Native flora in the gardens of Sir Geo. Fenwick and Messrs. Thomson Bros., at Halfway Bush. Mr. Tannock also stressed the need for introducing plants from other countries, and pointed out that such an institution as the proposed garden would be a valuable medium for the interchange of indigenous plants and seeds between New Zealand and other parts of the world. The people of the Dominion were not up-to-date unless they united and got a garden which would be a pleasure not only to them, but to visitors.

Dr. Chilton (Canterbury College) said that he looked on the matter from a scientific point of view. As a teacher of botany, he was aware of the difficulties that existed in obtaining living plants for demonstration purposes. It was necessary to stress that scientific men must be in charge of such a garden as that proposed, and which would also provide openings for trained horticulturists. He would suggest that in addition to one central garden, there should also be established subsidiary gardens in the various centres. Reciprocity would thus be established between these centres, which would be of great value to the movement. He would admit that Otago's claims to having the national garden were strong, and

what appealed to him more was the human element, it having been clearly demonstrated that people of Otago took an interest in the care and cultivation of their native plants. He, however, would strongly advocate the establishment of a national botanical garden with subsidiary gardens in the various centres. The famous Dutch naturalist, Dr. Lhotsky, when in New Zealand, was most enthusiastic over the variety of the Dominion's indigenous flora, which was unequalled in any part of the world, and other countries wanted specimens. The difficulty of supplying these would be eliminated by the establishment of a national botanical garden.

Mr. H. L. Christie warmly supported the proposal, and stressed the great danger of many species of our native plants dying out completely. A national garden would eliminate this danger.

Mr. G. A. Green (secretary of the institute), suggested that the proposal could be run on the same lines as the New Zealand University with its subsidiary colleges. He felt sure that if the people were appealed to, their patriotism and sympathy, would smooth away all financial difficulties. If the people could supply the money, it was more than possible that the Government could be successfully approached with a view to granting a £ for £ subsidy.



Flowering Trees and Shrubs.

Written for the New Zealand Institute of Horticulture.

By JAMES A. McPHERSON, F.R.H.S.; D.S.N.H.

Rhododendrons.

During the last ten years great changes have been taking place in the realms of horticulture. Gradually the stiff formal carpet-bedding has been done away with; there are less hard and formal lines found in the lay-out of private and public parks and gardens of to-day, and we ask ourselves the reason why. The simple reason is that hundreds and hundreds of magnificent alpine trees and shrubs have reached us from the far-flung corners of the earth, plants which, to show their glory to perfection, must never take part in stiff and formal garden design. They have a beauty of their own. This fact being realised by our best horticulturists has given rise to the grace and natural designs of our gardens to-day. Not a small part has been played by flowering trees and shrubs, leading many horticulturists of high standing to specialise in this particular branch.

To such plant-hunters as Farrer, Wilson, Kingdom, Ward and Forrest, we are indebted for the many magnificent flowering trees and shrubs introduced from Mongolia, Western China and Tibet. Enduring hardships known only to a few, they have unveiled the magnificent flora of these regions. A few years ago the Himalayas were looked upon as the headquarters of the genus *Rhododendron*; but Ward and Forrest have shown us that the greater bulk of them lie hidden in Upper Burma, Tibet and the Chinese provinces of Hu-peh, Szechuan and Yunnan. Thus we have had brought to our gardens over one thousand species of this genus alone.

The purpose of this article, however, lies not in following the botanical explorations in the countries named, but to place before readers some of the magnificent trees and shrubs from these and other regions, including also North and South America. Some have graced our gardens for a considerable period, others are only recent arrivals, while some are not yet in this fair land of ours.

Deplorable is the fact that we are so far behind in botanical and horticultural introductions, especially when we are aware of the fact that the fault lies within our own doors. Had New Zealand

had her own National Botanic Garden, many fine trees and shrubs, not to mention other classes of plants, would now be gracing her public and private gardens. At present there is no system in our introduction of new plants and seeds, while, on the other hand, those horticulturists abroad who are only too willing to help us by exchanging seeds and plants for seeds and plants of New Zealand flora lament the fact of our country not having a central station for systematic exchange. It is a recognised fact, not only by those competent to judge here, but by horticulturists in England and America, that New Zealand possesses the finest climate in the world for the growth of trees and shrubs, those withstanding severe climatic conditions growing in the South, while the more tender ones would grace the North, and all within a few hundred miles of one another.

Since rhododendrons have been mentioned, let us glance at a few of the newer species, leaving to one side all the garden hybrids and any that are as yet under the collectors' numbers. It is safe to suggest that once we realise the glory of the new species we will drop for ever the majority of garden hybrids, retaining only a few of outstanding merit, such as Pink Pearl, Alice, Loder's White, and a few others. W. J. Bean, author of "Trees and Shrubs Hardy in the British Isles," once expressed the opinion to the writer that New Zealand was an ideal country for *Rhododendrons*. Many species which are grown indoors in England will find comfortable quarters outdoors in New Zealand. When planting *Rhododendrons* it is essential to remember that the larger the leaf the more protection they require from winds. The smaller Alpine species, on the other hand, grow on the mountains in China in the way that heather graces the hills of Scotland, but being at a very high elevation they are constantly moistened with mists, and require a well-drained but moist place if planted as an alpine shrub.

Beginning with the large-leaved species, we find standing above all others a forest rhododendron with leaves of enormous size, sometimes being 2ft. or more in length and fairly wide. It was discovered by Forrest on the N'Maikha

Salween divide, in north-east Upper Burma, in 1919. This forest rhododendron has not bloomed in cultivation, seed being collected by Forrest from plants which grew to a height of 80ft. I know of only two small specimens in New Zealand. It goes under the name of *R. giganteum*, and is aptly named.

R. sino-grande also has leaves 2ft. or more in length, flowers of a creamy-white, with a crimson blotch.

R. fictolacteam grows to a height of 25ft. The leaves are very large and covered on the under surface with a mat of reddish-brown hairs. The flowers are white, with a crimson blotch.

A very useful species is *R. decorum*, perfectly hardy, leaves 6in. to 8in. long, and bearing loose trusses of white waxy blooms. It grows to a height of 15ft. Its close relation, *R. discolor*, is even better, with white flowers, each flower being 3in. long and 5in. across.

R. sutchuenense, hailing from Hupeh, produces heavy trusses of pale rose campanulate-shaped blooms, and grows to a height of 10ft.

Another white-flowered species of the same height as *sutchuenense* is *R. argyrophyllum*, with large leaves covered on the under surface with a white tomentum.

In 1914 Forrest found on the Yangtze-Mekong divide a large rhododendron with leaves 8in. long. This is now named *R. glischrum*, meaning "sticky," on account of the sticky nature of the young shoots. It forms a fine specimen, with funnel-shaped rose-pink blossoms.

R. Falconeri, though introduced from Sikkim as early as 1848, has not spread far in our gardens. It forms a fine small tree 20ft to 30ft high, with oval leaves 12in. long, covered on the under-surface with rust-coloured tomentum. The creamy white flowers have a crimson blotch towards the base, are bell-shaped, and often 3in. across.

Perhaps these species may not appeal to the general reader, but they are worthy of a place along with others of similar size, in gardens where room and shelter can be given them, their bold and handsome foliage being a picture in itself.

Of a type more suitable for most gardens are those species which grow to a height of between 3ft. and 6ft. In this group we find many fine flowered specimens. *R. orbiculare* is one of the finest in cultivation. It has medium-sized rounded leaves, and forms a compact bush. Its flowers are campanulate, of the richest rose colour, and borne in loose trusses.

R. Thompsoni, introduced many years ago from the Himalayas, is known to many gardeners as a splendid plant. The leaves are small and oval, and the flowers bell-shaped, very waxy and stiff, with a colour of bright blood-red.

R. cyanocarpum, belonging to the same series as the two just mentioned, is a very hardy plant, with bluish-white bell-shaped flowers.

R. bullatum, as its name implies, has bullate leaves, covered on the under-surface with a mat of thick felt-like hairs. Its flowers are white, tinged with yellow at the base, and it is one of the sweetest scented rhododendrons in cultivation.

R. campylocarpum is perhaps the finest yellow flowered rhododendron in cultivation. It has been in cultivation for many years, but is rare as yet in New Zealand gardens.

