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HEDGES, EVERGREEN AND FLOWERING, FOR PARK AND HOME GARDEN.

(By J. C. Stirling, N.D.H. (N.Z.), Wellington.)

Hedges of various descriptions are extensively planted in connection with parks and home gardens, and in many cases they take the place of an artificial fence and become instead a living one; but they are much more than that. They have beauty, they have colour; and they vary their form and appearance at the different seasons of the year. Hedges when properly selected and placed, add much beauty to the garden. Their use has made the ordinary wooden fence almost a thing of the past. Living plants in the form of hedges can be made to fulfil every purpose of the wooden fence and at the same time, give an added beauty and dignity. Not only do they act as boundary lines, but may serve also as barriers to keep out animals, to give shelter or to ensure privacy.

If one takes a short walk in the suburbs of any city, it will be seen that there is little variety in the plants used for hedges. On such a trip one would see *Coprosma Baueri*, *Escallonia exoniensis*, *Viburnum tinus* and *Ligustrum vulgare*. The monotonous use of these few plants in most of our suburban districts, shows how little attention to variety is being given to this very important factor in the home landscape. True, these commonly used plants are all excellent, under some conditions, for hedge purposes, but there are many others which should be known and utilized. When planting a garden, a hedge is usually included somewhere in the plan. First it is necessary to arrive at the purpose a hedge is to serve; the planter will then be able to select the type of plant best suited to the particular locality and the purpose aimed at. An intending planter is recommended to use the utmost care in plant selection, in order to achieve later on just the effects he desires. Home owners, who select plants less commonly made use of, will not only add beauty to their homes, but will give to these a charming air of distinction.

Protection against intrusion by persons or animals, shelter for the more tender plants and the securing of privacy, are the three

most valuable uses of hedges in landscape planting. The first desire of a house owner is to enclose his property for his personal use. For places such as public gardens and parks, hedges act as a means of control, by confining pedestrians to the walks, and restraining them from injuring lawns and flower beds. Hedges are also essential in such places for separating the various sections. Where there is sufficient space available for dense plantings of trees and shrubs, these can be allowed to grow according to their natural habit without clipping. Such plantings are known as shrub borders, but they take up so much room that their use on a small property is impracticable. Unless they are clipped, it is extremely difficult to use plants, that naturally grow sufficiently dense, as protective barriers against dogs and cats, and even small boys. Clipped hedges can be grown in a very narrow space if narrow columnar trees, such as *Cupressus sempervirens*, are used. They can be grown up to thirty feet in height and yet only to occupy a strip of ground from eight to twelve feet in width. If another type of tree was selected and left to grow in its natural fashion, the space required would be considerably wider. The beauty of hedges is often a strong recommendation for their use. They make a definite line to any lay-out and they can be so placed as to improve other plantings by forming an appropriate background. This is well illustrated by a good hedge of *Chamaecyparis Lawsoniana* for, when the young lateral tips begin to grow after the hedge has been clipped, they nod in every breeze, and such a hedge is very often the outstanding feature of an entire planting. Hedges can also be used to give the garden a formal appearance. They can be either long or short, and may be rigidly clipped to conform to certain definite, almost architectural lines. Flowering hedges are handsome if well placed and properly clipped, but in most small gardens there is very little room for such hedges. If grown at all, they are planted chiefly for their beauty during the period they are in flower; but in some cases flowering hedges have been seen which not only respond well to clipping, but also serve shelter purposes quite well, a good example being a hedge of *Abelia grandiflora*.

HEDGE PLANTS FOR VARIOUS SITUATIONS AND PURPOSES.

In the following lists, the hedge-plants named have been divided according to the purpose for which they are best suited. Although I consider these the best for the particular purpose named, there are other plants which merit careful consideration. Opinions differ as to which plants may be best, and local situations and conditions of soil and climate are also factors to be considered.

1. Hedge plants suited to exposed situations.
2. Hedge plants adapted to seaside situations.
3. Exotic plants suitable for less exposed situations.
4. Exotic plants suitable for topiary work.
5. Exotic plants suitable for flowering hedges.

1. Hedge Plants for Exposed Situations:—

(a) Native plants that can be trimmed for hedges and kept five feet high or taller are:—

Cōprosmā—Both *C. Baueri* (Taupata), and *C. robusta* (Karāmu) are excellent; they quickly establish themselves, and bear trimming very well. *C. Baueri* is one of the most popular hedge plants around Wellington. It has wonderfully glossy, bright green leaves. *C. robusta* is valuable as a hedge plant on account of its rapid growth. It trims well, but does not make such a dense hedge as *C. Baueri*, which however is less hardy.

Criselinia littoralis (Broadleaf)—This plant will grow in almost any soil or situation. It has bright green, glossy leaves and takes kindly to trimming. A good specimen hedge of this plant can be seen at Otari Native Plant Museum. It is one of the hardiest of our native hedge plants.

Leptospermum scoparium (Manuka)—This is one of the most widely distributed plants in the Dominion, being suited to most soils and situations that have a good rainfall. It makes a very serviceable shelter hedge, the growth being fairly rapid, and it bears trimming well.

Pittosporum—*P. crassifolium* (Karo) and *P. tenuifolium* (Kohuhu) are extensively used by the Wellington City Council Reserves Department, for planting in exposed and windy situations and they have been found eminently suitable. Both species grow fairly rapidly and they bear trimming well. Of the two, *P. tenuifolium* is the hardier.

(b) Native plants that can be trimmed for lower hedges, say four feet in height:—

