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Journal of the New Zealand Institute of Horticulture

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FRUIT GROWING IN NEW ZEALAND.

(Continued).

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Director of the Horticulture Division, Department of Agriculture.

DISEASES.

The orchardist from necessity is compelled to wage a continuous war against insect pests and diseases that invade his orchard, otherwise the health of his trees would deteriorate and the quality of the crop fall below the required standard.

Orchard diseases can be roughly divided into four groups, namely, fungus diseases, sucking insects, chewing insects, and physiological diseases.

Although control measures vary materially with respect to each group, there is a degree of similarity in the treatment obtaining with respect to those coming within the respective groups. Those coming within the general heading of physiological diseases, however, are more obscure and invariably call for individual treatment of a widely dissimilar nature.

The principal diseases in the different groups as far as New Zealand conditions are concerned are: Fungi—brown rot of stone fruits, black spot of apple and pear, and powdery and downy mildew of apple and grape-vine. Sucking insects—red mite; woolly aphis and other aphides; mealy bug; and San Jose, mussel, and other scale insects. Chewing insects—codlin moth and leaf-roller caterpillar.

This general form of grouping is useful only for the purpose of indicating to the grower the nature of any disease he may meet with that is new to him. A much more specific knowledge of the different diseases and their habits is necessary in order that the most effective means of control may be applied.

This does not mean that every orchardist should be an expert mycologist and entomologist. On the contrary, he should not waste his time on the scientific classification, identification, and life-history of the various diseases. Important as these matters are, they can well be left to scientists who have the experience, knowledge, and facilities

for carrying out the necessary investigations; but the grower should become thoroughly acquainted with the diseases he has to contend with from a practical point of view, and, aided by the information available from the scientist, establish a sound system of control. Generally speaking, the more experienced orchardists are fully alive to the position, and are well versed in the control variations necessary, not only with respect to diseases forming the different groups, but in those variations necessary to effect the best results with respect to diseases within each group, seasons of the year, prevailing climatic conditions, etc.; while the inexperienced orchardist can readily secure this and other information in connection with the running of his orchard from the local Orchard Instructor, or from neighbouring growers. The reception of information alone, however, is not sufficient to bring him lasting success; he must absorb such information and make it part and parcel of his own knowledge.

Self-reliance is an essential part of a fruitgrower's stock in trade. The successful orchardist is not one who, through lack of knowledge or confidence, has to seek the advice of someone else before undertaking any particular phase of his orchard work; but rather one who knows and has the necessary confidence and energy to apply his knowledge; and further, he is one who is not satisfied to carry on in a more or less casual way until something of a serious nature is well established before taking steps to meet the position, but on the contrary is one who is constantly endeavouring to anticipate the requirements of each individual tree, and thereby ward off or otherwise be in a position to take timely action towards remedying anything of a serious nature that may threaten any portion of his orchard. The care of his trees should be an intimate and personal matter to the fruitgrower.

While disease-control practices follow the same general plan throughout the fruit-growing districts of the Dominion there are quite a number of modifications introduced into the scheme of things by individual growers for the purpose of meeting real or imaginary variations in their orchards from those generally existing in the locality. Some, for reasons of economy, become too speculative in this regard, to their cost; but, generally speaking, spraying and orchard-sanitation in New Zealand compare favourably with those existing elsewhere.

The latest development in connection with disease-control has been the introduction of what is termed the stationary spraying-system. This system, which is rapidly growing in popularity, consists of the laying down of pipes throughout the orchard, through which the spraying compound is forced under high-pressure by means of a force-pump driven by a suitable stationary engine established in a convenient position in the orchard. The pipes may be run overhead, but in this country they are usually placed below ground; but in this case care should be taken to have them placed sufficiently deep to ensure them against displacement by the cultivating implements. The piping plan usually followed in connection with a ten or fifteen acre orchard is to run a three-quarter-inch main pipe from the pumping station the full length of the orchard between the second and third row of trees. Half-

inch lateral pipes are taken from the main at equal intervals and are carried to the outer boundaries of the orchard. Stand-pipes with high-pressure taps attached, to which the hose is coupled during spraying operations, arise from the laterals at certain intervals. The general practice in connection with stand-pipes is, in each case, to connect a short length of pipe to the lateral and carry it in close to the trunk of a tree at the point selected, bend it upward so that the end of the pipe will rise about two feet above ground level, and lash the pipe firmly to the tree trunk to prevent its becoming displaced through the strain of the hose during spraying operations. The distance between the laterals leading from the main and the taps along the laterals depends upon the number of trees to be sprayed from each stand. It is, however, a mistake to take in too many, as the labour of dragging a long length of hose will be found to be less convenient than the more frequent changing from one stand to another.

With a view to economising in piping, while at the same time not overlooking the question of convenience of working, the popular practice is to carry the laterals from the main along between each eighth and ninth row of trees, with the exception of the first one, which is run between the second and third row, with stand-pipes and taps at every sixth or eighth tree. The former will provide for the spray of 48 trees from each tap, and the latter 64. The lesser number is becoming the most popular.

Apart from the efficiency of the material used there are two important factors to be observed in spraying. One is to spray thoroughly, and the other is to spray at the right time. One essential to the first is high pressure, and this can be relied upon under a properly equipped stationary spraying-system, while the second can be more readily attained under this system than in any other way. In reality, this factor is one of the greatest arguments in its favour. Under this method spraying can be undertaken immediately following the wettest of weather, practically regardless of the condition of the soil; as against the enforced waiting, in the case of a portable outfit, for the soil to dry sufficiently for such an outfit to be operated, a particularly dangerous delay in the case of fungus diseases. Not only does this advantage apply, but there is the further one of being able to push the work forward rapidly by utilizing several additional nozzles at the same time.

FRUIT EXPORT.

Fruitgrowing in New Zealand, owing to the limited population of the country, and its situation in relation to the large centres of population, is perforce restricted in certain directions. Soft fruits cannot in the meantime be safely transported the great distances necessary to find satisfactory markets outside of the country. This fact has restricted our major orchard developments to the raising of those kinds of fruits which, by virtue of their better keeping and carrying qualities, make possible the establishment of a fruit export trade, namely, apples and pears. The shipment of these fruits overseas in

a small way commenced many years ago, but it was not until after the war—1920 in fact—that the export of fruit was earnestly taken up on anything like well-organised lines. Since that time, however, it has grown rapidly, and has been developed on extremely sound lines. Not only has the quantity increased in the ten intervening years from 40,000 cases in 1920 to 1,300,000 in 1930, but the grading, packing, and quality of the fruit itself has been of such a standard as to secure for it the pride of place among all fruits imported into Great Britain and the Continent. This is a very high compliment indeed, and one that is entirely due to the earnestness with which the industry was taken up, and the importance placed upon a sound system of grading and reliability of pack by those concerned in the organisation of the industry.

CO-OPERATIVE SOCIETIES.

In common with other fruit-producing countries, New Zealand fruitgrowers have endeavoured from time to time to improve their position, particularly in connection with the local marketing of fruit, by the formation of co-operative societies. However, notwithstanding the fact that a few such societies are still carrying on more or less satisfactorily, the movement as a whole has been far from successful, other than from the point of view of suggesting what not to do should further attempts be made to improve the growers' lot in this way.

On the other hand, while co-operative societies for the packing and marketing of fruit have not been altogether successful, the fruit industry of the Dominion is largely controlled and assisted by a different form of co-operative society known as the N.Z. Fruitgrowers' Federation, Ltd. This society, as the name suggests, is a federation of the various fruitgrowers' associations, a considerable number of which exist in various parts of the country. The Federation has so far not been actively engaged in the local marketing of fruit, but otherwise interests itself in practically every phase of the industry.

(An article on the operations of the Fruitgrowers' Federation and its sister organisation, the New Zealand Fruit-Export Control Board, will appear in a later issue).

MODERN HYDRANGEAS.

By Thomas Waugh, N.D.H. (N.Z.).

In the following notes it is not my intention to attempt to deal with the subject other than from a purely horticultural point of view and to describe what is being done with modern Hydrangeas to-day.

The Hydrangea of our gardens of a quarter of a century ago has undergone a marvellous change of recent years. Credit for this should be given to the British and Continental raisers, who have given us so many fine varieties, and to the English nurserymen, who have shown (by their exhibits at the various shows) to what a state of perfection they can be grown.

Hydrangeas are amongst the most accommodating of plants we have in our gardens to-day; they will grow in any fair garden soil, but will, of course, do better in well-manured soil and selected position; they flourish in a soil heavily manured (cow manure for preference), with plenty of moisture and partial shade.