From the Shweli-Salween divide comes a species with rounded leaves 2in. in length and fine bell-shaped rose-coloured flowers, under the name of *R. callimorphum*. Its growth is very compact, forming neat rounded bushes 4ft. in height.

Smaller in leaf and size of plant is the beautiful *R. Williamsianum*, with small waxy bell-shaped flowers of a rich rose. It is very hardy, and roots well from cuttings and wherever the branches rest on the ground.

R. genesterianum, found at an altitude of 11,500ft. in its native haunts, furnishes us with flowers of a plum-purple colour, covered with a distinct glaucous bloom. It grows to a height of 5ft.

Considered to be one of the finest introduced is *R. haematodes*. It presents a splendid sight when in bloom, each head being made up of four to six broadly bell-shaped flowers carried on decidedly woolly stalks. The flower colour is vivid crimson.

Two others will suffice to demonstrate the beauty of this group, namely *R. racemosum* and *R. yunnanense*. The former covers many acres of hillside in its native habitat. Its flowers are small and crowded into rounded heads. It is seen to advantage when planted in masses, and owing to its smallness of leaf it has been used for small hedges to protect more tender species.

R. yunnanense is a very floriferous and accommodating plant, producing a wealth of loose pink blossoms in almost any situation.

Lastly, there remains to be considered a very valuable and striking group of the genus, valuable on account of their adaptability for rock gardens and striking on account of the minuteness of their flowers and foliage. These

are the dwarf species, very few of which have reached many New Zealand gardens, though they strike readily from cuttings treated in the same manner as heaths, and germinate rapidly from seed. It has been known for *R. impeditum* to flower 18 months from seed sowing. This particular rhododendron never grows more than 1ft. in height, and forms compact little bushes after the style of some species of our dwarf veronicas. It has light purple-blue flowers. The size of the flowers is in keeping with its very small dark green leaves. Discovered on the Lichiang Range, Yunnan, at an elevation of 15,500ft., it delights in a cool, moist, yet exposed corner of the rock garden.

R. Hippophaeoides, as its name implies, resembles in leaf the sea buck thorn. It grows to a height of 2ft and has bluish, rose-coloured flowers.

Resembling in many respects a daphne is *R. ledoides*, hailing from an altitude of 13,000ft in Yunnan. It is a very hardy dwarf plant with thick leathery little leaves, and grows from 1ft to 2ft in height. The flowers are white, with a sprinkling of rose through them.

Yellow flowers are rare among the dwarf species; but fortunately we have two good species to fill the gap; these are *R. chryseum* and *R. flavidum*, both worthy of cultivation.

Growing only to a height of 18in, and yet producing flowers 2in across, is the remarkable *R. calostrotum*. The flowers are rose-coloured and hide the plant when in full bloom. It is easily raised from seed and cuttings.

One of the most remarkable of all dwarf species is *R. repens*. It creeps along the ground, never rising above 2in in height, and produces flowers of a blood red colour.

There are many species besides those mentioned in these short notes well worthy of cultivation, but space does not permit their mention. However, one must admit that the genus is one worthy of greater cultivation. Those privileged to inspect the great collections at Kew, Edinburgh, and the collection of members of the Rhododendron Society, England, have many times been impressed with their magnitude and magnificence.

To assist those already taking up the study of this genus, and as a guide to those contemplating, the following books on the subject will be found very useful:—

"Rhododendrons for Amateurs," by E. H. M. Cox; price 5/ (publishers, Country Life). This is a fine little book by an enthusiastic collector

and grower, brimful of sane and practical knowledge.

"Rhododendrons, Their Names and Addresses," by E. H. Wilding; price £1 1/ (publishers, Sefton, Praed and Co., Ltd., London). A little book containing the names of all known species, date of introduction, natural habitat, height, colour of flowers, etc. This book is small enough to fit comfortably into the pocket, and is useful when inspecting collections.

"Trees and Shrubs, Hardy, in the British Isles," W. J. Bean. Its well-known author has a large chapter devoted to the hardy species of Rhododendrons.

Until our collections are larger, the great work on "Rhododendrons" by Millais, will not be required for some time.

Magnolias.

Stately in both leaves and flowers, Magnolias are regarded among the most handsome of our flowering plants in the garden. Except for early spring frosts, which sometimes nip the buds of the early flowering varieties, they may be regarded in New Zealand as fairly hardy plants. The genus has a wide natural distribution, one section occurring in the Eastern United States and the other having its species scattered in India, China and Japan.

Transplanting is the most delicate stage in a Magnolia's career, a great mistake being made in transplanting too early in the season. The roots of all species being very fleshy are liable to damage and it is advisable never to shift young plants until growth has begun. Once placed in their new positions they benefit greatly if watered twice a week with warm—not hot—water. This saves many a plant from settling down to a two years' period of recovery. They are lovers of rich, well drained soil, always handsomely repaying any extra care and attention bestowed upon them; the sunnier and more sheltered their position the quicker their growth.

Propagation is carried out by means of seed, layers and grafts. If obtainable, seed always produces the better plants. Hybrids do not come true from seeds, and are best layered. Grafting, as with most plants of our gardens, should be a last resource. Unfortunately, the seed loses its vitality quickly, and such methods as wrapping each seed in wax or packing the seeds in charcoal have been used by collectors in forwarding new species to their destination. If, however, seeds of

our well-known species are obtainable, it is advisable to sow them immediately, even if it be in the depth of winter, by placing several seeds in small pots and giving them a little bottom heat in the propagating house.

Layering is the next best method of increase and perhaps most used by our nurserymen in raising fresh plants. Any branches near the ground may be used for layering. If these are unobtainable, dig round the plant in spring and lever it gently over on to its side sufficiently for some of the branches to touch the ground. Next, bend the branches down to the soil surface to ascertain where best they will lie with the least amount of strain to the branches themselves. Fork over the soil in which the layers are to be placed, adding plenty of sharp sand and a little leaf mould. Peg down all available branches, taking a thin peeling off the sides next to the soil surface. Hammer the pegs in firmly and cover with 3in to 4in of sandy soil, turning the tips of the branches as upright as possible without breaking them. Lastly, water the layers well to settle the soil about them. They require no further attention unless the season becomes very dry, when they may need several waterings. When the time comes for shifting them great care must be exercised in order to avoid damage to the tender fleshy rootlets.

Some species as yet rare in our gardens are grafted on to *M. acuminata* and *M. Kobus*; but, as before stated, grafting should be a last resource. Practically all *Magnolias* are deciduous, only three being evergreen.

Fairly common in our gardens is *M. Conspicua*, the Yulan or lily tree. It grows to a height of 30 feet, flowers early in spring, producing a mass of pure white blossoms each three inches long. It is a native of China, where it has been in cultivation for over 1000 years.

For magnificent growth and foliage *M. acuminata* is ideal, but it possesses only small greenish yellow flowers. Owing to its great seeding abilities, however, it is used as a stock for grafting.

Magnolia grandiflora, from the south-east United States, is another evergreen, but is enriched with large creamy white flowers, globular in shape, and often ten inches across. It is very fragrant, and blooms in late summer and autumn.

Commonly known as the Swamp Bay is *M. glauca*. Unlike other species it does not produce a wealth of blossom at one time, but keeps flowering off and on from

November to January. The flowers are globular and three inches wide, being beautifully scented. It is practically deciduous, but some plants retain their leaves the whole year.

Magnolia Fraseri is another American species, its native home being South Carolina. The leaves are often sixteen inches long, and the creamy white petals form a flower eight inches across, making up a very attractive plant.

Magnolia macrophylla excels in size of leaf, being often two feet to three feet long. It forms a large tree, and has fragrant cream flowers, often twelve inches across.

Perhaps the most magnificent of the genus is *M. Campbellii*. It is a native of Sikkim, Himalaya, where it attains a height of 150 feet. It is perfectly hardy, but suffers occasionally from the attacks of late frosts. It is one of the most beautiful trees I have ever seen in flower. The petals are very fleshy, five inches long, and form a cup-shaped flower. In colours they are rose-pink, but I saw a specimen near Paris with crimson blossoms, a real feast to the eyes.

