



*TARANAKI BUSH*  
*Supplejack and Filmy Fern*

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

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## **Gardeners' Contribution to Britain's Wartime Larder**

By J. P. HUDSON, B.Sc. (Hort.) Lond., N.D.H.

**A**RCHÆOLOGISTS tell us that agriculture has been practised in Great Britain for about four thousand years—since the time of Abraham. Little detail is known about the system then in vogue, but by 300 A.D. England was exporting food, sending up to eight hundred shiploads of grain to the Continent each year.

**T**HE history of British gardening really started at the time when monasteries walled in pieces of ground to protect herbs and medicinal plants from roaming stock. The number of vegetables grown in those days was relatively small, and the diet of the common people must have been remarkably dull, since practically everything they ate was produced by themselves. Hence the importance they attached to herbs—culinary herbs to make the food more interesting and medicinal herbs to correct the internal disorders from which they suffered as a result of their diet.

With the tremendous increase in population in the past two centuries, and the aggregation of millions of people into cities where they had little opportunity of growing their own food, Britons became more and more dependent on other countries for their food supplies. Before the war little more than a quarter of all the food consumed in the United Kingdom was grown there, and cattle, pigs and poultry, as well as human beings, lived largely on foods imported from all over the world. These imports included not only fruits, vegetables, meat, grain and dairy produce, but even perishable products like tomatoes and salad crops, which came in great quantities from neighbouring European countries.

### **PRE-WAR PLANNING**

It was realised long before the Munich crisis that if war came Great Britain's overseas food supplies would be in jeopardy, and that the shipping position might become even more desperate than in the previous war. However, the science of nutrition had made great progress since 1918, and far more was known about food requirements and utilisation than when World War I began. The whole question of the nation's food was therefore very carefully considered as far back as 1936, both by the dietitian, who calculated the amount and type of food which would be required to keep the nation fit, and by the agriculturist, who considered what steps would have to be taken to enable the farmers at home to produce as much of those foods as possible.



**CLEMATIS INDIVISA.**

[Photograph by D. Elliott, New Plymouth.

**CONTENTS**

	Page
Gardeners' Contribution to Britain's Wartime Larder ....	1
Classification and Naming of Plants ....	15
The Size of Exhibition Vegetables ....	17
A Vegetable-judging Competition ....	19
Book Reviews ....	21
A Giant Stock ....	22
Obituaries ....	23
New Leptospermum Hybrids ....	23
Variations in the Auricula ....	25
Preservation of Plant Boxes ....	31

The illustration on the front cover—a remarkable study of a difficult subject—is from a photograph by D. Elliott, New Plymouth, as are those above and on pages 26 and 28.

The illustrations in the article on Britain's wartime food are taken from "Land at War", prepared by the British Ministry of Information and now available in New Zealand at 1s. 6d. a copy.

### THE DIETITIAN'S CONTRIBUTION

Three main types of foodstuffs are required to keep the body nourished and active: Foods providing carbohydrates (such as sugar and flour) to supply energy; proteins (meat and fish) needed for body building; and vitamins (such as those supplied in fresh vegetables, fruits and fish oils) to keep the body working efficiently.

**Before the war, grain, meat, dairy produce, eggs, and fruits, including citrus fruits, were imported in vast quantities to supply these needs, and the principal meal of the pre-war day was likely to consist of a large helping of imported meat, with potatoes (largely home-grown) and vegetables as mere culinary adjuncts, and a sweet made from some form of imported cereal, probably flavoured with a foreign dried fruit and garnished with imported cornflour custard. How, then, could the nation still be kept fit to do a man's work if war came and imports of food had to be drastically reduced?**

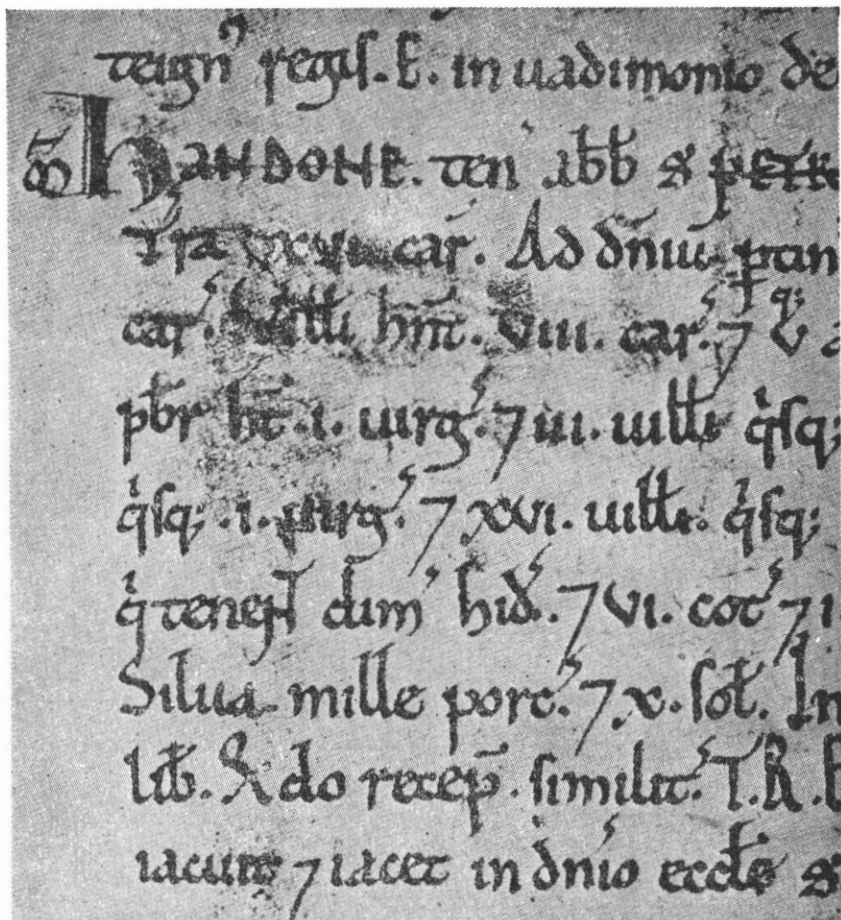
Bulk foods, especially cereals, required most shipping space, and the first essentials would obviously be to grow vastly more wheat at home and to grow, and encourage the people to eat, more vegetables than ever before. In fact, the average consumption of vegetables, other than potatoes, would have to be increased from the pre-war figure of 1½lb. to 2½lb. a head a week if the diet was to be balanced and the use of flour cut to a minimum. On the other hand, the consumption of meat, fish and eggs would be much reduced.