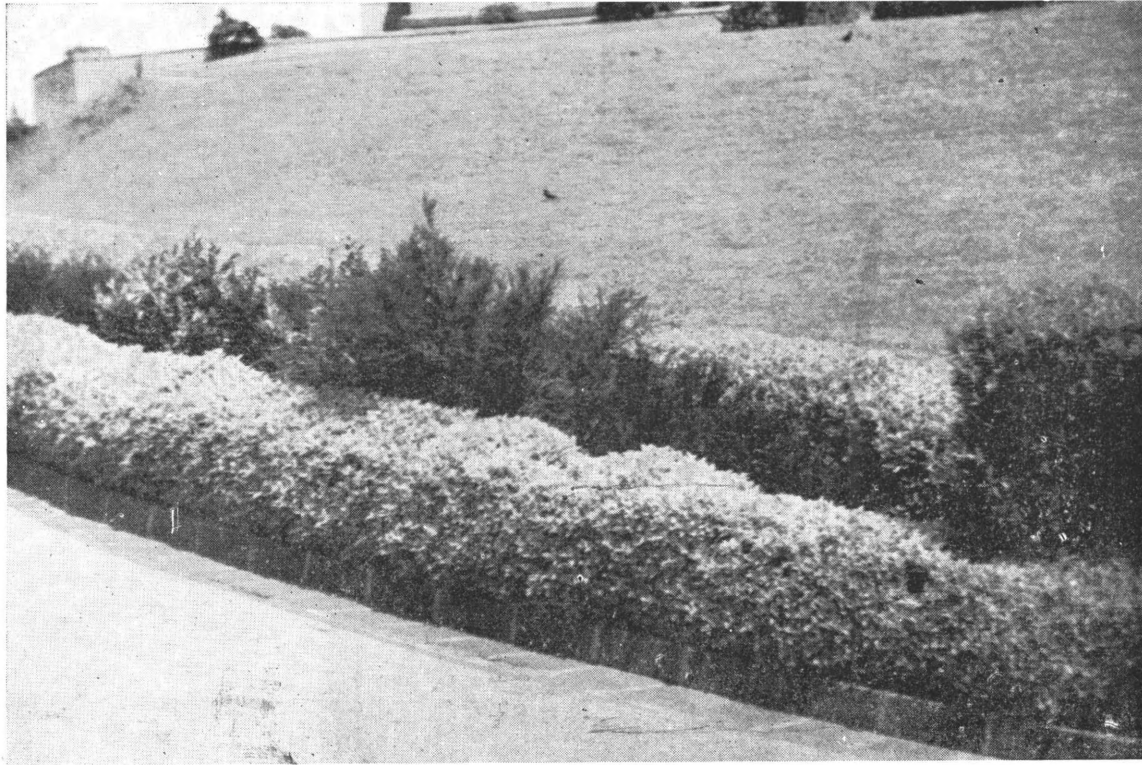
Hebe (Veronica)—From the numerous species available, the following are all suitable for dwarf hedges:—*H. buxifolia* has very small leaves one-third of an inch long, and one-quarter of an inch broad; its growth is erect, and it bears trimming well. *H. cupressoides* a remarkable species, the scale-like leaves resembling those of a cypress. It has numerous slender branches, and both trims and looks well. *H. elliptica* a copiously branched shrub, with closely set pale green leaves one inch long and half an inch broad. This is a very hardy species.

Senecio Greyii—An excellent plant for a dwarf hedge; it requires full sun, and will stand wind. The branchlets, the under surface of leaves, and the petioles are densely clothed with soft white tomentum, giving the whole plant a greyish appearance.

(c) Exotic plants that can be trimmed for hedges and kept five feet high or taller:—

Cupressus macrocarpa (Macrocarpa)—This makes a good hedge when properly trimmed. To make it a perfect barrier, completely covered with evergreen foliage, it should be wider at the base than at the top.

Escallonia macrantha—Good hedges of this plant are found



A low hedge of *Senecio Greyii*, bordering the Drive at the Dominion Museum, Wellington, provides a finish to the plantings.

growing well around Wellington, even in the most exposed and dry situations. It has glossy dark green foliage, with red tubular flowers. A good hedge plant for most purposes, except in localities with a low rainfall.

Elaeagnus angustifolia.—This is used extensively as a hedge plant in most parts of New Zealand. Its leaves are long and narrow, light green above and silvery beneath. The branches are silvery, and sometimes spiny. It is quick growing, and requires a lot of trimming, unless grown in positions exposed to strong salt winds.

Ilex aquifolium (the common holly)—Makes one of the best dense hedges, although rather slow in growth. The leaves have spiny margins, of value in keeping off browsing animals. Grows best in a cool moist climate.

Juniperus virginiana (commonly called red cedar)—There are few narrow leaved evergreens which will withstand extreme cold and drought as this plant does. It stands clipping well, and, if allowed to grow so that it is wider at the base than at the top, it makes a really capital hedge.

Ligustrum sinense (Chinese privet)—Is well known to most people. The species is very hardy and will succeed almost anywhere.

Prunus Laurocerasus (commonly called laurel)—Used extensively as a hedge plant. In South Canterbury last year some very fine hedges of this were seen. It has leathery, evergreen leaves four to six inches long, and from one and a half to two inches broad. Although there are many plants with smaller leaves which make just as good a hedge, one greatly admires this plant for an evergreen hedge.

Pseudotsuga Douglasii (the Douglas fir)—One of the best evergreens for making a clipped hedge for inland planting. It trims well and makes a perfect barrier.

Taxus baccata (the English yew)—Has been a favourite in Britain for hundreds of years as a hedge plant. It is so excellent a hedge plant that it should be considered carefully by home owners contemplating establishing an evergreen hedge. No species of *Taxus*, however, should be planted where cattle or such animals can have access to it, as it is poisonous to animals.

(d) Exotic plants that can be trimmed for lower hedges, say, four feet in height:—

Berberis buxifolia—Of stiff, erect habit of growth, this *Berberis* makes a good dwarf hedge. The leaves are less than an inch long, and are of a hard leathery texture.

Buxus sempervirens (Boxwood)—Despite its slow growth this makes the ideal dwarf hedge. Though small, the leaves are very numerous, and the plant branches very freely from the base.

Grevillea rosmarinifolia—This plant has dark green linear leaves about one and a half inches long, and the branches have a pendulous habit. It responds well to trimming, and makes a good dwarf hedge.

Myrtus Ugni—This plant has small dark green leaves, is slow-growing, and consequently requires very little trimming. It has round fruit, dark red in colour, with an agreeable aroma and pleasant taste.

Prunus Laurocerasus nana (commonly called laurel)—This plant is very hardy. It tolerates trimming very well and makes a splendid glossy-leaved, evergreen, dwarf hedge.

2. Hedge Plants for Seaside Situations:

(a) Native plants suited for this purpose are:—

Coprosma Baueri (Taupata)—This plant is found growing in exposed rocky places and sand dunes, the salt spray not affecting its growth. Its natural southern limits are Marlborough and Grey-mouth. Now known as *C. repens*.

Metrosideros tomentosa (Pohutukawa)—Though confined naturally to the northern half of the North Island, the pohutukawa may be grown in the warmer coastal districts at least as far south as Dunedin. It is easily cultivated and makes rapid growth after it is established. Although frost-tender when very young, once the leaves have developed their tomentum on the underside, the plant will stand ten degrees of frost or more. It makes a good hedge; for it can be kept in bounds by intelligent clipping.