Magnolia stellata is a dwarf shrub which never fails to attract attention in early spring, with its masses of small star-shaped blooms covering often the entire plant. I believe in placing it among the twelve best flowering shrubs for a small garden. It comes from Fujiyama, Japan, and if rain, winds, or frosts destroy the first bloom, it produces a second crop.

A shy little plant is *M. parviflora*, producing a few flowers at intervals during spring and summer months. The flowers are only two inches long, but have a ring of crimson stamens in the centre, giving the plant a very attractive appearance. It is a native of Japan and Korea.

Magnolia sadicifolia has slender branches no thicker than the twigs of English beech trees. It forms a perfectly straight upright small tree, and is covered in early spring with small white flowers. It hails from Mount Hakkoda, Japan. I saw it in bloom at the Royal Botanic Gardens, Kew, during 1924. It produces an abundance of seed, and should shortly find its way into many gardens.

A beautiful hybrid is *M. Soulangtana*, raised at Fromont, near Paris, in 1820, and believed to be a cross between *M. conspicua* and *M. obovata*. It is one of the most popular species, differing from *M. conspicua* by the purple colouring

on the petals, and in being more floriferous.

Magnolia Lenei is another popular garden hybrid of the same origin as the preceding; but differs from its parent, *M. conspicua*, in having purplish coloured flowers. It originated accidentally in Lombardy during 1850.

From Yunnan, China, comes an evergreen under the name of *Magnolia Delevayi*; it has smaller leaves and slightly smaller flowers than *M. grandiflora*.

There are other species all worthy of a place in our gardens, such as *M.s. Fraseri*, *Watsoni*, *tripetala*, *Kobus* and

Wilsonii. The last named is a fairly new introduction, and I have not seen it flower; but have seen it strike readily from cuttings in 20 days in sand propagating frames.

There is no doubt that the inclusion of *Magnolias* into our garden lay-out introduces a stateliness in the scheme. The dwarf species for small gardens, the larger ones added to large gardens, and for public parks and city gardens, there is no finer sight in spring than the glory of the azalea garden, dotted with spring blooming *Magnolias* and backed by a background of rich copper-leaved beeches.

No. 2.—SEVERAL MAGNIFICENT, YET LITTLE-KNOWN SPECIES.

From Central and Western China there has gradually come into European gardens one of the most distinctive of all hardy flowering trees. It was discovered as long ago as 1869, but not until 1897 did it make its appearance in Europe, when Pere Farges collected and sent 37 seeds to Maurice de Vilmorin in France. Of these seeds only one germinated, but such vivid descriptions were given by the collectors that in 1899 Messrs. Veitch, the famous English nurserymen, sent out a collector, his main object being that of sending seeds of this wonderful plant to England. E. H. Wilson (now assistant director of the famous Arnold Arboretum, America) was the man chosen. During 1899 and 1902 he sent Home extensive collections of seeds, including several thousand of this special plant, which we now know as *Davidia involucrata*, named in honour of Abbe David its discoverer.

Fortunately this plant has proved very hardy, and when in bloom is a glory of the garden. In its wild state it grows to a height of from 40 to 60 feet. It is a fine open branched tree with bright green heart-shaped leaves, four to six inches long, the apex being drawn out into a long narrow point. The leaf stalks often reach a length of three inches. Were it never to flower it makes a fine ornamental tree, but as stated before the flowers, or properly speaking, the bracts surrounding the flowers are its crowning glory. The flowers proper are insignificant, being inconspicuous and crowded at the end of each flowering stalk. Over each cluster of flowers hang two enormous creamy-white bracts, often six inches in length. The lower bract is always the larger, the upper one being only one third as long. This tree is greatly sought after by

all garden lovers in England and the Continent. I have not seen any very large specimens in New Zealand. One healthy specimen not yet flowered is in the garden of a Dunedin resident. It may be increased by layers, and if obtainable, by seed. The seed coat is very hard and germination often takes two years. It delights in a good moist loamy soil, and flowers during the month of December.

A stately little shrub some twelve feet in height is *Eucryphia pinnatifolia*, discovered in 1845 on the banks of the river Biobio, Chile. It forms a very fine plant, and when in bloom ranks among the elite of flowering shrubs. The flowers, formed of four white petals, are two and a-half inches across, while in their centre are numerous stamens with bright yellow anthers.

Another Chilean species is *E. cordifolia*, but it requires a warmer situation. It has five instead of four petals.

The other two species which complete the genus are natives of Australia, namely *E. Billardieri*, the "Tasmanian Dog-rose Tree," or "Pinkwood;" and *E. Moorei*, the "Wingecarribbee" of Victoria and New South Wales.

All the species are well worthy of cultivation, thriving best in good, rich, moist loam. Botanically, this genus is rather obscure some place it in *Rosaceae*, others placing it separately under *Eucryphiaceae*.

Sister plants to *Eucryphas* for garden effect are the little-known *Stewartias*. Three species are natives of China and Japan, while the other two come from the United States. They come into flower in January and February when flowering shrubs are scarce. Propagation is carried out by means of seeds and layers. Recently it has been found

that they will also strike from cuttings in pure sand with gentle bottom heat.

Stewartia malachodendron forms a graceful shrub twelve to fifteen feet in height. The leaves are ovate tapering towards the base. The flowers are borne singly in the axils of the leaves; coloured white with silky backs to the petals, five going to form each flower. The distinctive part of the flower apart from its five petals is the array of purple stamens with bluish anthers. This shrub in full bloom is very handsome. *S. sinensis* hails from China, and was discovered in 1901. The flowers are slightly smaller, being only two inches across; nevertheless it is a handsome shrub in full bloom.

Another species, *S. pseudo-camellia*, is also worthy of a place in all gardens. Its stamens are incurved and orange-yellow in colour.

The few shrubs mentioned in this article are among the finest we can obtain. Perhaps a little rare as yet so far south of the line, but it should be the earnest endeavour of all nurserymen and horticulturists to push to the fore plants which otherwise would remain obscure for many years and thus help to keep the standard of horticulture in New Zealand on the upward grade.

Zenobia speciosa produces racemes of pure white flowers like large bunches of lily-of-the-valley. It comes from Florida, and never fails to bloom in the spring, if given the same treatment as heaths.

A plant with flowers like *Zenobia*, except that the mouth of each flower is nearly closed, is *Arctostaphylos manzanita*. The leaves are a dull grey-green, very stiff, and the stems of the plant, after the bark has been peeled, are red. *Arctostaphylos* is very difficult to shift. It should be handled with great care. It should be given the same treatment with regard to soil as rhododendrons. The seeds are extremely hard; they take a long time to germinate. Cuttings in bottom heat have proved successful.

For a choice flowering evergreen *Desfontainia spinosa* has few equals. When not in flower it looks very much like a holly. It grows into a fine bush 10ft high, and when in flower is a perfect picture. The flowers, produced in the axils of the leaves, hang downwards on short stalks. They are narrow, funnel-shaped, and about 2in long. Crimson shading to orange scarlet is their colour, and when in full bloom the glossy green foliage makes a charming background for them. It is usually propagated by layering, but cuttings in bottom heat will root readily.

Very unlike the usual holly is *Ilex verticillata*, with oval leaves, which are shed in autumn. It is the "Winterberry" of N.E. America. Plants I have seen in winter time have been covered in bright scarlet berries. It is a useful plant at times when decorations are scarce.

Kolkwitzia amabilis, a very hard name for any plant to carry, comes from Hupeh, in China. The flowers, produced in midsummer, are yellow and pink in colour. They are shaped somewhat like *Abelia* flowers. The leaves and stems are covered in small brown hairs. As yet it is rare, but rapid increase can be made by cuttings.

Schizopogon integrifolia is allied to the hydrangea. It has huge showy bracts in place of outer flowers. In Central China, where it grows as a large climbing shrub, it is reported by collectors to make a wonderful display. I was fortunate in seeing one of the first to flower in the wonderful garden of M. Vilmorin, some eight miles outside Paris, during August, 1924. It is really a handsome plant. The cream-coloured bracts form large heads.

Space does not permit of more that could readily be mentioned. Suffice it to say, that, with the climate we possess, our difficulties in raising new plants are only half of those of many other countries. It is, therefore, the duty of all keen horticulturalists to awaken the desire for better trees and shrubs, and to assist in every way their introduction and distribution.