The principal wartime meal would have to consist of a large helping of home-produced potatoes and vegetables, flavoured with meat and occasionally relieved by entirely vegetarian dishes such as "vegetable hotpot" and "vegetable curry". Incidentally, this led to an increased interest in vegetables such as leeks, Brussels sprouts and cauliflowers, which "go" well with potatoes without meat—vegetables with character. The sweet would have to be made from home-grown flour, flavoured, if at all, with English fruits, and often with no custard or sauce at all. This diet, to which people in Britain have been accustomed for five or six years, has sustained them in health and strength, thanks mainly, perhaps, to the care with which it was balanced and the vitamin content maintained.

### IMPORTANCE OF TOMATOES

The loss of citrus and other fruits from abroad meant that full use would have to be made of home-grown vitamins. For that reason greatly increased acreages of tomatoes would have to be grown both indoors and outdoors—the latter an innovation for British commercial growers, as before the war the cheap tomatoes imported from the Channel Islands, Canary Isles and the Continent made the risky outdoor crop unpopular with British growers. The production of tomatoes under glass doubled, from 60,000 tons in 1939 to 120,000 tons in 1944, and during the war growers were compelled to devote at least 90 per cent. of their glasshouses to tomatoes and other food crops. The tomato came to be looked on not as a luxury, but as a health crop of first importance.

Black currants, which are even richer in vitamin C than oranges, were another important source of vitamins. The majority of the black currant crops were pre-empted by the Government and made into black currant syrup or puree for issue to children. Rose hips were collected in considerable quantity and made into rose hip syrup, which was also issued to mothers for their children. In addition, the greatly increased use of fresh vegetables, especially carrots, ensured that the population was not starved of vitamins.



DOMESDAY BOOK, 1084, in which William the Conqueror reviewed the wealth of his new kingdom. Here are listed the ploughs, cattle and "hides" of land which he found at Hendon.

It is interesting now to recall that in the drive for increased production of health crops the items were put in the following order of importance: Tomatoes, carrots, green vegetables, black currants, apples, pears, plums, small fruits (strawberry jam was regarded as a "morale" food), and, at a later stage in the war, onions (also listed as a "morale" food for flavouring purposes).

So much for the dietetic side of the problem. From the agricultural point of view long term and accurate planning was handicapped at the outset by a lack of comprehensive information about the farms of Britain, so in 1939-40 a preliminary survey was made of all the agricultural lands and resources of the United Kingdom—the first complete survey of British agriculture since

**B. CONDITIONS OF FARM.**

1. Proportion (%) of area on which soil is	Heavy	Medium	Light	Peaty
		45	25	
2. Is farm conveniently laid out ?	Yes ...	...		X
	Moderately			
	No ...	...		
3. Proportion (%) of farm which is naturally ...	Good	Fair	Bad	
	65	35		
4. Situation in regard to road ...	X			
5. Situation in regard to railway ...		X		
6. Condition of farmhouse ...	X			
Condition of buildings ...	X			
7. Condition of farm roads ...		X		
8. Condition of fences ...		X		
9. Condition of ditches ...	X			
10. General condition of field drainage		X		
11. Condition of cottages ...		X		
12. Number of cottages within farm area ...			No. 2	
Number of cottages elsewhere ...			0	
13. Number of cottages let on service tenancy ...			1	

**FARM SURVEY, 1940.** Nearly 900 years later, as a new invasion threatened, Britain made a second survey. Every farm was noted.

the Domesday Book was compiled nearly 900 years ago in 1084 A.D. All agricultural and horticultural extension workers were taken off their ordinary business, each given a small area and a large supply of forms, and for months worked feverishly collecting data for what history may call "The Great Survey of 1939".