Pittosporum crassifolium (Karo)—An excellent shrub for hedges near the coast in warm localities.

Olearia paniculata (Golden akeake)—This is one of the most used hedge plants for seaside gardens. It is a densely branched shrub having golden-green foliage with frilled margins. Unfortunately, it is often seriously damaged by a native gall insect, and so is undesirable for hedge purposes in some warm sheltered localities. It is very hardy.

(b) Exotic plants adapted to seaside situations:—

Callistemon lanceolatus—Makes quite a good hedge for the milder districts of New Zealand. The branches are very rigid. The leaves are quite narrow, one quarter of an inch wide and from two to four inches long.

Euonymus japonicus—A perfectly erect shrub, which has extremely thick, shining, broadish oval leaves, one to two inches long. It makes a neat hedge and always looks well. There are several horticultural varieties of this plant differing chiefly in the colour of the foliage.

Escallonia pendula—A plant of pendulous and compact habit. The branches are very twiggy and the younger parts more or less sticky to the touch. This species makes one of the best hedges up to six feet high.

Pittosporum Tobira—This is a beautiful evergreen plant which makes a good hedge but is frost-tender. It has thick, leathery dark-green leaves. The plant responds well to trimming, and may be trimmed to any reasonable height. It is a native of Japan.



The straight lines in the boundary hedge of *Escallonia pendula* are relieved by the well considered placement of the trimmed specimens of *Chamaecyparis pisifera plumosa*.

Rosmarinus officinalis (Rosemary)—This makes a hardy, evergreen dwarf hedge. It is a much-branched plant, and does not require a lot of trimming.

Tecoma capensis—This forms an extremely beautiful evergreen hedge. It trims well, and forms a dense, compact wind-break. When in flower, a hedge of this plant is beautiful, with its brilliant orange-scarlet flowers. It is, however, frost-tender, only flourishing in the warmer parts of this country.

3. Exotic plants suitable for less exposed situations are:—

Chamaecyparis Lawsoniana (Lawson's cypress)—Makes a beautiful hedge and stands clipping well. It is a favourite in Hawkes Bay and Taranaki.

Chamaecyparis pisifera filifera—Has long thin pendulous branches. It stands pruning well, and makes one of the best hedges.

Cupressus sempervirens (Italian cypress)—Noted for its columnar upright habit of growing. It stands clipping well, and easily makes a really serviceable hedge.

Eugenia Smithii—Has small white flowers with large purple fruit. It makes a very lovely informal hedge, if the plants are set four feet apart. It can be used as a clipped hedge too, as it trims well. It is a native of New South Wales.

Pinus Strobus—Responds well to clipping and makes good shelter in a surprisingly short time. It has soft slender foliage which looks handsome.

4. Exotic plants suitable for topiary work:—

Buxus sempervirens and varieties (Boxwood)—Has been proved to be one of the plants best suited for Topiary plantings; specimens of this plant and varieties, have flourished for well over two hundred years in Britain. The plant is very dense; its leaves are small, but very numerous; and all hedges formed of this material are well-branched at the base.

Ilex crenata (the Japanese Holly)—A good dense plant, although rather slow in growth; it has been used a great deal for Topiary plantings. It makes a good dense hedge, since it is very twiggy in its habit of growth, and has small evergreen leaves about the same size of those of the boxwood.

Taxus baccata and varieties (Yew)—Has been a favourite in Britain and Europe for hundreds of years. In fact, there is a specimen of *Taxus baccata* in Fortingall, Glen Lyon, Perthshire, Scotland, which has an estimated age of more than 2,500 years. However that may be, the astonishing tenacity of life possessed by this species and its varieties is thoroughly proved by the fact that the plantings at Levens Hall in Westmoreland, England, which were first made, early in the eighteenth century, are, to the best of ones knowledge, still existing. So it will be seen that, for over two hundred years, the young growths have been persistently cut off, in order that the requisite size and form of the represented objects might be preserved.

5. Exotic plants suitable for flowering hedges:—

Abelia grandiflora—Makes a delightful flowering hedge. It has small fragrant, light pink flowers in summer and early autumn. If, after flowering, trimming is restricted to cutting back only the long shoots, this plant makes a graceful, informal hedge.

Berberis Darwinii—From every point of view, this plant, where hardy, is admirable as a flowering hedge. It has deep-orange coloured flowers, developing in early Spring, and these are very handsome when at their best.

Berberis stenophylla—In spring the branches are covered with clusters of golden-yellow flowers. When the plants have finished flowering, they should be trimmed back hard.

Camellia japonica—All who see the camellias in bloom marvel at their beauty. They grow well outside in most parts of New Zealand. They need very little trimming to make a good hedge but any particularly long or straggling shoots will require shortening.

Chaenomeles japonica—This is a lovely plant, and some of its varieties have brilliant coloured flowers. This plant blooms in early spring and after the flowering season is over, it should be trimmed hard back.

Forsythia intermedia and varieties—If you wish to brighten up your garden in early spring, plant a hedge of *Forsythia*. It has bright yellow flowers and is of very luxuriant growth. It is best to cut it hard back after flowering, allowing the new shoots to grow out undisturbed till after the flowering period of the following year.

Rosa rugosa—There are many varieties and hybrids of *Rosa rugosa* with flowers ranging from single to double, and varying in colour. It stands clipping well, and should be used more widely than it is. It grows freely, and the fruit, in autumn and early winter, is very beautiful.

Rosa rubrifolia—The flowers of this species are very poor, but the foliage is beautiful. The stems are reddish purple, and the leaves are purplish, tinged with bluish green in contrast with the foliage of other plants. Trimming should be light and carried out in winter.

Syringa persica alba (Lilac)—This plant makes a beautiful unclipped flowering hedge and its annual wealth of flowers can be depended upon. As a cut flower in late spring, it is justly appreciated.

PLANTING HEDGES.

Undoubtedly it is best to transplant hedge plants in winter or early spring, when they are in a dormant condition. In digging up any plant, it is almost impossible to avoid cutting many of the small roots which serve to absorb from the soil the moisture the plant requires, the result being that, when they are replanted, the top receives less water from the roots. Because of this reduced supply some of the branches may die unless they are cut back at once, to restore the balance between tops and roots.

It always pays to buy hedge-plants from a reliable nurseryman, because those he offers for sale will be properly 'wrenched'. This wrenching is done to encourage the development of new roots close to the base of the plant. Plants which have been wrenched have a compact fibrous root system which will remain on the plant when it is moved.