A word about their cultivation. All good flowering trees and scrubs require proper attention. Even a little extra care and attention are well rewarded. To dig a border and place in it all our choice trees and shrubs is not sufficient. To use a horticultural phrase of great significance, "every plant has a personality." This must be studied by all good gardeners. Our border may suit many plants, but perhaps not *Arctostaphylos manzanita*, which likes coolness at the roots and a peaty soil. We must, therefore, assist it by adding leaf mould and a sprinkling of peat to the soil in which we intend to plant it. *Cytisus*, on the other hand, requires sandy and well-drained soil, so we prepare for requirements.

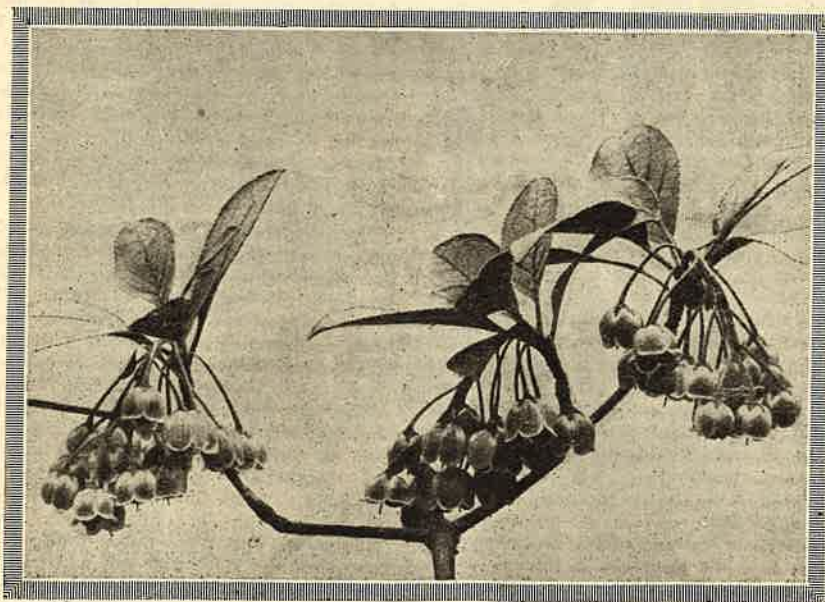
There should be a desire within us to educate ourselves to understand the requirements of these beautiful plants from abroad. We should find where they grow and how they grow in their natural habitat. We should try to provide for their natural environment by various methods in our gardens. They are well worthy of the best attention. Let us try.

No other country in the world possesses so ideal a climate for trees and shrubs as New Zealand. Yet it is a remarkable and lamentable fact that so very few of the magnificent introductions from North America and the East have found their way into our gardens. Why the delay, and who is responsible may be difficult to say. This fact we do know, it has placed New Zealand well down on the list of horticultural enterprise. Some would suggest that nurserymen are to blame, but I believe the individual citizen is responsible, owing to his lack of imagination and keenness to try new plants. Though if the subject were thoroughly thrashed out, the writer would be of the opinion that New Zealand as a whole has herself to blame. She does not possess a long-wanted, long looked for national botanic garden. Exchanges of seeds and plants with other national botanic gardens would have brought to our doors magnificent collections of trees, shrubs and plants, which in their turn would be distributed to the nurserymen for propagation. But, no—New Zealand has not yet awakened to her loss in horticulture. She is still content to listen to the criticisms of horticulturists abroad, and to remain unable to send the native seeds that

other botanic stations require. That a few new species of plants have arrived in New Zealand at all is due entirely to the efforts of a few nurserymen and private individuals in our midst. Shortly we shall be in a sad muddle, for as many of the newer introductions are still under numbers, it only requires a few labels to be lost and there will be chaos. It is, therefore, the duty of every true New Zealander to support and assist the New Zealand Institute of Horticulture. This society, and it alone, is competent to handle horticultural matters from a national point of view, and thus assist one and all by raising horticulture to its rightful place in the Dominion.

Turning once more to trees and shrubs, we find that herald of spring, *Forsythea intermedia*, with an improved variety called *spectabilis*, both worthy of a place in all gardens.

Several varieties of the common broom are becoming fairly popular. The first break away from the old type was *Cytisus dallimorei*, a cross between *C. scoparius* and *C. albus*. The colour of the flower is rosy pink, deepening to crimson on the wing petals. *Cytisus "Dorothy Walpole"* is a more recent hybrid with all the petals a deep crimson



ENKIANTHUS CAMPANULATUS.

There are also several cream varieties, including "Cornish Cream." All *Cytisus* can be raised from cuttings, while sometimes they are grafted on to *Laburnum* for making standards.

Among the many *Philadelphus* (mock oranges) there is one standing out distinctly from its fellows, namely *P. purpureo-maculatus*. It forms a nice shrub with very fragrant flowers $1\frac{1}{2}$ in across.



DEUTZIA LONGIFOLIA.

The petals are white with a large rose-purple blotch at the base. Several other species still under number should appear shortly.

Two new species of Lilac come as an addition to the shrubbery. *Syringa reflexa*, with drooping rose-coloured heads of bloom, and *Syringa wilsonii*. This is a pretty little shrub with semi-bullate leaves and small heads of delicate pink blooms. Both species are easily raised from seed. Plants of the latter are catalogued in New Zealand.

Among the hydrangeas there is one worthy of cultivation for its leaf alone. It has woolly leaves, dark green above, lighter below, and 8 in in length. The

edges are deeply lobed and finely serrated, quite distinct from all other species. It is called *Hydrangea quercifolia*.

Cotoneaster horizontalis is gaining favour as a good plant for dry banks and rock gardens. Its red berries and brilliant autumn foliage are very handsome. There is another species with rounder leaves, but even a dwarf habit which will be much in demand shortly. It hails from Central China and is called *Cotoneaster humifusa*. Other new species are coming on the market some being still under the collector's numbers, such as *cotoneasters*, sp. A 267; sp. Farrer 401; sp. Wilson 5567, etc. (seeds are offered to Fellows by the R.H.S.)

A small leaved *Camellia* is *C. sasanqua*, with pale pink blossoms opening in winter and early spring. A sister plant is *C. Thea*, the tea plant, one of the most important economic plants of to-day. But we have to turn to *Camellia reticulata* for a noble and majestic species. I shall never forget viewing a plant 20ft high and covered with huge rose-coloured blossoms 8 in across. A knot of yellow stamens in the centre of each flower added to the effect. It is propagated by grafting. Only second year wood being used for grafts. First-year wood is always a failure.

Among the many *Berberises* (Barbary) of our garden several recent introductions are gaining favour. These include *B. wilsonae*, *B. parviflora* and *B. francis-ferdinandi*. The plants are well-known for the autumn effects of both foliage and berry. Recently raised hybrids have many splendid varieties among them, including *B. x "Comet"* (aggregata group), *B. x "Firefly"* (rubrostilla group), and *B. x "Coral"* (ferax group).

Hailing from the Himalayas is the magnificent *Buddleia* called *B. colvilei*, too often neglected in our gardens. Its leaves attain a length of 10 in. The flowers are of a rich rosy-crimson. They hang in drooping panicles 6 in in length. It grows to a height of 20 ft in cultivation. As it is slightly tender it is more suited to the North Island climate. *Buddleia alternifolia* of recent introduction is quite distinct from the others. Its leaves are very small, branches drooping. When in flower each branch is covered to its full length with bunches of small sky blue flowers. It will make a very welcome addition to the shrubbery. *B. asiatica* produces long spikes of very fragrant white blooms.

Added now to our collection of *Deutzias* (brides' blossoms) is a very

fine species, *Deutzia longifolia* from Western China. It grows to a height of 6ft. In mid-summer it is covered with trusses of rose-coloured blossoms each 1in in diameter. This is perhaps the finest *Deutzia* brought into cultivation. It is easily raised from cuttings and seed.

A peculiar race of plants belonging to the heath family is the genus *Enkianthus*. About nine species occur. Several look well with their drooping *Andromeda*-shaped bells of white and creamy-yellow flowers streaked with red. In the autumn they are a glory of the garden with their vivid golden and blood-red foliage. They may be raised from seed, layers and cuttings. They require the same treatment as the rhododendron.