**THE FARMERS' CONTRIBUTION**

Something of the story of the British farmers' efforts to increase food production is told in "Land at War", published by the Ministry of Information. Those anxious days of summer, 1939, will not soon be forgotten by the people of Britain—"The breathless days of Indian summer, pregnant with news of war, the heat haze over the yellow fields and the silence of earth and sky. The countryside was not to know that silence again for years."

In all, during the drive for more food from the land, more than 7,000,000 acres of grassland were newly ploughed up, much of it for the first time for a century. In parts of England a paddock of corn became more familiar than a paddock of grass. There was a scramble for agricultural machinery, of which there was not then enough to go round, though now British agriculture is the most highly mechanised in the world, with more than 200,000 tractors, the equivalent of one for every holding of 50 acres or more. It was common to see tractors and ploughs working all night in the rush to convert from grass to arable land.

The potato acreage was doubled, and production was stepped up to 10,000,000 tons a year—enough to supply about a pound a day a person throughout the year. The people at Home became great potato-eaters, and "Potato Pete" began to make his appearance on posters and in the Press, exhorting his readers to "Eat less bread and more potatoes," with such verses as

"Those who have the will to win  
Cook potatoes in their skin;  
And those who throw away the peelings  
Deeply hurt Lord Woolton's feelings."

#### DANGER OF PESTS

An anxious watch was kept for an "invasion" of Colorado beetle, a most serious potato pest already well established on the shores of France and Belgium. Before the war a rigorous supervision of cross-channel traffic had succeeded in keeping the beetle out of Britain, but wartime traffic of commandos and invasion vessels was not amenable to scrutiny by inspectors of the Ministry of Agriculture. On several occasions the pest became established in isolated areas during the war, and altogether 13 centres of infection were found. In all of these the pest is believed to have been completely stamped out, thanks to the extraordinarily thorough and immediate steps taken by the authorities. The story of the Colorado beetle attacks makes quite a thrilling tale, which was kept secret during the war for security reasons.

A pest which has been "news" during the war is the wireworm, which, more than any other, may lead to failure of a cereal crop sown on newly broken-up grassland. To reduce this hazard a system of sampling was devised whereby the wireworm population of a paddock could be estimated and the farmer advised whether or not to sow a cereal. Thus, with a wireworm population of more than 1,000,000 an acre, the odds were 2 to 3 against a crop of wheat being successful, whereas with less than 300,000 wireworms an acre the chance of a good crop was 4 to 1 on.

Flower-growers were rigidly restricted to a quarter of their pre-war acreage of flowers, the remainder being put into food crops. Millions of flowering bulbs were ploughed in to make way for food crops, though fortunately it was not necessary to use these bulbs for food. In Holland, where dahlia tubers and tulip bulbs were eaten, the German-controlled Board of Household Information said, rather naively, that "they have not much food value, but they give one a sound feeling of being satisfied after eating them."

Though England once produced all the onions required, the crop had gone out of fashion because of the low prices at which onions could be imported before the war. When the war broke out only 6,000 tons of onions a year were being produced at Home, and in the earlier years of the war there was an acute onion shortage. By the end of the war the British growers were producing splendid crops of this vegetable, amounting in 1944 to 100,000 tons—no mean achievement. Among the varieties grown was "Pukekohe Longkeeper" from seed supplied by New Zealand.



The acreage of carrots was nearly trebled, to reach a peak of 35,000 acres in 1944, thanks to the help of the entomologist, who made it possible for the farmer to control the carrot fly and so make carrot-growing a more reliable commercial proposition. Carrots were said, by one authority, to "give colour to the cheeks, lustre to the eyes and gloss to the hair," and it was commonly held that plenty of carrots helped one to see better in the dark, an important point in those dreary black-out winter nights when the evening life of the countryside largely came to an end, and meetings which were essential were always arranged for nights when there was a full moon.

By the end of the war there were 650 airfields in Britain, and several hundred thousand acres, often the best land, were lost to cultivation in the construction of airfields, fortifications, minefields and camps. Yet this lost land was more than replaced in area by reclamation of bog, fen and moorland. Tens of thousands of miles of hedges, ditches and drains were put into order, and good crops were wheedled out of most unpromising areas. Even the lawns at Sandringham were ploughed and made their contribution to the nation's larder, on Norfolk sand, which is proverbially so poor that it will only carry "one blade of grass and two rabbits fighting for it".

### THE GARDENERS' CONTRIBUTION

Many men at Home were keen vegetable gardeners even in peacetime, and during the war there was a great increase in the interest taken in the home kitchen garden, guided and encouraged by a vigorous "Dig for Victory" campaign that was started soon after the beginning of the war. The greatest difficulty in increasing home food production in Britain was, of course, the fact that a big proportion of householders in the United Kingdom have either no garden at all or only a small patch of impoverished soil, deeply shaded by buildings and not improved by having been used for several generations as a playground for children and the neighbourhood's cats and dogs.