When grown in a hedge, plants are often severely restricted, and the branches are not allowed full development, but are being continually cut back and reduced in size. For these reasons, hedge plants should be given extra care and consideration at planting time to ensure good growth later. In planting hedges it is usually best to dig a trench rather than separate holes. A trench fifteen inches wide and fifteen inches deep will meet the requirements for most plants.

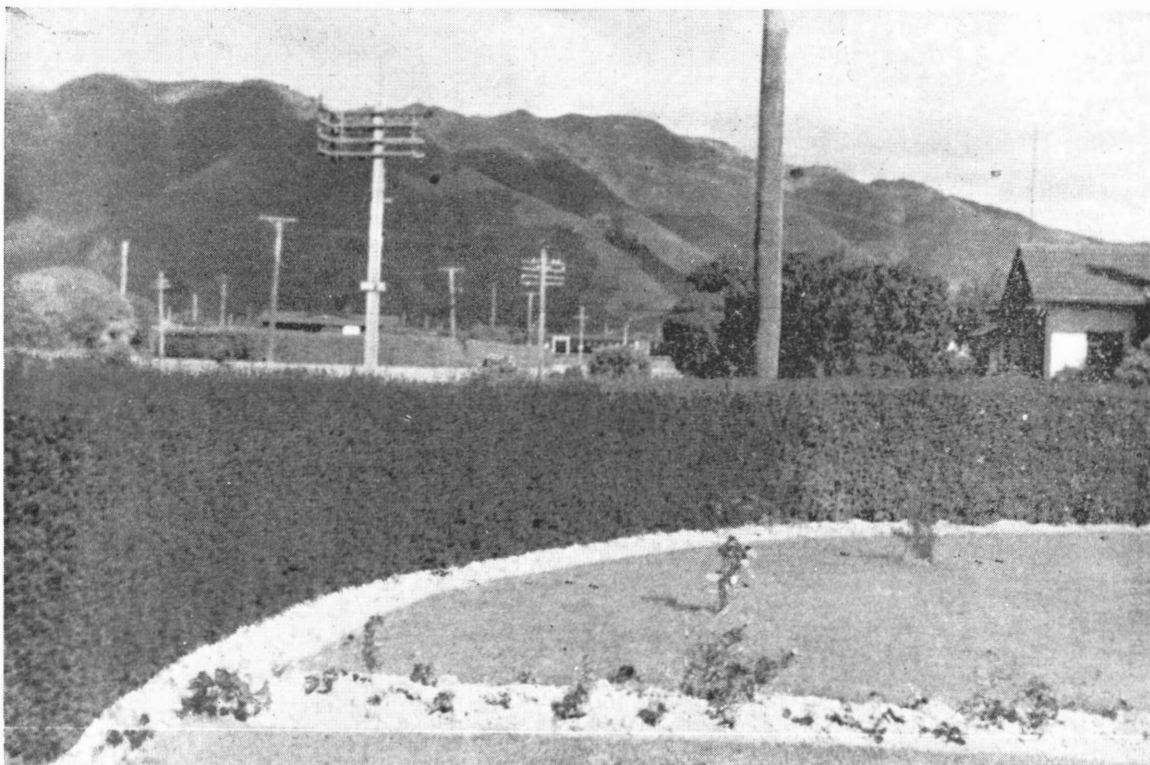
If the soil is poor, good soil should be mixed with it, or better still, the whole trench should be filled with new soil. It will always pay to provide a good growing soil for no matter what the purpose of the hedge may be the more dense it is, the better hedge it will make. A fertile soil is the surest means of inducing this density.

The roots of the plant should be spread out carefully; not wound into balls, or forced into very narrow holes or trenches. They should be then covered with a good soil, gently firmed, and one should tread the whole trench firm when all plants are in position. When finished, the surface of the trench should be slightly below the level of the surrounding soil so that water may drain towards the newly planted hedge. The tops should then be cut back to compensate for the roots lost in transplanting. Moreover, by cutting the plants back to within a foot of the ground, they will sooner become bushy and branched at the base, thus making a good foundation.

Hedges should be planted in well drained soil, and be situated so as to receive a maximum amount of sunlight. This is most important as hedge plants are required to grow in a close, unnatural position and, in order to do well, they should be given good soil and plenty of sunlight. It is always best to start a hedge with young plants, preferably between twelve and eighteen inches in height. This is because such plants are much more easily trained than are larger ones. The important part of any hedge is the first foot above the ground; if this is well filled with strongly branched lateral growth, it will make a good barrier against small animals.

The proper spacing for hedge plants is from twelve to eighteen inches apart. Hedges of *Fagus sylvatica* have been trimmed in Scotland, which were originally planted eighteen inches apart. These were in first-class condition, although they had been planted thirty years or more.

When planting a hedge it may be considered rather expensive to plant as close as eighteen inches but, if planted (say) three feet apart, it will take twice as long for the hedge to fill in and, if one plant should die, it will leave a very big gap necessitating replanting.



Lonicera nitida is proving satisfactory in the Hutt Valley for making
a low hedge.

CARE AFTER PLANTING.

Naturally, the most important factors in the care of the hedge are its training and trimming, but these will be dealt with separately. If one desires a perfect hedge, it should be given the same care and attention as the choice shrubs in one's garden. If the hedge is being grown in a very dry soil, a good mulch of well-rotted manure or decomposed leaves will aid materially. Watering is necessary during severe dry spells, and the nightly syringing of newly planted evergreen hedges helps to keep the foliage in good condition while the roots are becoming established in the soil.

Fertilizing is advisable only when the plants are not growing well. It is wasteful to apply a fertilizer to a hedge, which is in good growing condition, for such applications only increase the vegetable growth, and this in turn necessitates additional pruning. However, if the soil is poor, or a young hedge needs added stimulus to attain the desired height, well-rotted manure can with advantage be worked into the soil around the plants. This is best done in late spring. A complete fertilizer (approximately five per cent. nitrogen, ten per cent. phosphates, and five per cent. potash) can be applied at the rate of from five to ten pounds for each one hundred feet of row, the quantity depending upon the size and age of plants. For more mature plants, it is advantageous to make a stronger application. When mature evergreen hedges become ragged and open at the base, it is often a very tedious, if not an impossible task, to coax new branches to spring from the base. Pruning of individual plants and careful fertilizing is all that can be done. Then, if the plants do not respond, it may be that entire plants will have to be removed from the hedge and new ones put in their places, particularly in cases where open spaces at the bottom of the hedge have developed.

TRAINING AND TRIMMING HEDGES.