Styrax Japonica has now two other species to keep it company. *S. hemsleyanum* is a noble plant with very large

leaves and six inch spikes of pure white flowers. The flowers of *Styrax Japonica* hang from the under side of the branches, whereas *S. hemsleyanum* has its flower spikes standing fairly upright. *Styrax Wilsoni* is a new introduction with small leaves and snow white flowers. It is very floriferous. It commences to flower when it is only 12 months old. It is a shrub for every garden. Both species are raised from seed and cuttings.

Two plants in which the stamens form the conspicuous part of the flower are *Fothergilla Gardeni* and *F. major*. They grow to a height of from 3ft to 6ft, and when in bloom present a gay sight. The white stamens are capped with yellow anthers. In autumn *F. Gardeni* turns a brilliant crimson and the other a golden yellow.



EUCRYPHIA PINNATIFOLIA.



DAVIDIA INVOLOCRATA.



DAVIDIA INVOLOCRATA IN FRUIT.

Daffodil Names.

An important step has been taken by the New Zealand Institute of Horticulture in conjunction with the Royal Horticultural Society for the registration of New Zealand and Australian Daffodil names.

For many years the Royal Horticultural Society has had in operation a scheme for the registration of European Daffodil names. The New Zealand Institute of Horticulture has adopted a similar scheme, and appointed a Narcissus Committee to control it.

The arrangement with the Royal Horticultural Society is that the New Zealand List shall be a supplement to

and on the same lines as The Royal Horticultural Societies' list. It is hoped to publish the supplement by June, and the Royal Horticultural Society is publishing a statement concerning it in its list and making provision for its insertion in the same book as the 1927 Daffodil List.

It is to be hoped that all New Zealand growers will take advantage of this opportunity and at once forward their list of names for registration either to Mr. G. A. Green, Aratorga Avenue, Green Lane, or to Mr. N. R. W. Thomas, 54 Campbell's Building, High Street, Auckland.

Registration of Daffodil Names.

REGULATIONS PASSED BY THE NEW ZEALAND INSTITUTE OF HORTICULTURE.

1. THAT a Register shall be kept by the Secretary of all Daffodils raised in either New Zealand or Australia, such Register to be supplementary to that issued by the R.H.S.

2. THAT lists of names of varieties that are either in commerce or have been exhibited shall be lodged for registration by the 31st January, 1927, accompanied by a fee of 2/6 per list.

3. THAT the Register shall be compiled from the lists so submitted, precedence in names being given to those plants first exhibited.

4. THAT lists of names claimed for daffodils not coming under Clause 2 hereof be received at the same time and be included in the Register when the compilation from the lists referred to in Clause 2 has been finished.

The registration fee to be 1/- per name or 2/6 per list.

5. THAT those registering names of Daffodils, must, after registration, notify the Secretary a few days before the Show at which it is intended to exhibit the flowers of any variety on the register but not previously exhibited.

6. THAT if flowers of plants registered be not exhibited at a recognised Show within **three years** from the date of registration, the registration will lapse and the name, having been erased from the Register, will again become free for adoption.

7. THAT the Register be revised by the month of **November** each year, and varieties of insufficient value shall be placed on a suspense list until finally struck off.



Sub-Tropical Fruit Culture, Auckland District.

Address delivered before the Conference of New Zealand Nurserymen,
at Auckland, on January 5, 1927.

(By W. H. RICE.)

The coastal regions of the North Auckland District, the Auckland Isthmus and the East Coast regions of the Auckland Land District embrace a large area of land which is suitable for the cultivation of semi-sub-tropical fruits.

The range of subject is restricted to those which will endure light frosts periodically, as it is exceptional to find a location which can be depended upon as permanently free from frost. In areas subject to regular frosts many of the more tender plants cannot be grown, so that the balance of the Dominion is available as a home market for the produce. In areas geographically situated as North Auckland, frost usually travels in south western currents which are deflected by hills and encouraged by large open spaces or continuous valleys. The gently northerly slopes of a ridge would usually be found frost-free, or most nearly so, except in such places where side deflections of air currents are caused by foot hills which divert the wind.

However ideal the natural lie of the land, there are very few places which are not improved by growing a good south-west and east shelter belt of sufficient density to prevent more than a gentle movement of air through the plantation. An easterly shelter is more necessary for the sub-tropical class of fruits than the harder temperate ones. Generally they are of a much softer luxuriant growth, easily damaged by high winds, which are frequently experienced from the east, and some protection from the early sun is further advisable, in the case of a light frost to prolong thawing, and thus minimise damage.

The testing and establishment of sub-tropical fruits has been under way since the earlier settlement of the North, the citrus family having proved the most adaptable and profitable. Lemons and oranges were among the early exotics planted in the North, and history shows that they have succeeded or declined according to the amount of attention given. As introduced plants they have never been exactly at home, naturally, but have responded to culture admir-

ably. There are no fruit trees grown here which decline so rapidly when care and attention are withheld; this no doubt accounts for the fact that very few of the earlier plantations are in existence to-day. On the other hand the response to proper culture is so good that the citrus industry has made rapid strides towards economic importance. Lemons in particular may be grown to near perfection.

Some twenty years ago Auckland lemons were exhibited and highly praised and decorated in Australia, and this year, despite the large quantities of citrus grown in the Commonwealth, New Zealand lemons were exported there, and realised approximately £1 per case.

Apart from export, the possibilities are here in the North for development to displace the heavy importation of fresh lemons, candied and pickled peel, essence and oil of lemon, citric acid, etc., and with fruit drinks growing in popularity, there can be no doubt that the markets in this Dominion are capable of absorbing larger quantities of locally grown lemons; but it is apparent that a larger proportion of high-quality product is necessary to hold the local market against the imported lemons.

Probably the most serious drawback to profitable culture of lemons is the large amount of second-grade and cull fruit grown. As might be expected with an introduced plant under conditions variable from the natural habitat, decline is more likely to result naturally, than a disposition to improvement. Therefore, very keen attention and constant vigilance to select the best from which to propagate are required.

New Zealand nurserymen are to be congratulated on having maintained the desirable types to so high a pitch, and it is pleasing to record that every year sees them more enthusiastic in the matter, so that practically the whole of the buds used for propagating this year are from trees specially selected by the Institute of Horticulture. This will do much towards ensuring a larger output of high quality, as, with trees of selec-

tion, the basis is right without which the cultivation would be handicapped. It is of course not all that is required, as constant care and a high degree of skill are needed to bring the trees to profitable perfection; but it is the nurserymen's part to lay the foundation in a manner which will reflect credit on the profession to which he belongs, and bring profit to the Dominion.

The varieties of citrus for commercial planting are somewhat restricted, as attention should be restricted to those of approved merit. New varieties are constantly being introduced and tried out, but it would certainly not be wise to plant on a large scale other than varieties which have proved their worth. Of the lemons Lisbon is favourite—a tree very adaptable to a wide range of soil conditions; good robust constitution, and heavy fruiting habit. Eureka is now grown in approximately the same number as Lisbon, and gives equally good returns of somewhat better shaped fruit. Eureka is a thornless tree, and preferred by some for this reason. A good planting is equal numbers of Lisbon and Eureka—this affords an almost continuous supply of fruits. Villa Franca, Messina, Sicily, are varieties which have been under observation for some years, but have not disclosed any special merit to justify them being planted in preference to Lisbon and Eureka. Genoa and Meyer are of comparatively recent introduction, and are worthy of a trial in a limited way.

Of the preserving oranges the well known Poorman retains its place as the most suitable. Seville is now little grown, being considered too bitter, and Kin Kan, introduced a few years ago, is proving too coarse in texture and far too seedy to be readily acceptable.

There is a decided leaning in this Dominion towards the use of the Poorman orange as breakfast grapefruit, the larger sizes being particularly suitable for this purpose. The true grapefruits, Marsh's seedless and Foster, are both being grown here, but there is no indication that they are worthy of cultivation for profit. The Poorman orange is really a pomelo of sorts, and the larger fruits will meet with keener demand as time goes on and the use of breakfast fruit becomes more general in New Zealand. It is, therefore, a dual purpose orange, preserving and dessert. Though sweet oranges grow well in most parts, they do not thrive with sufficient luxuriance to compete economically with the Pacific Islands and parts of Australia, so until a variety is introduced which will succeed considerably better than any

now grown it would not be wise to undertake sweet orange growing as a commercial proposition, but nevertheless they can be grown quite well for domestic purposes, and there are instances where late fruits are profitably marketed after the Island season is finished. The most satisfactory variety to plant is Valencia Late, as it hangs for a longer period on the tree to mature, while at the same time retains the juice. Navelencia is the next to be preferred, while Best's seedless a variety of local raising does quite well when the trees get older, but does not come into bearing nearly as early as Valencia or Navelencia. St. Michael Jaffa, and Mediterranean Sweet are also grown locally, but are usually smaller in size and variable of quality.