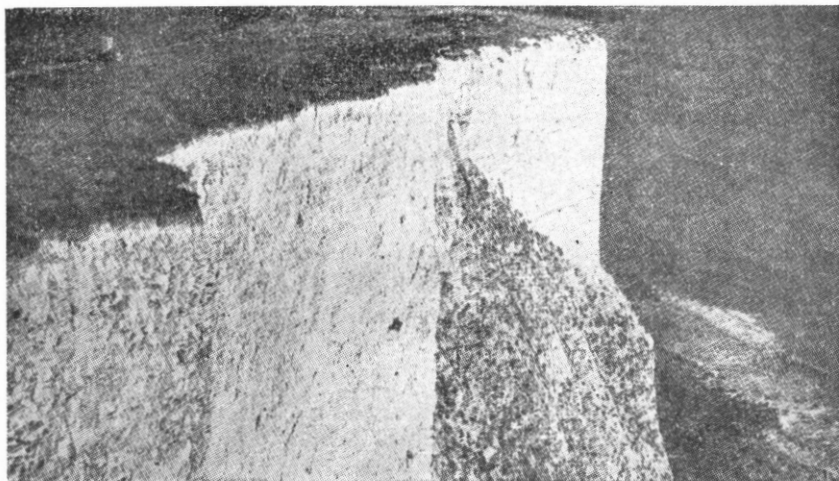
**The way out of this impasse was found in the 1914-18 war by the formation of those typically British institutions "allotments". The allotment which is now accepted as standard is a piece of land 30 by 10 yards (a "ten-rod plot"). In and around every city, town and even village in the United Kingdom will be found paddocks which have been set aside for allotment gardeners. In many of these sites before the war the land was owned or provided by the civil authority, which offered a degree of security of tenure to the holder.**

In the more progressive places a central building was provided, with tool lockers for each member, and in these cases the allotment-holders were not permitted to erect sheds on their plots. This provision increased the amenity value of the area, as it avoided the clusters of rather ramshackle individual sheds which are so often associated with allotments.

During the war temporary allotments were produced by the tens of thousands by ploughing up public open spaces and parks. Hornsey Council provided allotments in the centre of Alexandra racecourse, but banned runner beans or sticks because they might obscure the view of the race from the judge's box. In the London County Council area alone about 20,000 new allotments were formed in this way, including one, for demonstration purposes, in Hyde Park, just off Park Lane. This was worked by a personable young lady, in green jersey and breeches, who became one of the better-known features of wartime London, and will no doubt be remembered by many New Zealand returned servicemen—a first-rate gardener.

Many of the allotments were gardened with a high degree of skill, often by men working long hours and overtime in a war industry, as well as doing Home Guard or civil defence duty to the tune of 48 hours a month. Every

# [RETURN OF



They ploughed the hills and valleys; they ploughed to the very edge of the sea.

## **THE PLOUGH]**



They ploughed by day and by night through one of Britain's hardest winters in living memory.

possible help and facility was given by the organisations interested in horticultural education, by means of lectures, demonstrations, films, competitions and radio talks, and in many areas the allotment-holders formed associations for the co-operative buying of seeds, tools, manures and spray materials.

### RESULTS FROM ALLOTMENTS

In the hands of an expert an allotment is expected to yield about 15cwt. of produce a year, valued at about £20 sterling (and probably of much greater value at vegetable prices now ruling in New Zealand) for an expenditure of about 36/6 in cash and 156 hours of working time. This produce should be sufficient to provide all the vegetables, except main-crop potatoes, for a family of four for the whole year, and, moreover, should provide a choice of at least two vegetables every day of the year. Sufficient early and second early potatoes were normally grown to supply the family of four for three months, but allotment and home gardeners were not encouraged to grow main-crop potatoes, as it was considered that these could be grown more efficiently on a field scale by the farmer. There is little doubt that well-chosen vegetables, grown on the area which main-crop potatoes would occupy, are of greater value to the householders than would be the potatoes, especially if the vegetables are timed to be ready during the winter and early spring.

The contribution which allotments and home gardens made to the national larder, and their value in providing a healthy change of occupation to war workers, cannot be estimated, but must have been an important factor in keeping the nation so fit on strained means. One and three-quarter million allotments were being gardened in 1944 (including 10,000 by women). This represents an area of over 100,000 acres, every inch cultivated by the sweat of man's brow, and gives some idea of the magnitude of the effort. During the war years three out of five households in Britain were producing some or all of the vegetables they used, either in their own garden at home or in their allotments.

### MAXIMUM UTILISATION OF GARDENS

**In addition to taking in more land, a drive was made to increase the efficiency of amateur vegetable gardening. The most common fault was overproduction in summer and autumn and underproduction at other seasons of the year. The market gardeners' proverb "Look after the winter and spring and the rest will look after itself" is one that might well be taken to heart by home vegetable-growers.**

An attack was made on this fault to avoid waste of seed, time, and crop, and many gardeners became aware, for the first time, of the fundamental importance of those three essentials for successful vegetable gardening, **succession, inter-cropping, and rotation.** A cropping plan for an allotment was worked out by a committee which included several of the finest growers and foremost horticulturists in the United Kingdom, and, with little variation, was adopted by amateur gardeners everywhere with satisfactory results.