Practically any shrub can be trimmed to be dense enough for hedge planting. However, the process of trimming is more tedious with some plants than with others; and only those that are comparatively easily trimmed, make good hedge plants. Trimming a very young hedge is necessary, not only to keep it within bounds, but also to make it dense and well branched right down to the ground. When buying evergreen plants, it is absolutely essential to get them well branched at the base, thus avoiding a great deal of unnecessary trouble later on. Hedges should be shaped so as to be widest at the base and narrowest at the top. Unfortunately, there are too many hedges which are splendid examples of how not to trim a hedge. In the first place, they have probably been planted too close to a walk or road, and consequently are forced to be restrained within very narrow limits. Because of this, the sides are cut perpendicularly or, in some cases, are cut in such a way that the top of the hedge is actually wider than the base. When this is done with evergreens, only one thing can be expected, and that is the

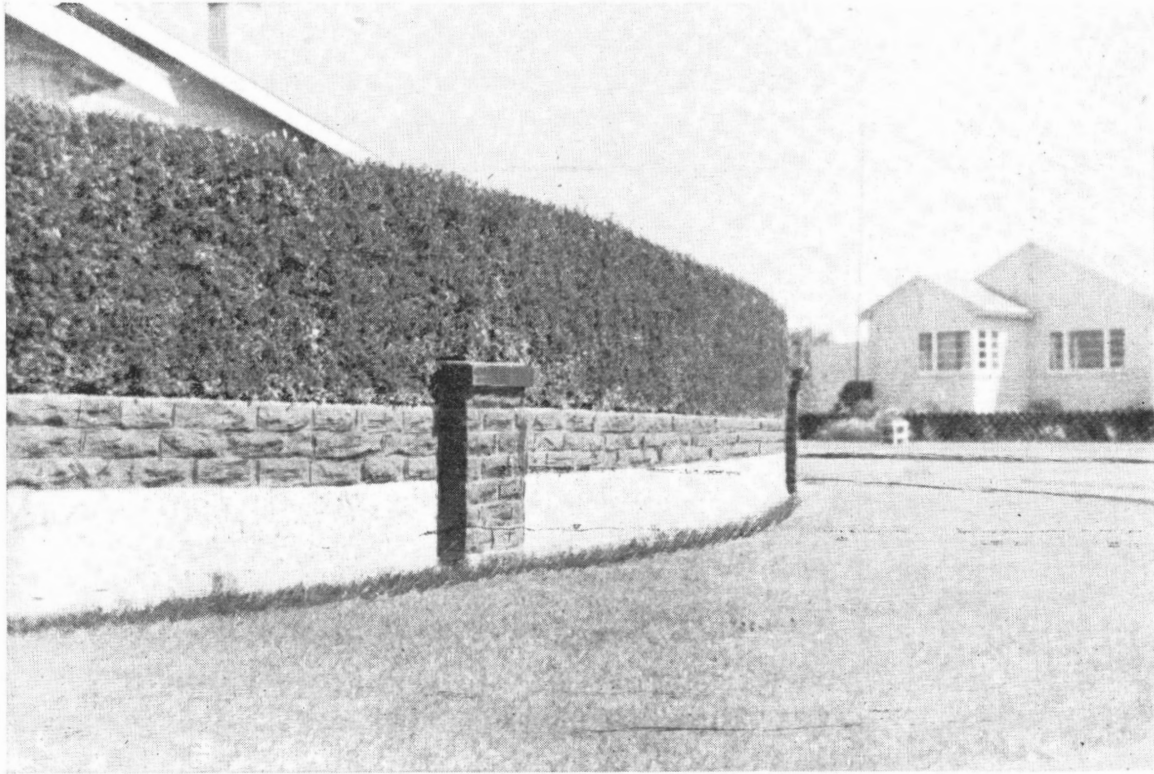
dying out of the lower branches. These need light and air to survive just as much as the upper branches. Anyone accustomed to pruning trees and shrubs, knows that it is always the inner shaded branches that are weakest. This applies to hedges also, particularly to evergreen hedges. The exact shape of the hedge may differ according to personal preference. Some persons like a hedge with a more or less rounded top, while others prefer their hedges to have a top with a narrow, flat surface. This type is easier to trim than the rounded form; but in districts where heavy snowfalls occur, the flat-topped hedge does not shed snow as readily as does the rounded form.

There is nothing difficult about the actual trimming of the plants in a hedge and most home owners can carry this out satisfactorily. The tools used should always be sharp, so that they cut clean, and do not pull or break the young shoots from the stems, or bruise the bark. With young plants that have just been planted, it is an excellent plan to trim back all upright branches in order to force growth on the sides, as well as in front and behind. This trimming may take the form of cutting back individual growing shoots during the first year or two. After the plants have developed hedge form, they can be trimmed periodically in the usual manner.

There are several types of trimming tools on the market. The most popular is the hedge shears, with two long blades attached to wooden handles and worked with both hands. Secateurs are small, hand pruning-shears and there are various forms of these. They should be used when cutting back individual growing shoots of young hedge plants. Hedges made of broad-leaved shrubs, such as *Prunus Laurocerasus*, should be cut with secateurs, in preference to hedge shears, which sever the leaves, rendering them unsightly and the hedge exceedingly formal. In the Wellington Botanical Gardens there is a machine with a cutting bar similar to that in the common mowing machine, which is operated electrically. It is so effective that it can be utilized with one hand. It has proved a great labour saving device and it can be strongly recommended where the clipping by hand of very long hedges has been the practice, for this machine very materially reduces both the cost and the labour of clipping.

The best time to trim a hedge varies considerably. This depends firstly, on the age of the hedge; secondly, on the plant material employed; and thirdly, on the purpose which the hedge is intended to serve.

With young evergreen hedges the pinching back of the actively growing shoots, as they elongate, is very important as this is the only way of obtaining a dense-growing hedge. During the first two seasons, great care should be given to each individual plant, by properly pinching back the young shoots and thus forcing the plant to become dense and well branched from top to bottom. After this has been done, the hedge will require trimming with the usual hedge shears, twice each season.



Shawia paniculata, growing above a wall, creates an illusion of greater depth.