If you can select a position which is slightly shaded, especially from the afternoon sun, near running water, or rather lower than the surrounding land, you have an ideal spot. If you have not the whole of these advantages, get as near to them as you can; for, as mentioned previously, Hydrangeas are most accommodating, and will well repay any little extra treatment in the way of thorough preparation of the site previous to planting.

Trench or double-dig the land, thoroughly pulverising the bottom spit, and mix with it a six-inch flower-pot of half-inch bones to each square yard. Do not bring the bottom spit of soil to the top. The top spit of soil is where you should incorporate the animal manure. If you can prepare in this manner some months previously, so much the better. If this has been done, dig the whole with a potato fork before planting.

The simplest plan to double-dig a piece of ground is as follows:—Mark out a trench 2 ft. 6 inches wide the full width of ground to be treated. Wheel the top spit to where you wish to finish. The bottom can then be dug in the usual way and left in the bottom. The top spit from the next trench is then thrown on the top of the first one, and so on until the ground is completed.

Small young plants are the best to start with, and these should be planted when dormant; if pot-grown they can be planted at any time of the year.

In summer planting care must be taken to consolidate the soil around the plants, and plenty of water must be given.

The plants should be encouraged to make as much strong growth as possible during the summer. This is the growth from which you will get the finest flowers next season.

Winter pruning consists in cutting out all the spent and weak growth, and slightly shortening back the stronger growth. This should be sufficiently wide apart to admit air.

Modern Hydrangeas lend themselves wonderfully well in forming a massed effect. You can get a magnificent array of colour by group-

ing several plants of a variety together. Arrange the colours to your fancy, for it is impossible for them to clash. When planting in groups allow about three feet between the plants.

There are in cultivation at the present time a great number of varieties. The following 24 are what I consider the best of the present day varieties:—

Blue Prince.—Rosy red, changing to cornflower blue.

Eclair.—Dark pink, merging on to red. Good truss and very fine form.

Elmar.—A very fine variety with dwarf bushy habit; colour quite a distinct shade of carmine red.

F. Mathes.—A fine strong grower with large truss and fine pip. Colour salmon-rose.

Gertrude Glahn.—A very fine variety; nice stiff habit, very large pip and truss; colour a beautiful rich lilac blue.

Goliath.—A grand variety, with enormous truss and very large individual pips. Colour clear pink.

Helge.—A very compact grower, with a large perfect-shaped truss. Colour soft pink.

Krimhild.—Salmon-rose, brilliant colour.

Lanzelot.—Lovely pink; edge of each petal fimbriated.

Madame Truffant.—Soft rose; fine large truss, very effective.

Marechal Foch.—A fine novelty; good truss; a beautiful rose-pink.

Matador.—Remarkable for its glorious colour, rich salmon-pink.

Mrs. H. J. Jones.—Trusses are immense. Colour is a real Dresden china pink.

Neige Orleanise.—Keeping pure white and in good condition for a very long time.

Niedersachsen.—A very fine variety; mauve pink with large truss.

Parzival.—This variety is most remarkable for the shape of the flower, which is like a Primula.

Pasteur.—Colour deep mauve-pink with white tips.

Peer Gynt.—A wonderful variety; immense truss and large individual pip; colour a rich red rose; unique.

Rhinegold.—A fine strong grower, good bushy habit. Very rich pink.

Rubis.—This is a very remarkable variety, having more real red in its colour than any other variety.

Sensation.—Very large trusses and pips; these are cup-shaped with nice rounded edge. Colour rosy mauve.

Splendour.—A wonderfully free-flowering variety. Colour a pretty shade of salmon-pink.

Vicompte de Vibraye.—Probably the truest blue of all; it only has medium-sized truss and flowers.

Yvonne Cayeux.—Very large truss of dark pink single flowers.

As pot plants for indoor decoration Hydrangeas are glorious; nothing can surpass them in brilliancy of colouring.

One-year-old plants potted into five to six inch pots in the winter should flower profusely in November and December.

FARM FORESTRY.

By Norman Hall.

INTRODUCTORY.

"Les fôrets précédent les peuples,
Les déserts les suivront."—Jacquet.

In the days before the advent of Europeans to New Zealand perhaps no other country had so great a proportion of its area covered by forests; but now, in the course of some ninety years of colonisation, the original forests have been so reduced that they occupy but a small fraction of the original area. That was the period of deforestation. Now we are commencing an era of afforestation, and substantial progress has been made by the State Forest Service and the various private enterprises which are establishing plantations. There still remain the problems of the small owner of land—shelter belts, farm woodlots for the production of firewood and farm timber, and small plantations for the economic utilisation of otherwise waste land. These are problems for the individual, and it is with them that I intend to deal briefly.

Forestry as a science is still in its infancy in this country, but provision for training the future personnel of forest staffs has been made by offering four-year degree courses leading to B. For. Sc. at Auckland and Christchurch university colleges. The course offered includes some twenty subjects, and aims at giving the student a sound training in scientific forestry.

SELECTION OF SPECIES.

The most important step in establishing forest growth is the choice of species to be used. The most careful establishment and tending cannot counteract the effect of a wrong choice of species. Many examples may be seen throughout the country of an unsatisfactory choice of species resulting in valueless plantations. This is particularly noticeable when dealing with Eucalypts. In that genus there are about 300 species, and their natural habitat ranges from the mountains of Victoria and New South Wales where snow occurs, to the coastal belts of Queensland where frosts never occur and the rainfall may be 60 inches or more, and to the arid semi-desert conditions of part of South Australia. Yet in the past species have been planted haphazardly throughout the country, sometimes with excellent, but more frequently with disappointing, results. A species from a frost-free area will not grow in a frosty area, but the reverse does not apply, and there are many examples to be seen of Eucalypts from cool areas being planted in the mild portions of the Auckland province. The trees have grown, but the form of the tree has been poor and it has been more subject to insect and fungus attack—a common

example is the bluegum (*E. globulus*), which was extensively planted from the Bluff to the North Cape prior to its attack by various insects. In the North the bluegum seldom develops a good form, but in the cooler parts of the South Island fine trees are to be seen, as these cooler parts approximate more closely to the natural habitat of the trees in Tasmania.

Another point of great importance is to secure the best strains of any particular species. This is of great importance in the genus Eucalyptus, where frequently several "strains" of one "species" exist. In the past what has been regarded as one species has now been shown to consist of two or even more species, one of which may be an excellent tree while the other is of doubtful value.

Referring to *E. globulus* again, it was known that the "strain" with large fruits (i.e. capsules) in pairs was a good "type," but that the "strains" with smaller fruits, commonly in threes, was a poorer "type," growing to a smaller size and of poorer "form." It has now been shown that two distinct species with distinct characteristics exist; the larger tree is *E. globulus* and the poorer one is *E. bicostata*. The same condition exists among conifers. Several strains of *Pinus pinaster* exist, and the small, scrubby type of *P. ponderosa* has now been raised to varietal rank as *P. ponderosa* var. *scopulorum*.

When dealing with any specific problem we have several factors to take into consideration. First of all the species chosen must be capable of producing the kind of product desired; if we desire to produce naturally-durable fencing-posts in a reasonable time we must restrict our choice to at least moderately-fast-growing trees which early produce a durable heartwood. Having thus partially limited our choice, we further restrict the range of species by considering only those which will grow healthily and vigorously in the locality in which we are going to plant. Such factors as soil, drainage, elevation, exposure to prevailing winds, and so on, are all intimately connected with choice of species. As a general rule we accept the fact that the new environment should approximate to the optimum conditions of the natural habitat of a species, and that while trees may be successfully transferred to a locality somewhat milder than the natural habitat the reverse is not always true. Some species grow satisfactorily over a wide range of environmental conditions, and we then say that they are "adaptable," e.g. *Pinus radiata*.

In the preceding paragraph I have briefly noted a few of the factors which must be taken into consideration when choosing the best species of tree to grow in an untried area. The small grower, however, frequently has a better means of selecting the species to be grown; that is to choose from the species already growing in the locality if any of them are at all suitable. This is better than experimenting with new species. When no suitable species can be found by this method the advice of the State Forest Service, or of a consulting forester, should be secured. This is especially the case when moderately extensive plantations are under consideration.