### MANURING PROBLEMS

More cannot be taken out of the soil than is put into it, and the problem of what to put into the soil in wartime to produce food crops was a knotty one. The French "maraichier", who often made a good living for himself and his large family on less than 2 acres of land, used 500 tons of stable manure an acre every year, and grew his salad crops on probably the most fertile type of compost which it has ever been a gardener's good fortune to own. It has been said that in some old Parisian gardens the manure of former years covered the original soil to a depth of two or three feet, and was as soft to walk on as a velvet pile carpet. Moreover, the "soil" became so much a part of the grower's stock-in-trade that on leaving a holding he was allowed by law to cart his soil away with him!

Though animal manure was not used on this prodigal scale, many of the best British garden practices in the past were based on an abundant and regular supply of horse manure, especially in private establishments where the gardener had first call on the manure from the stables. Even now the most successful English market gardeners often use up to 30 tons of animal manure, together with a ton or more of hoof and horn, or other fertilisers of organic origin, every year, and with clockwork precision produce a succession of up to seven first-class crops a year from the same piece of ground. It was not uncommon to see vast piles of straw being converted into compost—I have myself seen 1,000 tons of compost being made from straw on one market gardener's holding. Sometimes, after a raid, growers would buy up and compost scorched carpets, tobacco, and other damaged merchandise from blitzed warehouses. Most of the compost was made by wetting the material thoroughly and treating it alternately with sulphate of ammonia and lime as the heap was made up. (In is an interesting incidental sidelight on modern British market garden practice that, even in England with all its rain, artificial irrigation of vegetable crops is being regarded more and more as an essential if intensive cultivation is to be carried to its logical conclusion.)

The householder was not in such a fortunate position, and it is to be feared that many allotment holders on newly-turned park lands cashed in on the stored-up fertility of the turf, a policy that was perhaps justified in the emergency, since most of the land will again go back to grass as soon as it can be released. There was, however, keen interest in the possibility of composts, and many gardens or allotments had a compost pile where vegetable refuse of all sorts was rotted down, though there were no compost clubs such as those formed in New Zealand.

Some local authorities dry town sewage and convert it into an easily-handled organic fertiliser, which usually finds a ready sale and is a useful by-product of the sewage disposal scheme. As an incidental addition to the nation's manurial supply, ammonium nitrate from the explosive filling of German unexploded bombs was used by those who had access to it, until it was found that the material was not quite as innocuous as it looked!

### LABOUR AND THE LAND

As in New Zealand, shortage of labour was at all times a handicap to the farmer and gardener in Britain. More labour was needed to handle the increased production, yet men were continually being lost as they were recruited into the forces. Many expedients were tried, including the use of prisoners of war, and school children who were accommodated in school harvest camps; but by far the most important innovation was the formation of the Women's Land Army, and the girls who joined this organisation deserve the warmest gratitude for their work, much of which was of a heavy nature which, before the war, would hardly have been considered suitable for women. It was common to see women driving large tractors, threshing, sawing logs, digging, and handling orchard spray outfits, all with a quiet confidence and efficiency.

### MAINTAINING SEED SUPPLIES

Before the war the bulk of Britain's vegetable and flower seeds was imported, and a seedsman's shop represented literally the fruits of the earth. Outbreak of war, and especially the overrunning of Central Europe and the Mediterranean shores by the enemy, cut off supplies of much seed.

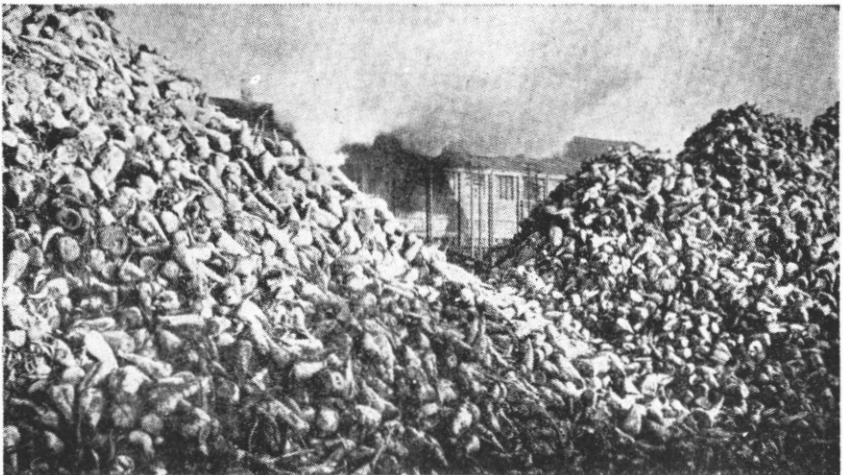
The shortage had, however, to some extent been foreseen and plans had been laid to ensure continuity of essential supplies. The position regarding vegetable seed was alleviated in three main ways: By increasing production

in the United Kingdom of seeds which could be grown there, by encouraging Empire seed production, and by importing seeds from America under the lend-lease agreement. New Zealand, of course, made a substantial contribution, especially of onion and pea seed, and a seed industry was even founded in Malta. It speaks highly of the vision and forethought of those concerned that even when the battle of Malta was at its height an eminent British horticulturist should have been sent there to found a new seed-growing industry, that place having been chosen as most suitable for certain types of seed crops, such as broccoli. This island has since made a valuable and substantial contribution of seeds.