Mature evergreen hedges should be trimmed twice a year, the first trimming being done after the spring growth has stopped (in Wellington, about the first week in December), and the second should be effected at the close of summer (in Wellington, say, about the second week in March). However, most people like to maintain a uniform hedge and, for this reason, shoots are not allowed to grow too lengthy before cutting. Consequently, it is preferred to trim a hedge several times during the growing season, in order to preserve its uniformity. The purpose for which a hedge is grown, often governs the frequency of its pruning. For instance, quite often beautiful *Chamaecyparis Lawsoniana* hedges are grown in a manner that does not necessitate close clipping. The young shoots of the previous year are allowed free lateral expansion, except that they are clipped back once a year, and that is done before the growing season starts. This means that the hedge has many free tips of young shoots, and these nod gracefully in the breeze. If a hedge has to make a considerable amount of growth before it reaches the desired height, more of the previous season's growth can be left on and several clippings can be made during the growing period. The object is not so much to check growth, as to remove continually the terminal buds of the branches, thus forcing several additional shoots to spring from one place. This is the surest way of promoting density in the young hedge and, until the desired height is attained, it should be the governing idea of all hedge trimming.

After planting flowering hedge-plants, the plants should be cut back in order to obtain a dense-growing hedge and to develop a strong root system in their new situation. In the second season, some plants may need a further strong pruning and, in addition, during the actual growing season, they may be pinched back several times to force the growth of many side branches. This is very important, and it is best done during the period of elongation, since new buds break more quickly at this time. By the third season, flowering hedges usually require one or two forms of trimming, thinning and shortening of branches here and there or severely cutting back of branches. The former treatment is usually associated with shrubs that flower from wood matured the previous year. The latter is more frequent with plants that flower from the points of the current year's shoots. But there are exceptions in both cases.

The best guide to the time for trimming is the method of flowering. Plants that flower on the previous year's matured wood should be pruned when (when pruning is necessary) as soon as the flowers fade whereas those that blossom from the current year's wood, are preferably pruned between late autumn and the end of July.

TOPIARY WORK.

Although the use of topiary work has become almost obsolete yet, as this art was for a considerable period regarded as the per-

fection of gardening, some mention of it is desirable.

Examples of topiary work on a large scale still exist in several British gardens. A large portion of this work consists in the formation of ornamental hedges of the common Yew, either dividing sections of the grounds one from another, or enclosing spaces devoted to special subjects. Single specimens, both of the common Yew or its golden variety, trimmed into conical pyramids of uniform size and height, are utilized. The astonishing tenacity of life possessed by the Yew is conclusively proved by the fact that many of the examples of topiary work have existed for over a hundred years. In order to maintain the requisite size and form of the objects to be represented, a considerable amount of trimming is necessitated, as the young shoots cannot be allowed to grow more than an inch or two before being cut back.

Evergreens are used exclusively for this purpose, for obvious reasons and of these, *Buxus sempervirens* and varieties (Box) *Taxus baccata* and varieties (Yew), and *Ilex crenata* (the Japanese Holly) lend themselves most readily to the topiarist's skill.

PESTS AND DISEASES OF HEDGES.

The heading of this part of the article is an ambitious one, as it would require a text-book of no small size to discuss the numerous species of pests which attack hedge plants. It is essential, therefore, to confine one's remarks to some few particular pests with which one has had actual contact, and to recognize that, to a certain extent, fungoid diseases of hedge plants, and insect attacks upon these plants, are not only rendered possible but are even promoted, by deficiencies in nourishment or by other faulty treatment or selection.

Plants, that are the weakly product of semi-starvation, or those of a coarse rank growth, resulting from ill-balanced manuring, are the first to succumb to the attacks of fungi, scale or aphids. The healthy plant of normal and balanced growth has powers of resistance that enable it, in a very large measure, to withstand the attacks of disease. At the same time, plants grown continuously on the same soil, as are hedge plants, have a greater tendency to develop certain bacterial and fungoid diseases. However, by the adoption of good cultivation, comprising these three factors, viz. regular aeration of the surface soil, rational manuring and adequate provision for the admission of light and air, hedge plants can and do thrive, for many years, as plants so treated have greater vigour and stamina to resist pest and disease attacks.

INSECTS.

Scale.—Of the pernicious insects, few are as common as the various kinds of scales. These are tiny insects, living beneath a scaly covering which they exude as a protection against injury. Nevertheless, they are not very formidable and can be killed if, after trimming, the plants are sprayed with resin wash. This coats the insect with a deposit, which prevents respiration. The chief diffi-

culty lies in wetting thoroughly the undersides of the leaves, and it is on the underside that the scale insects mostly live and it is consequently imperative to treat this side thoroughly.

Aphis.—Some hedges e.g. *Euonymus* become infected with a very small aphid which establish themselves on the tips of the growing branchlets. These are easily killed by spraying with nicotine sulphate, with the addition of a little soap as a sticker.

Red Spider.—Hedges, which are subjected to conditions that are too dry as well as those which are planted in a situation allowing but little circulation of air about the plants, become greyish in appearance, because of infection with a small mite called red spider. It can be controlled by spraying frequently with water, and also by using dusting sulphur.

Borers.—Borers which get into the stems of hedge plants are not easy to control. Nevertheless, we can find their burrows and inject carbon bisulphide therein with a medical dropper or pipette. This forms a gas heavier than air, which travels along the burrows and kills the insect. Calcium cyanide is a powder which may be injected into large holes. Moisture in the air or off the wood generates the poisonous hydrocyanic acid which kills the borers.

FUNGIOUS DISEASES.

In established hedges, it is not uncommon to see plants dying out (the common example is *Chamaecyparis Lawsoniana*). This is caused, in many cases, by a root rot fungus *Armillaria mellea*. It usually attacks the plant about the junction of the stem and roots, the mycelium finding its way into the cambium and sapwood. The obvious signs of the disease are these:—The foliage turns a pale yellow, growth stops and, in a short time, death occurs. Plants, set too deeply, are very susceptible to attack. Attention to drainage and to shallow planting, in wet positions, are safeguards against attacks; but where stumps and roots of old plants are present in newly planted ground, there is always danger. The remains of old woody plants should be removed and burnt. If any plants are already attacked, these ought to be dug up, burnt, and the soil removed to the depth the roots have penetrated. Then, making sure of collecting and burning every scrap of the fungus, the hole should be sterilized with formalin, and left for a fortnight. Finally, it should be filled in with sterilized soil, and replanted in the spring.

But, in this connection, it should be remembered that many of our hedge-plants are "host-plants" to a limited number of fungi, it being a well known fact that the spores of a given fungus cannot infect indiscriminately every kind of plant that its spores happen to alight on. On the contrary, the majority of the most destructive known parasites can infect with disease only a limited range of host plants.

SUMMARY.