1. SHELTER BELTS.

The benefit of well-planned shelter on both agricultural and pastoral farms is so great that the number of farms still devoid of appropriate shelter belts is surprising. The existence of short leases and a lack of a proper appreciation of the value of shelter are no doubt the two main causes of this condition. The mere haphazard planting of a few straggly trees does not produce a shelter belt. Again many farmers protest that they do not plant shelter belts because of the area of land occupied by them and thus rendered not available for grazing or cropping. It is acknowledged that shelter belts may occupy an appreciable area of ground, but if well planned this is only a very small percentage of the total area of the farm, and the increased production of pasture and crop, besides the better conditions for animals, compensates many times for any direct loss. This latter point is not fully appreciated by many farmers.

The two most commonly planted species have been *Cupressus macrocarpa* and *Pinus radiata*. The former, due to its wide-spreading habit, is only partially suited for shelter belts, while the latter is not suited for planting close to buildings.

The following characteristics are desirable in trees used for shelter:

a. Dense foliage, preferably evergreen, though in a few special cases the deciduous habit is permissible.
b. The habit of the tree should be conical and the foliage retained to the ground—*Cupressus Lawsoniana* (Lawson Cypress) is an excellent example.
c. Deep-rooted and wind-firm.
d. Moderately fast growing in early life.
e. Of long life and freedom from attack by insects and fungi.

LIST OF SUGGESTED SPECIES.

Recommended: When a shelter is needed as quickly as possible, as around farm buildings, it is suggested that rapid-growing species be used, but with the idea that such belts should eventually be replaced by species adapted to giving good shelter for a long time. Species of rapid early growth, such as most of the Acacias, are very suitable, but they usually thin out after 8-10 years, while many species do not live over 10-15 years. Then species such as *Pinus radiata* or *Eucalyptus Macarthuri* are suitable if planted close to buildings, but due to their large ultimate size such trees cannot be allowed to remain in such situations.

Species for quick shelter: *Acacia decurrens* var. *mollis*—(Black Wattle), and other species of acacia; *Eucalyptus Macarthuri* (this is usually the most suitable species of Eucalypt, but others such as *E. viminalis* may be used); *Pinus radiata*.

The following species are more suitable for shelter belts designed to be of use for long periods of time. This especially applies to

Cupressus Lawsoniana and *Pseudotsuga Douglasii,* which retain their lateral branches for a long time and are of relatively slow growth.

Species for permanent shelter: *Cupressus Lawsoniana* (Lawson Cypress); *C. lusitanica* var. *Benthami; C. macrocarpa; Pseudotsuga Douglasii* (Douglas Fir); *Pinus radiata; P. muricata; Eucalyptus Macarthuri.*

Other suitable species: *Cryptomeria japonica; Pinus laricio* (Corsican Pine); *P. ponderosa* (adapted to the coldest parts of New Zealand where *P. radiata* will not thrive. Of very slow early growth); *Populus fastigiata, P. nigra, P. serotina*: Though these trees are deciduous they are adapted to planting on the Northern boundaries of paddocks, as they allow more sunlight to pass through than do trees with denser, evergreen foliage.

In the last of this series of articles there will be found short descriptive notes on the species suggested for shelter belts, woodlots, and plantations. The reader is referred to these, as there he will find the general characteristics of the species, value of the timber produced, and the general suitability for specific purposes.

2. WOODLOTS.

Here we consider the production of wood for use on the farm—for firewood, fencing, and so on. Some of the properties desirable in wood for such purposes are as follows:—

1. Rapidity of growth, provided that other beneficial factors are not prejudicially affected.
2. Durability.
3. Ease in working, i.e. fissility, ease in nailing, etc.
4. High fuel-value if for firewood.
5. Vigour of growth, and immunity from disease.

Where moderately fertile soils occur the Eucalypts offer a greater possibility than any other group of trees, but it must be remembered that several hundred species exist, and that the choice of the most suitable species is not always an easy matter. Within fifteen to twenty years many Eucalypts will produce timber equal in durability to the best totara, while for the rapid production of good firewood they stand alone. There are other trees of value, but they are generally less suitable than well chosen Eucalypts, which combine the two factors of rapidity of growth and the production of a strong, usually durable timber.

The site of the woodlot should preferably be land that is least suitable for any other purpose. Most farms have at least a few acres of rough, unploughable land which is not of any value except for growing trees.

LIST OF SUGGESTED SPECIES.

Recommended: *Eucalyptus botryoides, E. Macarthuri, E. pilularis. Acacia decurrens* var. *mollis*—(Black Wattle), *Cupressus macrocarpa, Pinus radiata.*

Other suitable species: *Eucalyptus eugenioides, E. Muelleriana, E. obliqua, E. saligna, Pinus muricata, P. pinaster.*

3. PLANTATIONS.

Throughout the country there are areas anywhere from ten or twenty acres up to a thousand or so, which are unsuited for agriculture or even pastoral pursuits and are hence lying waste amongst arable farming land. Such land may be owned by farmers or local bodies. Instead of being a loss these areas could be made productive by the careful establishment of plantations of suitable species. The capital value of such areas is usually small, and the work of establishment could be done during the winter when other work was slack. The choice of species should be left to a professional forester, either a member of the State Forest Service or a consulting forester. Such plantations could be divided into one or two or more areas according to the total acreage, and each area planted with one species only. Only under special circumstances should two or more species be mixed, and then only on professional advice. In mixtures one has to consider relative rates of growth, habits of the various species, relations to light conditions, and so on. Data in New Zealand are still too scarce to recommend arbitrarily any particular mixture. A mixture of Eucalypts and *Cupressus macrocarpa* has been recommended in New Zealand by various persons, but it is very doubtful whether they were foresters.

LIST OF SUGGESTED SPECIES.

Recommended: *Eucalyptus botryoides, E. diversicolor, E. eugenioides, E. fastigiata, E. Muelleriana, E. obliqua, E. pilularis, E. saligna. Pinus pinaster* (synonym *P. maritima*), *P. radiata.*

Other suitable species: *Cupressus macrocarpa, Pseudotsuga Douglasii* (Douglas Fir), *Pinus canariensis, P. ponderosa, P. strobus, Sequoia sempervirens* (Redwood).

(*To be continued*).

REPORT OF EXECUTIVE COUNCIL

FOR THE YEAR ENDED 31ST MARCH, 1930.

The eighth year's work records a distinct advance, especially in the case of education, publications, and membership.

Patrons.—During their term of office in New Zealand Their Excellencies Sir Charles Fergusson, Governor-General, and the Lady Alice Fergusson, were good enough to accept office as Patrons of the Institute, and they ever took a deep interest in the primary industries of the Dominion. Their successors, Lord Bledisloe, Governor General, and Lady Bledisloe, have now kindly consented to act as Patrons.

Lord Bledisloe's great knowledge of and eminent services to the primary industries of the Empire make his acceptance of office a particularly happy one.

Education.—This is fully dealt with in the report of the Examining Board, the members of which are to be congratulated on the excellent manner in which their work has been attended to. The finalizing of the numerous applications for the diploma without examination, the inauguration of regular examinations, and the laying down of satisfactory lines of procedure, have involved much work which has been very effectively carried out.

Journal.—In the past, publications have been confined to the occasional issue of a Bulletin, but in June, 1929, the first quarterly issue of a publication entitled "Journal of the New Zealand Institute of Horticulture" appeared, and regular numbers have been issued since. The Journal is modest in dimensions, but contains much matter of horticultural interest, the records of the annual conference, and information of use to students for the Institute's certificates and diploma. Although the issue of the Journal involves a considerable expenditure it is felt that its educational use is considerable. By providing a tangible return to members the Journal should be of value in extending the membership of the Institute. To the Editor (Mr. W. R. B. Oliver), the members of the Publications Committee, and to those ladies and gentlemen who have been good enough to contribute articles of interest, the Institute owes a deep debt of gratitude.

New Zealand Horticultural Judges' Register.—During the past year the District Councils of the Institute, Horticultural Societies, etc., were invited to supply information for a Supplement to the Register to contain additional names, corrections, etc. A fair amount of information has been secured, and the Supplement will be issued shortly.

Institute Cups, etc.—Four handsome silver cups, purchased by the Institute, have been donated to the Horticultural Societies at Auckland, Wellington, Christchurch, and Dunedin respectively. They are to be known as the "New Zealand Institute of Horticulture Cups" and may not be won outright. The Societies to which the cups were presented have a free hand in fixing the conditions of competition. The Southland District Council has been instrumental in securing two handsome silver cups (donated by Messrs. Skenes Ltd.), one of which is to be used for a country schools' competition for the purpose of securing improved horticultural environment at the schools, while the second cup will be held in rotation by different horticultural societies in the district for such competitions as the holding society may determine. This District Council has also secured the donation (from Messrs. Thomas Bros.) of a handsome shield for furthering the work of the boys' and girls' agricultural clubs in Southland. The conditions of competition have yet to be fixed. The Southland District Council is to be congratulated on their enterprise in securing these incentives to the furtherance of horticulture in the district. If other District Councils can secure similar gifts they would prove of great use in stimulating interest in horticulture.