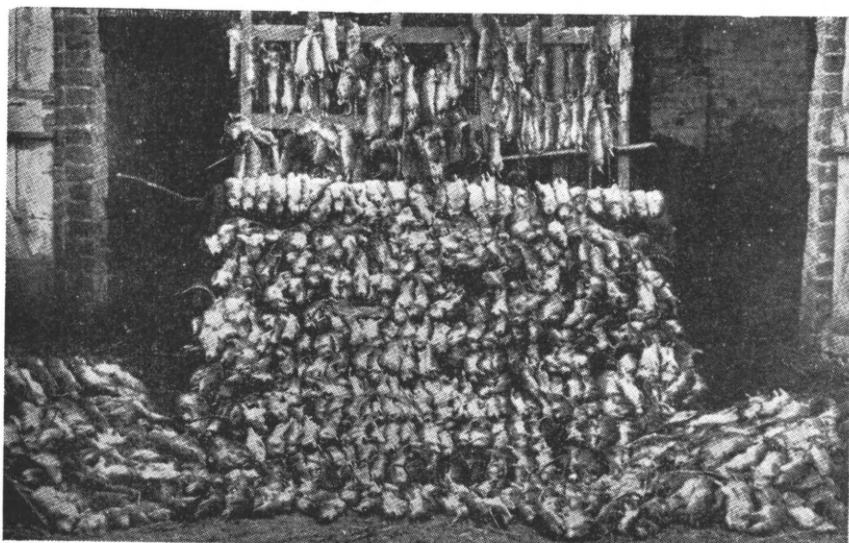
Another interesting aspect of the seed question was the compilation of a "standard list of vegetable varieties", which substantially reduced the number of varieties imported and grown, and thereby effected a useful economy in seeds, as seedsmen carried smaller stocks and the varieties chosen were those most likely to give heavy crops.

### STORAGE AND SALE OF PRODUCE

The drive for greater and more continuous production would not, of course, have been complete without a parallel drive to ensure that the produce grown was all used to best advantage. Attention was paid to improved methods of home storage and preservation of vegetables, and also to the use of those varieties which keep best. Even so, it was found that there was often a surplus of vegetables in the country districts, and in 1940 the Government set up Garden Produce Committees to organise the disposal of surplus vegetables from villages. This was achieved by means of stalls in local markets, gifts to hospitals, a system whereby hampers of mixed produce were sent regularly to ports for use in revictualling minesweepers, and use in the local British restaurants. (The latter were communal restaurants organised in every town and city to provide cheap and well-balanced meals. They were one of the least talked about yet most successful of the Government's plans



**SUGAR RATION:** Piled like coal in a factory yard, the raw beet awaits refining. Britain's entire domestic wartime ration came from this home-grown root, with cattle food and molasses as by-products.



**WAR ON PESTS:** Rats figured high on the target list for Britain's war-time drive against destroyers of food. Here is the result of one day's offensive in a Hereford barn. What would a similar campaign yield in New Zealand?

to ensure that everyone should get at least one well-cooked, nourishing square meal a day at a time when many women were working and not at home to cook.)

Salvage bins in town and city streets were the means of collecting large quantities of swill, bones, and other waste from households without gardens. Sometimes neighbours pooled their scraps, and kept a "co-operative hen" to eke out the one egg a month provided by the ration.

When blitzes caused large numbers of people to be evacuated into the country it was found that, far from handling a surplus, there was a deficiency of fresh vegetables in the villages, and the committees then became organisations for increasing vegetable production—another example of the unexpected vagaries of war.

An interesting commercial development was the national scheme for distributing tomatoes fairly to the whole population—the first time in history that a marketing scheme has been successfully applied to such a highly-perishable crop. Most of the tomatoes are produced in three main centres: On the south coast near Worthing, in the Lea Valley north-east of London, and in Lancashire. It was a major feat of organisation to distribute the fruit equally over the whole United Kingdom, often in the face of great transport difficulties.

### **GARDENING IN THE FORCES**

Many Army and Air Force units were static, and such units were encouraged to grow their own vegetables. By 1944 the combined Forces were gardening 20,000 acres and producing food crops for their own consumption to the value of £650,000 a year. Airfields personnel made a big contribution to this total, despite the exposed and windy positions in which their plots were often sited.

### EFFECTS OF ENEMY ACTION

In one county alone 70,000 bombs and several hundreds of aeroplanes all fell on farms and gardens within a period of six months, during which time, at the height of the Battle of Britain, land girls at work wore tin hats because of the rain of machine-gun bullets from the duels being fought above. Yet in spite of these disturbances farming and gardening went on, even at Hell-fire Corner, near Dover, in range of German cross-channel guns. Fire scorch soon faded and craters were filled in, and the earth of Britain now shows surprisingly few traces of the ravages of war.

While awaiting the invasion, time and railway trucks were found to evacuate 65,500 sheep from Romney Marsh to a safer place—the largest animal migration ever arranged in Britain. This was considered a considerable feat of organisation at the time, though to the people of New Zealand it probably seems quite unimpressive in view of the vast annual movement of sheep to the freezing works by rail which is part of the Dominion's agricultural system.