Summing up the qualities required in a hedge plant, we see that these are:—

- (1) Vigorous growth, even if it be somewhat slow.
- (2) Ready reaction to clipping.
- (3) Resistance to premature decay, due to fungus or blight attack.
- (4) Ability, in some cases, to withstand dryness and/or exposure to wind.
- (5) Abundant foliage, about the base, either natural or capable of being induced by skilful treatment.
- (6) Habit of growth, suitable to its situation and purpose—dwarf or tall.
- (7) Self protection, by reason of thorns, prickles, unpleasant taste, etc. against browsing animals.
- (8) Attractive appearance—a highly desirable quality in a garden hedge plant.

In this article the plants specified are among the best; but there are many more which one should know of. It is only necessary to take an interest in plants to find out which are, and which are not, suitable for hedge-plants for any particular purpose and in any particular locality.

It has been thought advisable also to deal briefly with pests and diseases injurious to hedge plants.

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PRESERVATION OF NATIVE PLANTS.

By Wm. Martin, B.Sc., F.R.G.S.

(Hon. Botanist to N.Z. Native Plant Preservation Society).

During the past one hundred years many factors have contributed to the destruction and replacement of the native vegetation of New Zealand. The settlement of the country by the pakeha in particular has necessitated the destruction of the forest, the draining of the swamps, and the ploughing of the indigenous grasslands. Consequent on the establishment of a population now numbering a million and a half, the occupied area amounts to two-thirds of the total and of this one half, or approximately twenty million acres, has been denuded of its original plant cover to make way for sown pastures, crops, plantations, orchards, and gardens as well as urban areas.

Thus, only one-third of New Zealand has escaped direct interference by man. Little, if any, of this remaining third has, however, escaped the indirect effects of human settlement, and in consequence few of the existing forests, grasslands, and fell-fields carry a truly primitive vegetation.

The introduction of exotic plants, animals, birds and insects has initiated a chain of profound changes in the plant associations still remaining. The forests have had to withstand the direct depredations of cattle, deer, goats and pigs in particular; the subalpine vegetation has been extensively grazed by deer, goats, pigs, and thar; hares and rabbits have denuded many lowland areas of almost all plant cover; stoats and weasels, by serious depredations on the bird life, have made an indirect but very serious attack on the forests; while such exotic plants as gorse, heather, and needle-bush now occupy large areas formerly carrying in the main a cover of native plants.

With these thoughts in mind, a small band of plant-lovers, banded themselves together and initiated the "Native Plant Preservation Society" under the patronage of Lord Bledisloe and the chairmanship initially of the late Mr. J. G. Helyar, but later of Mr. Hope B. Gibbons of Wellington, in order to study the effects of settlement on individual species of the native flora, and to take such steps as seemed necessary for the preservation of any species reported to be in danger of extinction. While the loss of any existing species would be an irreparable loss, it was decided that first attention should be given to plants having distinct horticultural merits.

The need for "yet another Society" was clear; for while our forests had come under the beneficent and protective care both of the Forestry Department and of the Forest and Bird Protection Society, all the subalpine belts and grasslands, where the danger was not less acute and where alone a majority of the rarer plants were

known to exist, were nobody's business. Whether the number of plants that were now rare was great or small was not known.

The first activity of the newly formed society was to communicate with botanists and plant-lovers throughout New Zealand and obtain from them lists of plants each deemed rare or in need of investigation. Thus was obtained an initial list, from which numerous names were speedily removed as information concerning them was received from botanists—amateur or professional. Seeds, seedlings, or cuttings of the others were speedily secured through the good offices of members resident in the areas concerned, and propagated.

When thoroughly established, these plants were then distributed among such curators of public parks and botanical gardens as were willing to grow them and, where necessary, to further propagate them. Through the co-operation of the Wellington City Council, permission was readily granted to propagate rare plants at the Otari Open-air Plant Museum, near Wadestown in Wellington.

As a result of the tireless energies of a small number of members mainly resident in Lower Hutt, working unostentatiously, gratuitously, and unremittingly, hundreds of plants have been collected, propagated, and distributed. Protective measures have in several cases been taken in areas where rare plants are fast disappearing. It may also be stated with confidence that there are few native plants having horticultural merits, that are not now in cultivation.

However, the Society felt that its activities should now be placed on a more scientific basis by conducting as comprehensive a survey as was possible and subjecting every species to investigation, irrespective of any horticultural value it might possess. On this new list would appear the names of all plants in the flora save such as were definitely known to be common. It was obvious that many (perhaps most) of the plants retained in this list would prove common enough when investigated, for no comprehensive survey of the native vegetation had recently been carried out save in limited areas; but no name would be eliminated without adequate evidence that it was plentiful or at least in no danger of being lost. Accordingly, such an initial list was prepared by the writer as honorary botanist to the Society and through the interest and assistance of the Hon. W. E. Parry, Minister of Internal Affairs, was printed and distributed.

Provision was made on this list for assessing both the degree of rarity and of horticultural excellence of all plants reported on, whether these were located in the locality where the botanist was resident or in some other with which he was familiar. Gardener's varieties were excluded as likely to swell the list unduly and for the further reason that the botanical status of many was not known, while many more were certainly hybrids. Some of the results to date may prove of interest.

The names of 245 plants were included in the printed list of rare and "possibly rare" native plants. Of these 95 have already been eliminated, reports having proved them to be common enough in some area. 50 of the remaining 150 species are assessed as rare so far as various qualified observers are aware. This leaves 100 species of which nothing is at present known in respect of their degree of rarity, a fact that justifies their inclusion and retention in the initial list.

A study of records to hand shows that no large tree is as yet sufficiently rare as to demand action; but of the smaller trees no reports have been received concerning *Pseudopanax Gilliesii*, *Pomaderris rugosa*, or *Pittosporum Buchanani*. The following four are rare but not so rare as to be in danger of extinction—*Nothopanax laetum*, *Chordospartium Stephensoni*, *Olearia fragrantissima*, and *Pittosporum Dalli*. Only three trees of the Round-leaved Hinau (*Elaeocarpus dentatus* var. *obovatus*) are known to members of the Society.

Among the shrubs, *Hebe macrocarpa* var. *latisejala*, one of the finest species in the genus, is regarded as now almost extinct in its natural habitat, though fortunately it is firmly established in horticulture. The Kaka-beak (*Clianthus puniceus*) may actually be extinct in nature though abundant in gardens, while *Senecio perdicoides* has also escaped recent notice in the wild state; but the hilly country south from East Cape is probably insufficiently known to enable positive assessments of its actual rarity. Another shrub which in its typical form appears to be moderately rare is *Pachystegia insignis* var. *minor*. However, as it appears that more than one *Jordanon* is included by some botanists under this name, it may be held that the variety should be removed from the rare list.