Like the Sweet Orange the mandarin is hardly worthy of extensive cultivation for commerce, but where a few trees are to be grown, Emperor Thorny and Scarlet will give good results. A wide range of the citrus family may be grown as ornamental if not profitable plants and adds charm to the Northern garden.

Another subject worthy of more attention is the Loquat. This highly ornamental tree—*Eriobotrya Japonica*—luxuriates in the North, but is perhaps the most disappointing fruiting tree grown undoubtedly caused by the indiscriminate propagation from seeds. The trees most frequently seen are haphazard fruiters not even maintaining a biennial or triennial fruit habit. This has given a false reputation to a desirable fruit. At present the Loquat is grown more as an ornamental and shelter tree from which fruit is occasionally picked. There are, however, available from nurserymen worked trees of superior quality, varieties which, while quite as ornamental and suitable for shelter trees, have more constancy of fruiting and better quality. The period for marketing Loquats being when other fruits are scarce invariably means good prices, and, when one considers that mainly Australian grown fruit is sold retail here and compares the freedom of growth in this country, one can only assume that better and more constant fruiting varieties would make Loquat growing a profitable sideline from shelter trees or even as a section of a commercial orchard.

Guava.

Plants established throughout the Province show that two species of guava are of wide distribution: *Psidium Cattleyanum* and *Psidium guyava*, the purple and yellow. Of the older plants which are succeeding, the purple predominates, and is undoubtedly the hardier. There are very few aged plants of the yellow

variety, though it is quite common in the nursery of to-day. As domestic plants both are useful, fruiting as they do in the off season and meeting a wide range of uses—preserves, jellies, cooking and dessert. But as a commercial proposition the yellow does not promise as well as the purple. Undoubtedly the fruits are larger and of better dessert quality, a fact which is also known to the birds, who greedily devour most of the yellow fruit grown. The yellow variety is also disposed to shed the fruit when half matured. A very pronounced feature of the older fruiting trees is the wide range of strains grown. Occasionally a plant is found—though under the same conditions—which produces superior sized fruits with a refined seed, while others are not worth cultivation as fruiting plants, though highly ornamental. It should be the duty of every propagator to select from the best type only in order that evolution of this species may be assisted, or adopt vegetative reproduction in order to avoid the wide range to be expected from seedlings. Though there is a very limited area planted in guavas in a methodical orchard way, there is sufficient to indicate that it is not the most economical way to grow them. The most profit from a minimum area of land is returned when these plants are used as a dividing hedge; they thrive best in close company, crop quite well, and provide a very desirable hedge-row, but should not be expected to act as a breakwind to south or south-west winds. Further introduction of allied species might be profitably done, particularly from Norfolk Island, where, I understand, the species common to New Zealand has variations quite superior.

Feljoa.

A warm-climate fruit of recent introduction, which will no doubt become quite popular, is Feijoa-sellowiana, of the myrtle family, a highly ornamental shrub with mid-green foliage, silver on the reverse side. A very symmetrical growth, which carries a profusion of quaint flowers, purple, white and blue, in pleasing combination; the petals are thick, fleshy, and sweetly flavoured. The highly perfumed late autumn fruit, about the size of a walnut, is of a sweet pineapple-strawberry flavour, but lacking acid. Mr. Hayward Wright has some fine specimens which have demonstrated its suitability to the Auckland climate. As an ornamental plant it is to be highly recommended, while the fruit is a decided acquisition.

Passion Fruits.

These are a most accommodating plant to the variable conditions of the

North. Of this branch of the *Granadilla* family the *Passiflora edulis* succeeds to best advantage for commercial purposes. Though the long white variety does quite well, it is most suitable for domestic purposes near the point where it is grown, owing to the softer nature of the rind. Of the purple passion fruit, the Mammoth variety is certainly more attractive, owing to size, but this is the only advantage it possesses over the smaller variety. The ordinary small *edulis* can be depended upon to set a prolific crop, sufficient to compensate for the lack of size, so that the case output per acre is equal. The Mammoth is prone to partial infertility, and produces many semi-hollow fruits, a fault rarely met with in the smaller variety. Fullness of pulp is a great commercial asset, as consumers would soon become dissatisfied with sham fruits, and restrict purchases. The rapidity to wilt and become corrugated after picking is also more pronounced in the Mammoth than in the smaller variety. The ease of cultivation, which is only marred by certain obscure troubles of establishment after transplanting, is such that it is surprising that more extension is not made. Though a plantation is more of a temporary nature than most vine or tree fruits, the time between planting and fruiting is less, so returns are secured much earlier—an advantage with new settlers and others desiring a semi-temporary catch-crop between wide spaced orchard trees. The local markets are capable of absorbing at payable prices considerably more fruit than is at present grown, while the overseas market is as yet only touched. Australia is planting extensively for export to Europe, as fresh fruit and pulp, so that quantities should soon be going forward sufficient to make an impression. So with quality only exported from this Dominion, we can confidently look forward to the best returns from Europe. Quality only is mentioned advisably, as it is only quality which will pay. A large proportion of low grade fruit will seriously affect the profits of the plantation. The Passion is more accommodating than most fruits in so far as fruits of inferior size and appearance may be used for pulp. But, on the other hand, the ease of propagation is such that strains of low quality are more apt to be perpetuated, as to a large extent the propagation is not in the hands of a highly skilled propagator, but undertaken by all and sundry. Every effort should be continued by nurserymen to select seeds of advanced quality and prolonged fruiting habit, and to produce plants which will become known as superior to home-raised, as it is only by such selection that the general average

of quality can be maintained or raised. There is also room for a considerable amount of research work in endeavouring *Granadilla* suitable to conditions here, and it is well within the bounds of horticultural possibility that a hybrid could be raised which may exceed all others in quality and become of great commercial value to the Dominion.

Tree Tomatoes.

Cyphomandia betacea is most luxuriant in growth and prolific in fruiting in localities free from wind and frost; quite profitable crops are grown on plants three years from seed, and though the plants are more or less of a temporary nature, say ten years, the produce is absorbed locally at prices which make growing profitable. The plants will withstand only slight frosts, and their culture is impossible in other places. High winds are very detrimental, and they may make an otherwise suitable locality impracticable for tree tomato culture. Too close or dense a shelter creates conditions suitable to mildew, practically the only disease which affects these plants, so a naturally wind-free situation is to be desired. It is generally conceded that consumers have to acquire a liking for the peculiar flavour before partaking freely of these fruits, nevertheless the demand is quite keen for dessert purposes, while the fruit is eagerly sought after for preserving. Their suitability as pie fruits requires only to be better known to be more appreciated, available as they are in the season of shortage of soft pie fruits. Possibly the greatest improvement on existing varieties could be made in the direction of extending the season, as the very late and slightly out-of-season fruits command luxury prices at present.

Avocado.

An example of a fruiting plant attaining great commercial value in a short space of time is the development of *Persea grattisima* on the American Continent. Two races, natives of the West Indies and Guatamala, have been used to evolve the modern commercial variety, which has been extensively planted in

Florida and California, and is meeting a keen demand in U.S.A.

It is a handsome evergreen tree, mature at from 25 to 30 feet. The fruits are pear shaped, about the size of a large pear, and contain a large single seed. When ripe the skin parts easily from the pulp, which is of firm buttery consistency, and with pepper and salt is a perfect salad in itself. Few people fail to like it, even at first trial. The fruit is highly charged with a nutritious oil, which is quite agreeable to the palate. Plants have been established here for some years, and do quite well in frost-free areas. Mr. A. Davidson, of Tauranga, has fruited some trees, and has a range of varieties under trial, while many other plants are distributed throughout the North. Many nurserymen are now offering plants propagated in the most approved manner to avoid any risk of seedling variations, and it will be highly interesting and probably profitable to foster the establishment of the correct variety in the more sub-tropical parts in the Dominion. It is hardly to be expected that we shall produce such luxuriant fruits as in the tropics, but owing to their susceptibility to fruit fly it is not likely that this market will ever be supplied from outside countries, and the hardier varieties may succeed here quite well enough to give the people the benefit of this highly nutritious and agreeable dessert fruit.