Almost all the iron railings around parks and reserves at home have been removed, to the great improvement of those open spaces which, at last, have become truly open, and it is to be hoped that these reminders of Victorian London will never reappear.

One of the most notable and moving relics of the blitz is the Garden of Remembrance in Plymouth Parish Church, which lost its roof in an early raid. The floor of the church, now open to the weather, but still surrounded by the ancient walls, has been laid out in beds filled with those flowers most closely associated with England's history.

An indirect effect of enemy action was the discontinuance, at the beginning of the war, of the weather forecasts, so useful to farmers and gardeners in a changeable clime. Few places, however, were out of visual range of the balloon barrage over some city or vulnerable point, and the place of the weather forecast was, to some extent, taken by the new weather proverb "When balloons be high, fair weather be nigh," since the balloons were usually hauled down if a storm was imminent.

### SPIRIT OF THE PEOPLE

Many incidents could be recalled to indicate the spirit of Britain during the war, but none perhaps better than the placard outside a bombed shop, "More open than usual," and another, in a store not yet damaged, which stated: "These premises will remain open during a blitz, but in the event of a direct hit will close immediately."

Many gardeners at Home made an effort to keep at least a part of their flower borders bright in spite of shortage of time, seeds and materials. The display in some of the flower shows was smaller, yet but little below the pre-war standard of excellence, and that was not because people were indifferent to the war but because they would not use it as an excuse for horticultural incompetence. Later the sending or taking of flowers or pot plants by rail was forbidden because of the acute curtailment of rail services, and all flower shows were cancelled.

The general health of the people of Britain at the end of the war was better than it was before the war, in no small measure the result of the efforts of gardeners to supply the national larder with health-giving, home-grown foods, and the soothing effect which gardening had on work-weary brains and blitz-frayed nerves.

**The gardeners of Britain, no less than the farmers, have a wartime record of which they may well be proud, and without the material and spiritual contribution made by them the nation would have been less able to respond to Mr. Churchill's demand for toil and sweat.**



# CLASSIFICATION AND NAMING OF PLANTS

By ELLA CAMPBELL, M.A.

Botanist, Massey Agricultural College.

FOR those who grow plants for profit it is not enough to know the species; the particular variety within the species must also be known. For instance, in most crop plants, such as oats, wheat, barley, maize, turnips, mangolds and potatoes, named varieties which possess some advantage over other varieties of the same species are used.

A SPECIES, which is usually the smallest group considered in a botanical classification, is a collection of very similar individuals which usually interbreed. However, the individual plants of species are not identical, and any two individuals may differ slightly. Anyone who looks carefully at perennial rye (*Lolium perenne*) will find many different types of plant all of which would be included under the name *Lolium perenne*. These different types are called varieties. What is known as a strain (for example Hawke's Bay rye) is not a single variety but a mixture of rather similar varieties.

## CHARACTERISTICS OF PLANTS

There are many different kinds of plants—those with green leaves and coloured flowers, pines, ferns, mosses, seaweeds, moulds and other fungi, microscopic green plants of stagnant water, and bacteria. Plants are alive, and so show the characteristics of living things. They cannot always be distinguished from the other group of living organisms—animals—but they have the following characteristics: 1. They are able to build up their food from simple inorganic substances such as carbon dioxide, water, and nitrates; 2. most plants are unable to move from one place to another; 3. the plant cell is surrounded by a cell-wall; and 4. growth in length usually takes place at the tips, as in stem or root, and continues as long as the plant is alive.

There are exceptions to every rule: Certain animals (sponges for example) have lost the power of movement; certain plants (including clover, dodder and fungi) have lost the ability to manufacture their own food, and either parasitise other living organisms or obtain their food from decaying vegetation. Certain minute plants like bacteria can swim in the water in which they live.

From earliest time man has attempted to classify plants into groups. Many kinds of classification were tried, some of which were artificial (that is, based on one or a very few selected characters), and others natural (the grouping together of plants most nearly related). The present-day classification is partly natural and partly artificial. For indicating relationships, reproductive structures (flower and fruit) are more reliable than vegetative structures, and so it is mainly the reproductive which are used as the basis of classification. The principal groups or divisions are: 1. Seed-bearing plants—the only group the plants of which have seeds; it includes flowering plants and conifers; 2. ferns and allied plants; 3. mosses and related plants; and 4. pond scums, seaweeds, fungi, and bacteria.

## SUBDIVISIONS OF FLOWERING PLANTS

Flowering plants are subdivided into two classes, monocotyledons (one seed-leaf) and dicotyledons (two seed-leaves). Monocotyledons include grasses, rushes, lilies, New Zealand flax, and cabbage tree. These usually

have long leaves with veins running parallel, a fibrous root system, flowers with the parts in threes, and in the seed an embryo with only one cotylédon or seed-leaf. Nearly all are herbs; such large plants as cabbage tree and bamboo have a peculiar soft, pithy stem quite different from a normal tree trunk. Dicotyledons usually have broad leaves with veins running outward from the main veins, a tap-root system, floral parts in fours or fives, and an embryo with two cotyledons. Each of these two classes is further subdivided into orders, and thence into families. Families are subdivided into genera, and these again into species.