Herbaceous plants that have now become rare include three from the Chatham Islands—the endemic *Coxella* and its relative *Aciphylla Traversii*, and the magnificent Chatham Island Lily (so called)—*Myosotidium hortensia*, Prince of Forget-me-nots. When in 1925 the writer spent six weeks botanizing in Chatham Island itself, he saw all the known patches of this plant that remained from what had once formed an almost continuous girdle round the island. They would scarcely cover two square chains. However it was reported to be more common on Pitt Island. The suffruticose *Cotula Featherstonii*, restricted to the nesting sites of sea-birds, was likewise very rare on Chatham Island itself.

Among the endemics of the mainland deemed to be rare are a number of species of the Cotton Plant or Mountain Daisy, namely *Celmisia Adamsii* from the Auckland Province, and the following restricted to the mountains of the South Island *Celmisia cordatifolia* var. *similis*; ditto var. *Brockettii*, *C. Gibbsii*, *C. Macmahoni*, *C. Rutlandii*, and *C. Thomsonii*. Probably not half-a-dozen plants of the very distinct *C. Macmahoni* are now in existence. This is a rock frequenting species most difficult to cultivate, unique and beautiful and in definite danger of extinction.

FURTHER SHRUBS STILL RETAINED AS "PROBABLY
RARE" INCLUDE:

Alseuosmia linariifolia	Hebe pubescens
Carmichaelia Fieldii	" Townsonii
" gracilis	Helichrysum Selago var. tomentosum
Coprosma obconica	Pimelea Haastii
Corokia buddleoides var linearis	Pittosporum Fairchildii
" Cheesemanii	" intermedium
" macrocarpa	" Matthewsii
Cotula Featherstonii	" obeordatum
" Renwickii	" " var. Kaitaioensis
Dracophyllum Townsoni	" pimeleoides
Geniostoma ligustrifolium	Raoulia Petriensis
" var. crassum	Senecio compactus
Hebe acutiflora	" myrianthus
" Cookiana	" radiolatus
" Gibbsii	" sciadophilus
Hebe obtusata	
Among the supposedly rare herbaceous species in the flora are the following:—	
Geum divergens	Myosotis saxatilis
Gentiana filipes	Ranunculus crithmifolius
" Gibbsii	" pauciflorus
" lineata	Thelymitra caesia
" tereticaulis	" Colensoi
" vernicosa	" intermedia
Myosotis amabilis	Wahlenbergia vincaefolia

In conclusion, it may be emphasized that much more information is necessary before many of the plants can be confidently assessed as rare. In support of this may be mentioned the case of *Tetrachondra Hamiltoni* which twenty years ago was regarded as "possibly extinct." Mr. Geo. Simpson of Dunedin, now reports this insignificant endemic plant as "common near Invercargill." Bearing in mind the difficulty of ascertaining the true position, it is hoped that readers who are able to supply information will be good enough to do so in respect of any of the plants listed above.

INSTITUTE NOTES.

CONDOLENCE:—At the August meeting of the Executive Council, resolution of sympathy was directed to be conveyed to the widow and family of the late T. W. Attwood, Director of the New Zealand Alpine and Rock Garden Society, Lower Hutt, which stands as his monument after a useful life devoted to horticulture in many phases.

DISTRICT COUNCILS:—Auckland—Mr. N. R. W. Thomas, Hon. Treasurer, represented the Auckland District Council before the Local Bills Committee, in support of the Council's suggested amendment of the Constitution of the Waitatere Park Board under the "Auckland Centennial Memorial Park Act, 1941." Dr. W. R. B. Oliver, Acting Chairman of the Executive Council, and the Dominion Secretary also gave evidence in support.

Southland reports a good collection of subscriptions in arrears and from new members.

Otago reports special lectures at Dunedin Gardening Club and matters for Conference.

VEGETABLES AND FOOD PRODUCTION IN WAR is the title of an address to Farmers, Gardeners, Horticultural, Patriotic and other Societies, by Mr. George J. W. Cooper, of Messrs. F. Cooper Limited, Wellington, a member of the Executive Council who has been thanked and congratulated on this valuable publication.

PLANTING AND BEAUTIFICATION OF CAMPS:—Following on the Auckland District Council's reports on plantings at Whenuapai and Hobsonville Aerodromes, circulars have been issued to District Councils and representatives regarding assistance towards the planting and beautification of camps and aerodromes and also by other local interested bodies including Horticultural and Beautifying Societies, etc.

The Executive's Committee has visited Trentham Camp and has discussed this question with the Camp Commandant. Circulars have been issued requesting donations of surplus seeds, plants, etc., and receiving depots have been established at Wellington and Hutt Valley.

The Otago District Council has appointed a Committee to see the Commander of the Taieri Aerodrome.

NURSERYMEN'S APPRENTICES in the Wellington Industrial District, who acquire the Junior Certificate, Intermediate Certificate and Diploma in Horticulture will receive 2/6, 3/6 and 5/- additional respectively on the scheduled rate of wages. This has been noted with appreciation by the Executive Council and the Examining Board.

NATIONAL HORTICULTURAL WEEK, 1942.

The Joint Committee has agreed that Hastings shall be the venue of National Horticultural Week, 1942. This will commence on Tuesday, 3rd February, 1942, with the following programme:—

Tuesday evening:—Annual Conference of the Horticultural Seedsmen's Association of New Zealand at 7.30 p.m.

Wednesday afternoon:—Official opening of National Conferences and National Flower Show.

Thursday, all day and evening:—Annual Conference of the New Zealand Horticultural Trades Association and Continuation of National Flower Show.

Friday:—Annual Conference of New Zealand Professional Floral Artists at 9 a.m.; Annual Conference of the Royal New Zealand Institute of Horticulture at 10.30 a.m. and in the afternoon; Evening, Banks Lecture.

It is expected that the Annual Conference of the Association of Directors of Parks and Reserves will be held during the Week.

The National Flower Show on 4th and 5th February, 1942, will feature exhibits of national importance and the necessity and value of food production. Ample accommodation is available, in the Government's new Cool Store at Hastings. Space exhibits by Government Departments and private, outside and local, space and competitive exhibits, in which Hawkes Bay is particularly strong, will make this Show a memorable occasion.

A list of accommodation for visitors will be supplied upon inquiry.

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