Loder Cup.—An illustration of the Loder Cup and the rules governing its competition appear in the September, 1929, issue of the Journal. Information regarding the result of the competition appeared in the following issue of the Journal. Messrs. Duncan & Davies Ltd. of New Plymouth were the first winners, the competition being held at Auckland. The Auckland District Council raised funds for the purchase of the winning exhibit and very generously donated it to the Auckland City Council, suggesting that it be used in part for the fernery and the remainder as a nucleus for the botanic garden proper. The next competition (1930) will be held at Dunedin. The competitions for this cup should do much to foster an interest in New Zealand plant life, and assist, in the words of the donor, "the preservation and development of the incomparable flora of New Zealand."

Tulip Nomenclature.—The Royal Horticultural Society appointed a Tulip Nomenclature Committee, representing British and Dutch growers, to undertake, in connection with Tulips, a similar work to that undertaken in connection with Daffodils. The result was a publication entitled "A Tentative List of Tulip Names." A reference to this publication appears in the December, 1929, issue of the Journal of the Institute.

Fruit Nomenclature.—With the object of securing uniformity in fruit nomenclature a Central Committee was tentatively formed, and the interests concerned approached to secure their concurrence in the action taken and an undertaking to accept as final the decisions of the Central Committee. The desired unanimity was secured, and representatives of (a) the Department of Agriculture, (b) the Department of Scientific and Industrial Research, (c) the New Zealand Fruitgrowers' Federation Ltd., (d) New Zealand Fruit Export Control Board, (e) the New Zealand Horticultural Trades' Association, and (f) the New Zealand Institute of Horticulture is now in existence. It is expected that this Committee will be able to do much towards securing uniformity in fruit nomenclature in this Dominion.

Fruit Research.—The Government has set up a Committee for the purpose of fruit research, and the Institute is represented thereon by Mr. F. S. Pope, a member of our Executive Council.

Plant Registration.—Acting on the decision of the Auckland Conference, proposals were drafted for the recording of new varieties of plants, and circulated to District Councils for their consideration and suggestions. These proposals are being finalized, and it is hoped that it may soon be possible to do something for the protection of the discoverers of new varieties of plants.

Bud Selection and Survey.—The research work in connection with citrus fruits, conducted by this Institute in conjunction with the Department of Scientific and Industrial Research, has been continued during the past year. One thousand stocks have been provided for in the Auckland Test Area, and it is expected that the testing of these will be of material value to the citrus industry in New Zealand. The financial contribution made by the Department of Scientific and Indus-

trial Research has been of material assistance in connection with the carrying on of the work, and it is hoped that this help will be continued. The importance of the establishment of a horticultural research station has been placed before the Government.

Dried Fruits.—With a view to the fuller utilisation of present production and the encouragement of further production of fruit the Government has been urged to grant a bonus for the production of dried fruits.

Preservation of Native Bush.—The efforts made for the preservation of the native bush along the route of the Waikaremoana–Te Whaiti Road (about 30 miles long) have been continued throughout the year, and it is hoped that the action being taken may result in the whole of the existing native bush in that area being left intact. In this matter the Hawke's Bay District Council has rendered very valuable service. It has also taken action for the purpose of securing the preservation of native trees, including a Kauri on Maori property at Waipatu and the fencing of an area of White Pine bush. The Auckland District Council has actively interested itself in connection with the Waimauku Kauri bush, the Whakamarama and Puketoki Scenery Reserves, and the exclusion of undesirable growths from Rangitoto Island and the Auckland Domain. This Council has also given valuable assistance to the Auckland City Council regarding the planting of trees and shrubs in connection with the Auckland War Memorial Museum and to the Great South Road Beautifying Council. The Otago District Council interested itself in the better preservation of the scenic reserves in the vicinity of Dunedin, for the declaration of the native bush at Ferguson's Creek as a scenic reserve, and for the preservation of an area of land along the summit of Maungatua as a botanical reserve. The Southland District Council took steps towards the preservation of the Waihopai Scenic Reserve and other areas of interest. For the purpose of assisting the Government in the preservation of scenic reserves throughout the Dominion the Institute has submitted to the Government the names of about 80 ladies and gentlemen willing to act as honorary inspectors. The Government has appreciated the assistance rendered in this way and appointed all of the persons recommended. The activities of the appointees are not confined to the Land District in which they reside, but have been made Dominion-wide. A number of local bodies controlling reserves have agreed to accept the assistance of such honorary inspectors in connection with the scenery reserves under their control. It is desired that there should be an extension of these activities until every District Council has secured the consent and recommended the appointment of suitable persons in their respective districts to act as honorary inspectors. The damage done to our native forests by wild deer is causing much concern, and this Institute heartily supported the proposals of the recent conference called by the Government, viz., that the wild deer should be controlled, even to extinction, should that course be necessary for the effective preservation of our native vegetation.

National Botanic Gardens.—The Institute's representations that a national botanic garden be established received sympathetic consideration, but in view of the existing financial depression nothing tangible can be done at present. This matter will be again brought before the Government when a favourable occasion presents itself. In the meantime a National Botanic Gardens Committee has been set up under the chairmanship of Mr. W. R. B. Oliver and including representation from individual District Councils.

International Horticultural Congress.—This will be held in London during August, 1930, and this Institute will be represented by Mr. T. L. Lancaster, M.Sc., N.D.H. (N.Z.).

Conference of Empire Horticulturists.—This is also being held in London during August, 1930, under the auspices of the Imperial Bureau of Fruit Production, and Mr. Lancaster will represent this Institute. Other New Zealand interests will be represented by the Chairman of the New Zealand Fruit-export Control Board and the Managing Director of the New Zealand Fruitgrowers' Federation Ltd.

Combined Horticultural Conference.—For some time past negotiations had been proceeding for the purpose of securing a combined annual conference of horticultural interests in New Zealand, and as a result such a conference, representing the New Zealand Horticultural Trades' Association, the New Zealand Park Superintendents' Association, and this Institute will be held in Wellington in January, 1931. A skeleton programme has been drawn up by representatives of the interests concerned, and submitted to these bodies for consideration. It is hoped that the proposed conference will materially assist in the furtherance of horticulture in the Dominion.

Organisation.—During the year a District Council has been formed in Southland, the boundaries being those of the Southland Land District. Since its inception this Council has done very good work in giving effect to the programme of the Institute. During the year the membership of the Institute has been materially increased, due largely to the special efforts of several of the District Councils, but in all of the Districts there is still much scope for progress in this respect. During the year the Executive Council has defined the functions of the District Councils with the object of securing a better co-ordination of effort.

Finance.—Although the publication of the Journal has added materially to the expenditure of the Institute the finances continue in a satisfactory condition, due largely to the increased membership. It is anticipated that the issue of the Journal and the educational activities of the Institute will make an appeal to the sympathies of those interested in horticulture, so securing additional members, strengthening the finances, and making possible an extension of the activities of the Institute. During the year the Executive Council decided to set apart all life-membership fees to form the nucleus of an endowment fund, which now stands at £63. Further life-membership, supplemented by donations and bequests, will, it is hoped, soon provide a

Statement of Receipts and Payments for year ended 31st March, 1930.

RECEIPTS.

	£ s. d.	£ s. d.	£ s. d.
Balance brought forward, 1st April, 1929			322 0 11
Subscriptions—			
Individual:			
Arrears	27 13 10		
Current	191 19 3		
In advance	16 5 0		
		235 18 1	
Life members		26 5 0	
Affiliated Societies, etc.—			
Arrears	3 3 0		
Current	40 5 0		
In advance	1 1 0		
		44 9 0	
			306 12 1
Fees—			
Diploma		142 18 0	
Examination		113 18 6	
			256 16 6
Publications—			
Contribution from Cawthron Institute		13 13 4	
Journal advertising		10 0 0	
Journal Sales of copies		0 2 6	
Journal Sales of extracts..		0 19 6	
		24 15 4	
N.Z. Horticultural Judges' Register: Sales		0 3 0	
			24 18 4

PAYMENTS.