Other sub-tropical fruits known to grow well but not fruit luxuriantly in the Auckland district are:—

Casimiroa edulis—the white Sapota of Vera Cruz; *Zissiphus*—the true jujube; *Punica granatum*—the pomegranate of commerce, and many others, while there are enormous latent possibilities in the adoption of fig culture, providing the right varieties are introduced or raised. In the past, nurserymen have been keen to introduce new or improved varieties, and have raised locally many of outstanding merit, while the present generation of nurserymen are worthily upholding the credit of their profession, and are keenly alive to the possibilities of advancement and the necessity of continuous perseverance to excel.



Forest Nomenclature.

With Special Reference to the Eucalypts.

Written for the Conference of the N.Z. Association of Nurserymen (Incorporated.)

By REV. J. H. SIMMONDS.

In all civilised countries, trees, as well as other plants, have two sets of names. Those of one set have been derived from the common or vernacular language of the people. They vary from country to country. Those of the other set have been deliberately given by scientific men. They have been derived from Greek and Latin, or have been modelled in accordance with the usages of those classic languages. They are the same in all countries. The common or vernacular names are without descriptions of the plants to which they are attached. They are what in Latin would be called *nomina nuda*, or naked names—that is to say, they are names without the clothing of descriptive information about the plants. In contrast with this nakedness of the common names, each scientific botanical name carries with it an exact description of the plant or group of plants to which it is applied.

Oak or Quercus.

The familiar English word oak is commonly associated with a group of trees that bear acorns and produce hard and durable wood. It has a noble place in the history and poetry of the English people. But it does not carry with it a definite description of the trees it designates. With a plastic language and changing circumstances, it may easily become detached from the acorn bearers and attached to other genera. In Australia this has actually happened. There were no oaks in the indigenous forests of that country; but early bushmen, prompted by some fancied resemblance of the fruits to acorns, called *Casuarina* trees and *Grevillea* trees oaks; and the name has clung to those trees ever since. This shows that even the most dignified of vernacular names may be unstable in their attachments.

The generic botanical word for the acorn-bearing group of trees is *Quercus*. It has the same scope and meaning in all countries, and cannot anywhere be used as the name of another genus. The names of its numerous included species are similarly registered and fixed in application. A common name may wander about from one object to another.

A botanical name must keep always to the same object, unless completely changed by the consent and authority of learned men. Without a uniform and constant nomenclature progress in any science would be impossible. Only the exact language of science can record discoveries and pass them on to another generation. Ignorant people sometimes rail against the so-called technicalities of the learned. If they knew a little more, they would understand that, without technical terms and records, we should still be groping our way amongst the most common objects in nature.

Trade is dependent in a hundred ways upon science. This is more clearly realised and more fully admitted every year. Education demands that science and trade shall be in agreement. Discrepancy in nomenclature is inconsistent with such agreement. The trades dependent upon botanical science pressingly need reforms in this respect. The timber trade especially is infected with the vice of calling numerous things by wrong names or by names that are not scientifically defined. It would be easy to multiply examples in support of this statement; but, as space is limited, one must here suffice.

Cedar or Cedrus.

The student learning botany at college is told that the genus *Cedrus* includes three, and only three, species. He learns that one species, *Cedrus deodara*, is indigenous to the Himalaya region in India; a second, *C. libani*, to the Syrian uplands in Asia Minor; and the third, *C. Atlantica*, to mountainous country in North Africa. He is assured that no true cedar tree has ever been found in the natural forests of America. Later he discovers that North-west America is a large exporter of cedar timber. Only after long hours of patient searching in books on botany and forestry does he solve the puzzle by finding that American cedar is juniper wood, or some other wood, with the appearance and odour of cedar, but not botanically connected with the genus *Cedrus*. If the botanical names and common names of the several

timbers were always bracketed together, students would be saved a great deal of trouble and waste of time. And, what is still more important, people engaged in the timber trades would be placed in a position to describe and discuss intelligently the various kinds of wood they have to handle or to offer for sale.

The Eucalypts.

Common or vernacular names are applied to trees and other plants in two quite distinct ways. In the one case, they denote groups of species; in the other, individual or separate species. As group names they may be useful; as specific names they are generally unnecessary, and often misleading. The distinction is very important. It is especially important in the study of the eucalyptus. Botanical research to date has named and described over 350 distinct forms of *Eucalyptus*. The great majority of the forms are ranked as species, a few as hybrids. A considerable percentage of the species fall into natural groups, that have received vernacular names. The validity of the grouping and naming of the groups has been admitted generally by botanists. Where the vernacular names conspicuously fail is not in their application to groups, but in the attempt to use them as specific names. The position will be made clear if we present the case for three of the principal groups by way of illustration.

(a) The "Gums."

A large number of the eucalypts shed their dead bark from their branches and stems, and present a pale-coloured and naked appearance to the eye. These smooth, or naked barked trees, are technically called "gums." They vary over a wide range in botanical characters, and are divided into several sub-groups, the one common character being the naked bark. There are the redgums. They are so called from the red colour of their timber. There are the bluegums, which are supposed to be distinguished by a bluish aspect of foliage and bark. There are the white gums and grey gums so named from the appearance of the bark alone. The one thing common to all these gums, let us repeat, is the shedding of the dead bark and naked appearance of branches and stems. The grouping cannot claim to be scientific, but it stands in a general way for truth, and does not necessarily lead to confusion.

But the moment we attempt to separate one "gum" tree from another by means of vernacular names, we find ourselves in difficulties. We have to use adjectives and epithets that are always liable to be misunderstood and misapplied. If we call *Eucalyptus* *rostrata*

"river redgum" and *Euc. tereticornis* "forest redgum," we leave other "redgums" still to be distinguished and load ourselves with long names to no useful purpose. In a similar way we cumber ourselves with long and quite unnecessary terms if we call *Euc. globulus* "Tasmanian bluegum" and *Euc. saligna* "Sydney bluegum." If we name *Euc. viminalis* "manna gum," we must explain that several other eucalypts exude from their leaves the white, sweet substance called in Australia "manna." If we tell people that *Euc. cladocalyx* is the "sugar gum" we are suggesting a property not possessed by this or any other eucalyptus tree. If we get a little lower down, and call *Euc. coriacea* a "cabbage gum," we shall send people's thoughts to the vegetable garden instead of to the forest. Education by confusion is impossible. The first condition for discerning and remembering truth is clearness. A "gum" tree is not any eucalypt, but a smooth-barked eucalypt; and the smooth-barked group includes several species. To distinguish the species and to exclude all confusion, we must use the botanical names and suppress the vernacular names. In this procedure science and trade must be in agreement.

(b) The "Stringybarks."

Turning from "gums," we find numerous eucalypts that retain their dead bark on their stems and more or less on their branches. In one group the persistent dead bark is distinctly fibrous, or even stringy. The trees are called "stringybarks," and the name as applied to the group is obviously appropriate. But there are fifteen or sixteen members of this "stringybark" group, and the task of discriminating them by adjectives or other words in the vernacular language becomes bafflingly difficult. In strict truth, it becomes impossible. *Euc. obliqua* has sometimes been called the "Tasmanian stringybark"; but the species has a wide range on the mainland as well as on the island, and cannot be properly designated by a name that restricts its habitat to Tasmania. It was thought at one time that "messmate" might be a good name for this tree; but other claimants to this name came in and spoiled the proposal. *Euc. Muelleriana* is sometimes called "yellow stringybark," because of the yellow colouring in its inside bark; but *Euc. eugenioides* often shows the same character. The name thus fails as having a dual application. "Brown stringybark," "white stringybark," and "red stringybark" are all in as bad a case. By different people and in different localities they are all liable to interchange and confusion. Even if these adjectives were appropriate and could stand, there would

not be enough of them to go all round the group. The one feasible conclusion is that here, as in the case of the "gums," the whole of the common names should be suppressed and the botanical names brought exclusively into use.