	£ s. d.	£ s. d.	£ s. d.
Salaries—			
Dominion Secretary	150 0 0		
Dominion Secty. (Bonus, 1928-29)	100 0 0		
Dominion Secty. (Bonus, 1929-30)	50 0 0		
		300 0 0	
Dominion Organiser		50 0 0	
			350 0 0
Travelling Expenses—			
Dominion Secretary	6 1 10		
Dominion Organiser	11 7 7		
Allowance to Delegates to Annual Conference	8 0 6		
			25 9 11
District Council Capitation Fees—			
Auckland		19 10 8	
Gisborne		1 10 0	
Palmerston North		4 0 0	
Hawke's Bay		5 7 6	
Otago		11 6 5	
Southland		5 12 6	
			47 7 1
Publications—			
Institute's Journal (four issues)			128 17 6
Annual Conference—			
Order Paper		4 2 6	
Sundry Expenses		6 16 4	
			10 18 10

Government Subsidy			100	0	0	Institute Cups: Engraving....				4	0	0
Interest (Post Office Savings Bank)			10	13	2	Educational—						
						Text-books		2	4	0		
						Advertising		0	18	0		
						Printing Certificates		1	5	0		
						Examination Expenses		0	16	6		
											5	3	6
						Refund of Fees—						
						Diploma		13	13	0		
						Examination		4	4	0		
											17	17	0
						Office Expenses—						
						Allowance to Secretary for Rent and Equipment		50	0	0		
						Printing and Stationery....		22	6	10		
						Postages		32	18	7		
						Sundries		4	16	5		
											110	1	10
						Balances at 31st March, 1930—						
						Post Office Savings Bank	292	2	1			
						Bank of New Zealand	24	3	3			
						In hand (Dominion Organiser)	5	0	0			
										321	5	4
			£1021	1	0					£1021	1	0

Statement of Affairs as at 31st March, 1930.

LIABILITIES.	£ s. d.
Endowment Fund	63 0 0
Subscriptions received in advance	19 3 6
Diploma and Examination Fees in suspense	42 0 6
Sundry Creditors	1 13 3
Balance	223 13 1
	£349 10 4

ASSETS.	£ s. d.	£ s. d.
Office Furniture		7 5 0
Diploma Fees due		10 10 0
Sundry Drs. (advertising)		10 10 0
Balances—		
Post Office Savings Bank	292 2 1	
Bank of New Zealand	24 3 3	
Cash (Dominion Organiser)	5 0 0	
		321 5 4
		£349 10 4

Outstanding subscriptions are excluded from the Statement.

A. R. STONE, A.P.A. (N.Z.), Treasurer.

I certify that I have examined the books of the New Zealand Institute of Horticulture (Inc.) and that the above Statement of Receipts and Payments and Statement of Affairs represents, in my opinion, the true position of the Accounts.

LLEWELLYN A. JONES, C.A.N.Z., Auditor.
22nd May, 1930.

sum the interest from which should prove a substantial factor in securing an income which will materially further the objects of the Institute. The work of supplementing this fund is commended to the earnest consideration of District Councils and individual members. During the past year the Government has again made a grant of £100 towards the funds of the Institute, and this has been of material assistance in carrying on the work. The annual accounts for 1929-30 are presented herewith. For his services in auditing these the Executive extends its hearty thanks to Mr. L. A. Jones.

Condolence.—It is with much regret that the Executive has to record the death of Sir George Fenwick of Dunedin, an Honorary Fellow of the Institute and one who, throughout a long career, took a great interest in everything that pertained to horticulture.

Congratulations.—During the year the Institute extended its hearty congratulations to Dr. L. Cockayne, F.R.S., Past President and Honorary Botanist of this Institute, whose eminent services to horticulture received recognition from His Majesty the King, who conferred on Dr. Cockayne the honour of Companion of the Most Distinguished Order of Saint Michael and Saint George.

Overseas Visitors.—During the year Mr. Henry Morse, a prominent rose-grower from England, and Mr. Guy L. Wilson, a noted daffodil-grower from Ireland, visited New Zealand, and were cordially received by the horticultural interests throughout the Dominion. Their visits should do much to stimulate horticultural interest, especially in the flowers in which each is particularly interested.

Ginseng.—In the March, 1930, issue of the Journal is set out a statement of information gathered regarding the cultivation etc. of this plant.

Conclusion.—The success achieved to date augurs well for the future of the Institute. A number of difficulties have already been overcome, and co-ordinated effort on the part of every section will enable the Institute to continue to progress and give effect to its numerous schemes for the advancement of horticulture in this Dominion.

REPORT OF EXAMINING BOARD

FOR THE YEAR ENDED 31st MARCH, 1930.

The educational side of the Institute's work has received considerable attention, and steady progress has been made.

Classes for Students.—The following classes suitable for Institute students are in operation:—

Auckland: Horticulture (Technical College); Botany and Zoology (Technical College).

New Plymouth: Horticulture.
Hastings and Napier: Botany etc.
Wellington: Biology and Horticulture (W.E.A.).
Christchurch: Botany (Technical College and W.E.A.).
Dunedin: Horticulture (Technical College), also practical instruction at the Botanic Gardens.

As opportunity offers it is hoped that classes suitable for the students will be arranged for in other centres. The Examining Board has under consideration the formation of a correspondence class for students who are unable to secure personal tuition, but the number of students so placed is too small to warrant starting such a class at present.

Text Books.—The following text-books have been approved to date:—

1. Percival's "Agricultural Botany" (Morphology, Physiology, and Plant Breeding sections only required).
2. Neve's "Botany."
3. Fernald's "Applied Entomology."
4. Cunningham's "Fungous Diseases of Fruit-Trees in New Zealand and their Remedial Treatment."

For correct spelling and the rules that govern the use of capital and small initial letters with respect to the botanical and proper names of plants:—

5. Nicholson's "Gardeners' Dictionary."
6. Baillie's "Encyclopaedia of American Horticulture."
7. Johnson's "Gardeners' Dictionary."
8. Cockayne's "Cultivation of New Zealand Plants."

Further text-books will be recommended as occasion should require.

Horticultural Diaries.—In the December 1929 issue of the Institute's Journal appear a number of hints to students in connection with the keeping of horticultural diaries, and rules adopted by the Institute concerning the use of capital letters in the names of plants. The Board attaches considerable value to the proper keeping of horticultural diaries by students, and the hints and rules referred to herein should be carefully observed. During their student course, from the date of registration until obtaining the Senior Certificate in Horticulture, students are required to send in at the end of May and October, their diaries, or one week's extract from same for consideration by the Board. Students are then supplied with such comments as the circumstances require. Under the preceding section (Text Books) is given a list of books containing satisfactory guidance in the matter of botanical spelling, etc. The supervision of diaries referred to herein should prove of very considerable educational value to students. Although the examination regulations do not require the keeping of a horticultural diary after the Senior Certificate in Horticulture is secured, students are recommended to continue their horticultural diaries during the whole of their horticultural practice.

Garden Service.—The list of gardens providing qualifying service is being extended from time to time, principally due to enrolment of students employed in gardens not previously listed. In some cases inconvenience is caused to students who are employed in gardens which cannot be classed as fully qualifying, making it necessary for such students to seek work in gardens providing better experience. In such cases, however, it is for the ultimate benefit of the students concerned, as it tends to ensure a wider experience, which cannot fail to improve their training and fit them more fully for higher positions in their profession.

Chemistry and General Science.—It has been decided that class passes at the Technical Colleges at Auckland, Wellington, Christchurch, or Dunedin, or the Technical High Schools at Hamilton, Wanganui, Feilding, or Greymouth may be accepted in lieu of a pass at the Education Department's Intermediate Examination in these subjects.

Examination Questions.—The Board has under consideration the publication of specimen questions for the different examinations, which should be of use to candidates, especially those who cannot obtain class instruction, as indicating the line of study they should pursue in order to meet examination requirements.

Examinations.—A number of individual examinations took place throughout the year, principally for candidates under "Group C" which involved only an oral examination, but it has been decided that, in future, examinations involving written papers shall be confined to June and November each year on dates to be fixed by the Board. The first examination under this arrangement took place on 13th November, 1929. Twelve candidates presented themselves at the four principal centres, with the following results:—

Preliminary: 1 complete and 5 partial passes.
Intermediate: 2 complete and 1 partial pass, and 1 failed.
Professional: 2 complete passes.

Fuller details of the results are set out in the March 1930 issue of the Journal (p. 114).

Up to the present, examinations have been confined to the four principal centres, but occasional examinations may be held in other centres if sufficient candidates are offering and satisfactory arrangements can be made for the conduct of the examination. The professional (diploma) examination will probably continue to be confined to the four principal centres.

In some cases candidates possessing an intimate practical knowledge of only one branch of horticulture have applied for examination. Such candidates were advised of their disability, but, provided their service-qualifications were in order, they were allowed to present themselves for examination.

The *right* to examination for diplomas under Groups "B" or "C" expired at the end of 1929, but the Examining Board has discretionary power to extend the date in special cases should the cir-

cumstances warrant such a course. It is not intended that this discretionary power shall continue indefinitely, and candidates who delay application do so at their own risk.

Diploma in Horticulture (without examination).—The right to apply for the diploma without examination under Section 6 of the New Zealand Institute of Horticulture Act, 1927, expired in October, 1929, as provided by this Act.

Diplomas and Certificates Issued.—Appended to this report is a list of diplomas and certificates issued in addition to those shown in previous annual reports. The following is a summary of the list:—

	Men	*Women*	*Total*
Diploma in Horticulture:			
Without exam. (Section 6)	62	3	65
By exam. (Section 4)	17	1	18
Senior Certificate in Horticulture:			
By exam. (Section 4)	2	1	3
Junior Certificate in Horticulture:			
By exam. (Section 4)	—	1	1
Total	81	6	87

Total issued to date:—

	Men	*Women*	*Total*
Diploma (without exam.)	167	3	170
(Group C exam.)	20	—	20
(Group B exam.)	1	1	2
(equivalent)	1	—	1
Certificates:			
Junior	—	1	1
Senior	2	1	3
Total	191	6	197

Sectional Certificates or Diplomas.—The New Zealand Institute of Horticulture Act, 1927, provides for the granting of diplomas and certificates *in Horticulture,* and to obtain these practical experience and a sound general knowledge of the subject are required. The student course provides for not less than four years in an approved garden before sitting for the Intermediate Examination for the senior certificate in horticulture, and students must subsequently practise horticulture for a further period of two years before sitting for the diploma in horticulture. The garden service specified is essential to provide the practical experience considered necessary for those who aspire to the Institute's certificates or diploma in horticulture. There are, however, a number of persons who become proficient as orchardists, seedsmen, florists, etc., but who do not possess the theoretical general knowledge of horticulture and the practical garden experience necessary to qualify for the existing certificates and diploma in horticulture which the Institute grants. Representations have been made to the Institute that there should be provision to meet such cases by granting a sectional certificate or diploma. To give effect to these suggestions it would be necessary either (a) to secure an amendment to the existing Act, or (b) grant a sectional certificate or

diploma apart altogether from the Act. It is hoped that it may be possible to submit proposals to the January 1931 Conference which may meet the needs of the cases referred to herein.

Standing of the Diploma and Certificates.—In order to secure due recognition for the holders of the Institute's certificates and diploma the Public Service Commissioner and the principal City and Borough Councils in the Dominion were written to recommending that in cases of applications for positions requiring horticultural knowledge preference be given to the holders of the Institute's certificates or diplomas, provided the qualifications in other respects are equal. Favourable replies have been received from the Public Service Commissioner and from a number of the Councils. This result is very satisfactory to the Institute and to those who hold its certificates and diplomas, and will serve to encourage young people adopting a horticultural career to take up the methodical study of horticulture.

General.—A considerable number of students have enrolled for the Institute's course, though so far the number of those who have presented themselves for examination is comparatively small. In a considerable number of cases the students have not yet completed the prescribed garden-service qualification, and in other cases the delay is due to lack of instructional facilities. It is anticipated that each year should see an increasing number of candidates presenting themselves for examination, and in a few years' time the beneficial effect of systematic training in horticulture should be reflected in a higher standard of work, increased production, and the raising of the status of horticulture generally.

List of diplomas and certificates granted under the New Zealand Institute of Horticulture Act, 1927, since the issue of the last Annual Report.

DIPLOMAS IN HORTICULTURE.

Section No. 4.

Adamson, Norman James, Hastings.
Brockie, Walter Boa, Christchurch.
Clist, Alfred Herbert, Devenport.
Combridge, David, Christchurch.
Cone, Frederick William, Christchurch.
Daily, Frederick, Meeanee.
Dallas, William Kerr, Dunedin.
Granger, John Edward, Timaru.
Howden, George, Christchurch.
Lange, Ernest Heinrich Ezart, Feilding.
McPherson, James Anderson, Invercargill.
Murgatroyd (Miss) Olive Gertrude, Balmoral, N. Cy.
Penn, Frank, Cambridge.
Reader, Leonard Leslie, Thames.
Rhodes, Sydney Charles Emmanuel, Dunedin.
Skeates, Edgar Hugh, Auckland.
Smith, Andrew Hendry, Invercargill.
Thomas, Norman Russell Withiel, Auckland.

Section No. 6.

Allan, Ebenezer, Buckland.
Baillie, Herbert, Wadestown.
Baker, Thomas William, Kaitaia.
Bews, John, Sawyer's Bay.
Black, Peter, Palmerston North.
Burt, Henry James, Dunedin.
Cameron, Peter Duthie, Levin.
Causley, Frederick John, Thames.

Cockayne, Leonard, Ngaio.
Cook, Robert William, Gisborne.
Dallenger, Joseph Sidney, Lower Hutt.
Davidson, John Henry, Tauranga.
Emslie, James Watson, Auckland.
Estcourt, Leslie Martin, Nelson.
Fillmore, George John, Auckland.
Fountain, Rupert George Frederick, Dunedin.
Gordon, Thomas Thompson. Nelson.
Green, Alfred William, Hamilton.
Hamilton, Alfred William, Pahiatua.
Hanlon, Lionel, Whangarei.
Harding, Albert Edward, Northcote.
Herd, Ernest Albert, Onehunga.
House, Samuel Ward, Mangere.
Hunter, James, Auckland.
Johnston, Wiliam Samuel, Auckland.
Kent, James, Christchurch.
Kibblewhite (Miss) Elizabeth Frances, Auckland.
Kirk, Harry Borrer, Wellington.
Knowles, George Edward, Timaru.
Lancaster, Thomas Leonard, Auckland.
Lennie, John Arthur, Invercargill.
Lennie, Laurence, Invercargill.
Macdonald, Kenneth Reginald, Whangarei.
McLeod, John Neil, Christchurch.
McMillan, Archibald, Lower Hutt.
Maunder, George Thomas, Gisborne.
Maxwell, Ebenezer, Opunake.
Mergerney, George Reno, Auckland.
Morrison (Mrs.) Jean Davis, New Plymouth.
Morrison, Walter George, Christchurch.
Nathan, Frederick Joseph, Welllington.
Nicholson (Mrs.) Jeannie McOnie, Motueka.
O'Dwyer, Thomas Ignatius, Matamata.
Palmer, Arthur William, Auckland.
Parnell, James, Wanganui.
Pilcher, Charles Frederick, Lower Hutt.
Reid, Edward Arrott, Rarotonga.
Robinson, James Henry, Christchurch.
Rodda, Thomas Edward, Te Kauwhata.
Rollett, Frederick Carr, Auckland.
Short, Frederick William, Manurewa.
Smith, David, Auckland.
Snow, Charles, Te Kauwhata.
Stevenson, James Jackson, Palmerston North.
Stratford, George, Motueka.
Tannock, David, Dunedin.
Thomas, Algernon Phillips Withiel, Auckland.
Thorne, Frederick, Christchurch.
Thorp, John Henry, Nelson.
Turner, George Richard, Auckland.
Willcox, William, Papatoetoe.
Wiltshire, Sidney, Auckland.
Woodward, John Youens, Auckland.
Wright, George William, Auckland.
Zumbach, Emil Frederich, New Plymouth.

SENIOR CERTIFICATE IN HORTICULTURE.

Section No. 4.

Hamilton, Reginald George Iliffe, Hamilton.
Hunter, James Anderson, Auckland.
Watt (Miss), Margaret, Dunedin.

JUNIOR CERTIFICATE IN HORTICULTURE.

Section No. 4.

Martin (Miss), Bina Elizabeth, Dunedin.

EXAMINATION PAPERS

PRELIMINARY EXAMINATION (SYLLABUS NO. 1), JUNE, 1930.

HORTICULTURAL BOTANY.

1. Describe the different types of stems and their modifications, explaining the terms, runners, rhizomes, stolons, rootstocks, sucker, bulb, corm, tuber; *or*
Describe the different types of leaves and their modifications, explaining the terms linear, lanceolate, ovate, cordate, spathulate, serrate, dentate, crenate, pinnate, pinnatifid, palmate.