(c) The "Ironbarks."

"Ironbark" is a group name applied to eucalypts that carry dead bark of a very firm, deeply-furrowed, and non-fibrous character on their stems and main branches. With the progress of research the number of species included in the group has increased from five up to eleven or more. The tests by which we determine an "ironbark" are bark and texture of wood. Leaves and fruits differ with the several species. In the bush and in the timber yards we hear about "grey ironbark," "red ironbark," "narrow-leaved ironbark," and "broad-leaved ironbark." The terms are familiar vernacular names for some of the most valued members of the group. Long usage seems to have given them a secure place in nomenclature. Upon close scrutiny, however, every one of them fails to make good its claim to permanence. *Euc. paniculata* is sometimes described as "grey," sometimes as "white," sometimes as even "red." No one of these adjectives is securely and exclusively wedded to it; no one of them carries a description of the species. The botanical name alone can rescue this eminently valuable tree from uncertainty and confusion. *Euc. sideroxylon* has very red wood, and is commonly called "red ironbark"; but, being unable to maintain a monopoly of the word "red," it, like its congener, must take refuge under the botanical name for positive identification. For a long time *Euc. crebra* was known as the "narrow-leaved ironbark" and *Euc. siderophloia* as the "broad-leaved ironbark"; but now each of those names has another acknowledged claimant in the group, and we are accordingly confronted with uncertainty in using them. Again, the botanical names offer the only refuge from confusion.

Other Groups.

Other fairly well defined groups of the timber-yielding eucalypts are the "boxes," the "peppermints," the "bloodwoods," and the "mahoganies." The group names are sufficiently appropriate to admit of defence, but, when we come to scrutinise closely the common names applied to the several species in each group, we find that most of them fail hopelessly in respect to the conditions that render names for natural objects appropriate, exclusive, and trustworthy.

Lists for Catalogues.

Catalogue makers perhaps need a word

of warning against introducing into their lists the vernacular names of eucalyptus species because of their sound or appearance. Such names as Bangalay, Bimbil Box, Coolabah, Camden Woollubutt, Mountain Ash, Swamp Gum, Tuart, York Gum, and Red Tingle Tingle may be thought to add interest to a catalogue, but in reality they only waste time by diverting the attention of busy foresters and nurserymen away from the things they most urgently need to know to things of relatively trivial importance. The proper place for all these vernacular names is in a historical monograph, not in a working catalogue for the twentieth century. There are strong reasons why even such familiar names as jarrah and karri should step back in favour of the botanically registered *Euc. marginata* and *Euc. diversicolor*. "Blackbutt" means in middle New South Wales *Euc. pilularis*; farther north, in New England, it means *Euc. andrewsi*; away in South-western Australia it is the common name for *Euc. patens*. In New South Wales "spotted gum" usually denotes *Euc. maculata*; in Victoria we may find people calling *Euc. goniocalyx* or *Euc. maideni* by that name. Terms so variable in application are disqualified for use in exact language. Their fitting place, like that of so many others, would be in the suggested historical monograph on the eucalyptus common names for all Australia.

Suggestions.

Very much that might be cited in discussing the nomenclature of the eucalypts has been omitted from this paper for the sake of brevity. But enough has been said to suggest the following conclusions:—

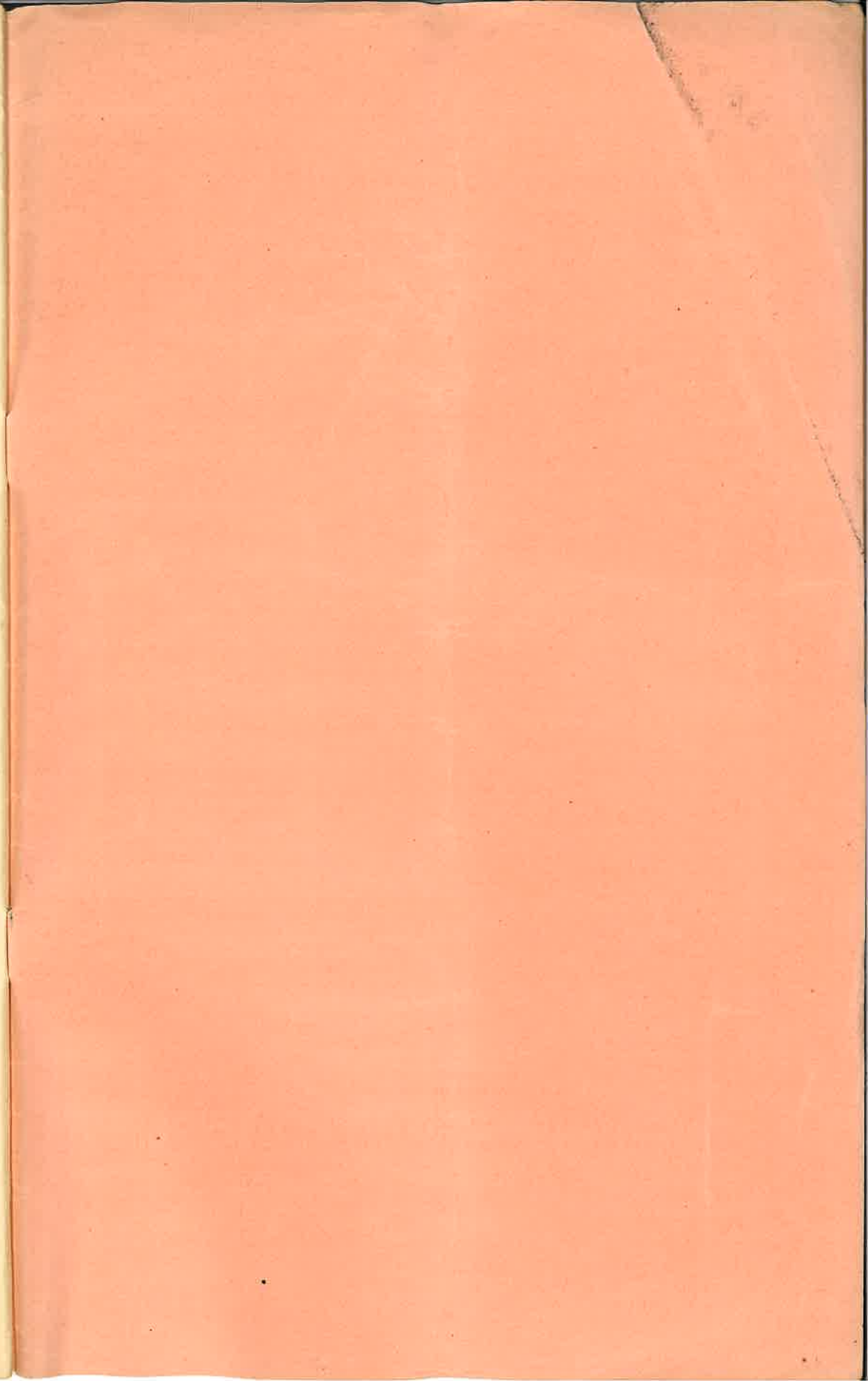
(a) As applied to groups of species, some of the vernacular names are permissible, and even useful.

(b) As applied to separate or individual species, these vernacular names almost invariably lead to uncertainty, and frequently to confusion.

(c) In the interests of both science and trade, the botanical names should be brought more fully into use, and the use of vernacular names everywhere discouraged.

(d) Omission from the catalogues of all vernacular names would make room for instructive notes on the derivation of the scientific names, and on the natural habits and characters of the plants.

(e) Botanists, foresters, nurserymen, and the timber trades should combine to put the nomenclature of timber trees and their products on a thoroughly scientific and business-like footing.



NEW ZEALAND

NATIVE PLANTS

These are specially grown in pots for export. Collections made up to any value and packed to preserve them during the longest transit.

NATIVE FERNS

In these we grow a large collection also Tree Ferns, which can be supplied in any size up to 8 or 9 feet. Tree Fern trunks carry well to Britain and give good results.

T. WAUGH & SONS,

NATIVE PLANT SPECIALISTS.

HUTT VALLEY NURSERIES, - LOWER HUTT.

Also 234 Lambton Quay, Wellington.