2. Describe the structure of the stem of a monocotyledonous plant and that of a dicotyledonous one; *or*
   Describe the structure of the growing point of a stem and compare it with that of a root.
3. What is meant by transpiration and respiration? *or*
   How is starch formed by plants?
4. Explain the terms genus, species, and variety; *or*
   Describe the main features of the family Umbelliferae and enumerate the main genera of that family that are found in New Zealand gardens.
5. What are sports and how do they arise? *or*
   What is meant by Mendelian segregation?
6. Describe rose mildew, it's life history, and methods of treatment; *or*
   Give an account of club root and the principal precautions that have to be taken to avoid its spread.
   Note! *Any five only* of the above questions to be answered.
7. *In addition* Describe in technical language the botanical specimen (violet or pansy complete with root, stem, leaf, and flower) supplied by the Supervisor.

PRELIMINARY EXAMINATION (SYLLABUS NO. 1), JUNE, 1930.

HORTICULTURAL ZOOLOGY.

1. Describe the general characters, life history, and habits of the earthworm, and compare them with those of an eelworm.
2. Describe the general structure of the adult, pupal, and larval stages of a beetle and a sawfly.
3. What do you know about Aphides? In what respect are they harmful? Discuss their control by biological, insecticidal, and cultural means.
4. Give the symptoms indicating infestation by (a) Grass grub; (b) Thrips; (c) Codlin moth; (d) Woodlice, (e) Earwigs; (f) Cicada; (g) Red mite.
5. What introduced birds are of value in keeping down insect attacks?
6. What are the main contact insecticides, against what insects should they be used, and at what stages in the insect's development?
7. What are the main methods for avoiding weevil infestation in a grain store?
   Note! *Any six only* of the above questions to be answered.

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

THE PRINCIPLES OF HORTICULTURE.

1. Explain and show by diagrams how the water-table is influenced by tile or other drainage, and explain why soils become more fertile when drained.

2. Weed seeds will be dormant in the soil for many years, but germinate when it is disturbed. Explain exactly why this is so?
3. What do you understand by the stratification of seeds, and why is this done in preference to sowing the seeds directly in the soil?
4. What are the main effects of lime in the soil? Under what conditions should it be used?
5. What is meant by green manuring? And name six crops for the purpose.
6. Enumerate the principal phosphatic fertilisers and state the circumstances in which you would use any one of them.
7. Discuss the effects of surface cultivation and compare them with those brought about by deep cultivation.
8. How would you set about to produce a new variety of potato?
9. What plants would you use in your own locality to supply winter flowers?

Note! *Any six only* of the above questions to be answered.

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

THE PRACTICE OF HORTICULTURE.

1. Describe the methods of pruning any three of the following plants:—Gooseberries, Raspberries, Red Currants, and Loganberries, and illustrate where possible with diagrams.
2. How do you propagate the following plants:—Rhododendrons, Dahlias, Roses, Gladioli, Hydrangeas, Carnations.
3. Briefly discuss three fungus diseases and three insect pests, and explain how they can be controlled.
4. Give a list of the tools required for a small garden of say a quarter of an acre and the approximate cost of each.
5. Explain how you would eradicate weeds from lawns by (a) chemical means, and (b) mechanical means.
6. What is meant by "wrenching" and for what types of plants is it advantageous?

Note! *Any three only* of the above questions to be answered. Also *any three only* of the questions on the special subject nominated.

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

Special Subject.

THE FLOWER GARDEN IN ALL ITS ASPECTS.

1. It is desired to form a herbaceous border 12 feet wide and not less than 60 feet long. Show by diagram how you would group the plants, naming each group.
2. Name 12 new Roses and give, as far as possible, the names of the raisers.
3. Give a list of six Spring flowering bulbs or corms, with brief notes on each.

4. Give six combinations of Summer flowering plants suitable for flower beds, and state the groupings you would suggest. Diagrams to illustrate your meaning may be used.
5. Give a brief description of 12 sorts of plants suitable for Rock-gardening.
6. Using annual plants, say how you could have two crops of flowers from the same bed in one year.

Note! *Any three only* of the above questions to be answered, in addition to *any three* from the paper on the "Practice of Horticulture."

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

Special Subject.

A KNOWLEDGE OF TREES AND SHRUBS TOGETHER WITH THEIR PROPAGATION AND USE IN HORTICULTURE.

1. Write an essay on *one only* of the following:—(a) Rhododendrons; (b) Lilacs; or (c) Hydrangeas.
2. Show by diagram how you would plant a shelter belt 30 feet wide, using New Zealand trees only.
3. What stocks would you suggest as suitable for grafting the following plants?—(a) Flowering Crab Apples; (b) Japanese Cherries; (c) Japanese Maples; and (d) Rhododendrons.
4. Write a short essay on the Rose under the following headings:—(a) Propagation; (b) Soil prepartion; (c) Planting; and (d) Pruning.
5. What do you understand by layering? Mention six plants that can be economically propagated by this means.
6. It is frequently necessary to transplant trees that have been planted for eight or more years. How would you proceed to carry out this work?

Note: *Any three only* of the above questions to be answered, in addition to *any three* from the paper on the "Practice of Horticulture."

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

Special Subject.

LANDSCAPE GARDENING.

1. Show by cross section diagrams how you would form and construct (a) a twelve foot driveway; and (b) a six foot path. Show adjoining grass or planted border in each case.
2. Give a list of New Zealand trees or shrubs suitable for background planting to flowering shrubs.
3. What are the general principles governing the formation of Rock-work gardening? Explain your meaning by diagrams.
4. Having a border 25 feet wide and 100 feet long, show by sketch how you would arrange your permanent shrubs or trees: name these and give distances apart.

5. Name five sorts of trees suitable for avenue planting and state distances to be planted apart.
6. What kind of timber would you select for rustic pergola work? And give reasons for your choice.

Note! *Any three only* of the above questions to be answered, in addition to *any three* from the paper on the "Practice of Horticulture."

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

Paper No. 2.

THE SYSTEMATIC BOTANY OF ALL THE FAMILIES OF THE LEADING GENERA CONCERNED IN HORTICULTURE.

1. What characters in a flower would lead you to place it in the family *Compositae?* Name five genera of *Compositae* common in cultivation and assign two species to each.
2. What are the main characters of the family *Gramineae?*, and name the genera commonly used in lawns.
3. Give an account of the distribution, according to continents and islands of any three of the following genera:—*Primula, Lilium, Rosa, Quercus, Gladiolus,* and *Rhododendron* (including *Azalea*). If special details of the distribution are given then select two only.
4. What are the characters of the family *Cruciferae?* Show by quoting the genera and species how important this family is in horticulture.
5. Into what genera does modern classification divide the great genus *Prunus?* State your opinion as to the propriety or otherwise for horticulture in so dividing the genus.
6. What special character or characters would decide you in referring a plant to the following families?—*Scrophulariaceae, Campanulaceae, Salicaceae, Leguminosae, Papaveraceae, Cucurbitaceae, Ranunculaceae, Umbelliferae, Solanaceae, Coniferae.* Not more than three to be dealt with and special attention to be given to the characters of the fruit.

Note! *Any three only* of the above questions to be answered, in addition to *any three* from the paper on the "Practice of Horticulture."

INTERMEDIATE EXAMINATION (SYLLABUS NO. 2), JUNE, 1930.

Special Subject.

THE HORTICULTURAL SEED TRADE IN ALL ITS BRANCHES.

1. Enumerate the vegetable seeds required for a small kitchen garden, and the time of the year each should be sown.
2. What types of seed can be safely kept for more than two seasons, and what are unsafe?

3. Give a seed mixture for (a) a bowling green; (b) a temporary pasture; and (c) a permanent pasture. Discuss the significance of the district or country from which the seeds are derived.
4. Enumerate the exact investigations you would make with regard to a complaint that turnip seed supplied had failed to germinate.
5. What are the main seeds you would import from the United States and Australia respectively, and what are the main seeds you would export to those countries respectively?
6. Give the main conditions that you would make in arranging a contract for the growing of a pedigree line of garden peas.

Note! *Any three only* of the above questions to be answered, in addition to *any three* from the paper on the "Practice of Horticulture."

PROFESSIONAL (DIPLOMA) EXAMINATION (SYLLABUS NO. 3), JUNE, 1930.

Paper No. 1.

GENERAL.

1. Why is it that swamp lands require to be left several years after draining before they attain maximum fertility? Give a biological explanation of this.
2. Explain how you would proceed to destroy (a) Californian thistles; (b) Couch grass or other weeds having underground stems. Give reasons for your practice.
3. What takes place when soil is sterilised by steam? Explain the practice of steam sterilisation.
4. Write a short essay on the preparation of superphosphate and explain the chemical changes that take place during the process of manufacture.
5. Land in New Zealand that was originally covered in forest is frequently very fertile, and the same land under pasture or other crops decreases in fertility the longer it is in use. Explain why this is so.
6. Write a short essay on lime in its relation to horticultural practice.
7. What are the principles governing the Mendelian practice of plant breeding?
8. Write a short essay on the theory and practice of grafting, and mention the stocks you would use for four fruit and four flowering shrubs.

Note! *Any six only* of the above questions to be answered.

The Second Diploma paper (special nominated subject) consisted of the six questions set for the special subject in the Intermediate examination but required a higher standard of answers.

PLANT-RECORDING.

The New Zealand Institute of Horticulture has adopted a system of recording new varieties of plants produced in New Zealand. Although no responsibility beyond the mere recording of the new varieties is undertaken by the Institute it is thought that the record will not only have a value in establishing priority of claim to the production of the novelty, but it is possible that it may lead to a system of registration, with patent rights being legalised in New Zealand.

In order to give wide publicity to the scheme adopted by the Institute, a copy of the application-form is printed below. It should be distinctly understood that the discovery of a "new" variety growing in a state of nature, that is, the product of an indigenous species of plant, does not entitle the finder to record it as a new variety produced by him.

NEW ZEALAND INSTITUTE OF HORTICULTURE.
(Incorporated).

.....*Full Address.*
.....
.....*193....*

Dominion Secretary,
N.Z. Institute of Horticulture (Inc.),
G.P.O. Box 1237, Wellington.

Sir,

I beg to apply for the recording of the following new variety raised by me:—

1. Class of plant:
2. Name (if any) allotted by the raiser to the new variety:
3. Origin, including parents, if known:
4. Full description, including stems, leaves, flowers and fruit, always indicating the special characters of the new variety, and pointing out how it differs from other related kinds:
5. Habit, including constitution, average height, time of flowering and fruit ripening (in the case of an edible fruit), etc.
6. A specimen of the new variety is forwarded with this application.
7. A recording fee of five shillings (5/-) is enclosed.
8. It is distinctly understood that the Institute has the right to refuse to record the variety, and that, if recorded, no responsibility beyond the mere recording attaches to the Institute.

.....*Signature.*

The Institute has recorded, under the number given at the head of this form, the application made above, but beyond recording accepts no responsibility in connection with the matter.

.....
for the N.Z. Institute of Horticulture.

INSTRUCTIONS.

(a) On application being made to the Institute, forms of application for recording (in duplicate) will be sent to the applicant (the original on white paper and the duplicate on buff paper).
(b) If in filling in the description on the face of this form, there is found to be insufficient space, the description is to be continued on blank sheets of paper (in duplicate) and attached to the form.

(c) Typewritten descriptions are preferred. If the description is written, great care must be taken to ensure legibility.
(d) The applicant shall complete *both forms* and send them to the Dominion Secretary, New Zealand Institute of Horticulture, G.P.O. Box 1237, Wellington.
(e) If the Institute decides to record the application, both forms will be impressed with the Seal of the Institute, the original returned to the applicant and the duplicate retained by the Institute for record.
(f) If the specimen referred to in (6) on the other side hereof is a flowering plant, it should be placed flat between dry newspaper and so packed as to avoid damage in transit.
(g) A photograph showing the special features of the plant should be forwarded, if possible, with the application, but this requirement is not essential.
(h) A short notice of any new variety recorded will be inserted in the Institute's Journal without further charge.
(i) If, for any reason, the Institute should refuse to record the new variety, the fee of 5/-, deposited with the application, will be refunded to the applicant.
(j) The system of recording is confined to plants actually *raised* and not to new varieties found growing in a state of nature.
(k) The record number at the head of the form is to be filled in by the Institute when it has been decided that the application shall be recorded.

INSTITUTE NOTES.

National Conference on Horticulture.—Definite arrangements have now been made between the New Zealand Horticultural Trades' Association, the Association of Directors of Parks and Reserves, and this Institute for the holding of the first gathering in Wellington, commencing on Tuesday, 27th January, 1931, and continuing until the following Friday. The programme adopted will enable each of the three bodies to meet separately for the transaction of their own business and also provides for combined meetings to consider questions of common interest. One of the features of the National Conference will be the first National Flower Show, to be held in the Town Hall, Wellington, and in connection with this item the Hutt Valley and Wellington Horticultural Societies are co-operating. Later on members will be supplied with a Schedule for this Show, which it is hoped will be as representative as possible of the whole of the Dominion.

Inspectors for Scenic Reserves.—The Government has recently gazetted the appointment of 52 persons in Otago and Southland as Honorary Inspectors of Scenic Reserves, their names having been recommended by the Institute.

Plant Recording.—This is now in operation as set out elsewhere in this issue. The first application for recording has already been received.

New Zealand Horticultural Judges' Register.—The first Supplement to the Main Register issued in 1928, is now ready for sale as per advertisement appearing elsewhere in this issue.

Rules for Judging Horticultural Exhibits.—Draft rules have been prepared and it is hoped shortly to consult the various interests concerned with a view to their adoption, so securing uniformity in judging throughout the Dominion.

June Examinations.—These resulted in two complete and two partial passes in the Preliminary Examination and one complete and one partial pass in the Diploma Examination. In addition two candidates passed the Diploma Examination, one each under Group "B" and "C."

HORTICULTURAL SHOWS:

NATIONAL FLOWER SHOW.

In connection with the National Conference on Horticulture and in association with the Hutt Valley and Wellington Horticultural Societies: in Wellington Town Hall, 29th January, 1931.

AUCKLAND HORTICULTURAL SOCIETY.

President: Sir Edwin Mitchelson, K.C.M.G.
Secretary: c/o. Box 124, Auckland.

Daffodil Show: 18-19 September, 1930.
Summer Show: 4-5 December, 1930.
Dahlia Show: 12-13 March, 1931.
Chrysanthemum Show: 23-24 April, 1931.

WELLINGTON HORTICULTURAL SOCIETY.

President: Dr. Arnold Izard.
Secretary: J. G. MacKenzie, N.D.H. (N.Z.), c/o. Town Hall.

Spring Show: 24-25 September, 1930.
Summer Show: 26 November, 1930.
Autumn Show: 22-23 April, 1931.
All shows held in Town Hall, Wellington.

HUTT VALLEY HORTICULTURAL SOCIETY.

President: D. S. Patrick, Esq.
Secretary: A. J. Nicholls, P.O. Box 19, Lower Hutt.

Spring Show: 17-18 September, 1930.
Summer Show: 19 November, 1930.
Mid-Summer Show: 4-5 February, 1931.
Autumn Show: 15-16 April, 1931.
All Shows held in King George Theatre, Lower Hutt.

MATAURA HORTICULTURAL AND INDUSTRIAL EXHIBIT SOCIETY.

President: J. L. Mitchell Esq.
Secretary: James Ingram.

Annual Show held in Society's Hall, Balclutha, in February.

New Zealand Institute of Horticulture (Inc.)

Patrons: Their Excellencies *LORD BLEDISLOE*, Governor-General, and LADY BLEDISLOE.

Vice-Patron: The Hon. The Minister of Agriculture.
President: F. J. NATHAN, Esq., Palmerston North.
Dominion Secretary: A. R. STONE, G.P.O. Box 1237, Wellington.
Dominion Organiser: GEO. A. GREEN, 16 Aratonga Avenue, Green Lane, Auckland.

Hon. Secretaries of Local District Councils.

Auckland: N. R. W. Thomas, 54 Campbell's Bldgs., High Street.
Gisborne:
Hastings: L. A. Denton, Tribune Building.
Palmerston North: J. J. Stevenson, Boys' High School.
Nelson: E. R. Neale, P.O. Box 114.
Christchurch:
Dunedin: Geo. H. McIndoe, P.O. Box 445.
Invercargill: Jas. A. McPherson, Public Gardens.

Membership:

Individuals: 12/6 per annum.
Societies, firms, etc.: 21/- per annum.

Journal:

To Members: Free.
To Non-members: 7/6 per annum (in advance).
Single copies: 2/6.
Hon. Editor: W. R. B. Oliver, M.Sc., Dominion Museum, Wellington.

Advertising Rates:

These will be supplied on application.

Examinations:

Examinations will be held half-yearly (June and November). Students desiring examination should make early application to

DOMINION SECRETARY,
N.Z. Institute of Horticulture,
G.P.O. Box 1237, Wellington.