As an example take the clover family (**Leguminosae**), distinguished by its fruit, a pod or legume. Anyone can tell from a glance at the flower that the plants of this family are closely related. There are many genera in the family, each with distinguishing features, such as: Genus **Trifolium**—clovers or trefoils (leaf with three leaflets, pod enclosed by faded petals); genus **Medicago**—lucerne (pod curved or spiral, leaf of three leaflets each with a sharp tip); and others such as **Vicia** (vetches), **Pisum** (peas), **Cytisus** (brooms). Each genus, as a rule, contains several species. **Trifolium** includes **Trifolium pratense** (red clover), **Trifolium incarnatum** (crimson clover), **Trifolium repens** (white clover), and **Trifolium subterraneum** (subterranean clover). Likewise, **Vicia** includes the following, and many others: **Vicia sativa**—common vetch or tare; **Vicia hirsuta**—hairy vetch or tare; **Vicia disperma**—the two-seeded vetch or tare.

In scientific work the two names, that of the genus and that of the species, are used; for example, **Vicia sativa**. If the reader did not know that **Vicia** was a genus of the pea family (**Leguminosae**) and belonged to the dicotyledons he could readily find out by referring to a suitable book. The scientific names of the family (**Leguminosae**) and of the genus **Vicia** are always spelt with capital letters. The name of the species (**sativa**) is spelt with a small initial letter, though when a species is named after a person it is permissible to use a capital.

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## A CENTURY AGO

*Araucaria imbricata* or Chili Pine.—This noble species of Pine is now in course of being extensively planted in this country, and within a few years will constitute an important element in the scenic character and landscape of English domains. No adequate conception can be formed of the majestic and ornamental character of this tree, and nothing can exceed the grandeur of an *Araucaria imbricata* when it has attained its growth. Its branches commence close to the ground, spreading out in horizontal expansion, rising flight by flight, in successive sheeted steps, into a spiral top. It is hardly possible to overrate its value as a Timber Tree, or the natural advantages that will accrue by having it extensively planted in Great Britain, where there is every prospect of these lords of the vegetable world succeeding to our utmost wishes. Among the more striking objects that attract the visitor to Dropmore are the fine specimens of *Araucaria imbricata*, unprotected from the hardest frosts, and which are from 15 to 20 feet high. There they stand, not a leaf nor a shoot discoloured; their stems studded with leaves, as if they were columns of lanceheads, and forming a strange and beautiful contrast with other trees, by their singularly foreign aspect and magnificence. At the Earl of Orford's at Wolverton, and at Kew Gardens, they are flourishing with equal vigour, as well as on the estate of the late Sir Francis Mackenzie, in the Highlands of Scotland.

(Advertisement in the Gardeners' Chronicle, January 11th., 1845.)

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## THE SIZE OF EXHIBITION VEGETABLES

AT the Royal Horticultural Society's Fruit and Vegetable Show last October opinions were expressed by certain Fellows on the size of the vegetables exhibited, both in the collections and the open classes.

The subject was referred to Mr. Walter F. Giles, V.M.H., one of the judges, for his opinion and comments, and his views were discussed by the President and Council. By their wish, his opinion is now printed in the Society's Journal:—

At almost every vegetable show, the size of the produce shown is sure to be discussed by someone. Occasionally, also a reference is made to it in the papers, but, generally speaking, the matter soon becomes forgotten until the next show comes around. I have attended most of the Royal Horticultural Society's Shows and fortnightly meetings for 46 years, and I well remember the great consternation apparent in 1913 at the Royal Horticultural Society about the size of vegetables.

At the Royal Horticultural Society's Autumn Vegetable Show that year, the Council had arranged a class for nine kinds of vegetables which were

*"To represent the quality and size in which they are most useful for table use."*

Two chefs from London hotels were invited to do the judging. They came to the conclusion that the produce staged was not ideal for table use, and promptly condemned the two exhibits arranged for competition. This, of course, so to speak, "put the cat amongst the pigeons" and resulted in many letters expressing all points of view, and these appeared in the gardening press at that time.

Some thought a standard size should be fixed, others seemed to think that it didn't matter how big a vegetable was if it had perfect quality. It was not possible to speak of a "perfect table size" because this varied according to the circumstances and requirements of each case.

### IMPOSSIBLE TO ESTABLISH STANDARD SIZE

I think perhaps the best concise opinion was that expressed by the chef of one of London's leading hotels, who wrote as follows:—

*"I think it is impossible, and, moreover, useless, to establish a standard size for vegetables destined to be exhibited. The first thing that should be considered by judges in an exhibition of vegetables is the quality, considering that they are meant to be eaten and not merely to be looked at. If the quality is good, the size is important only with regard to the use to which the vegetable is to be put. Therefore, to establish a standard of size without reference to the use of the vegetable would be absolute nonsense, and could produce no correct and practical result."*

There is no doubt in my mind that this chef is right. The epicure may prefer dwarf beans picked when the pods have hardly formed or peas before the seeds have really developed, whilst those who are well-to-do and/or discriminating may like small cabbages, cauliflower, or marrows in which one specimen is just the size for one person on a plate.

The general run of middle-class people, however, would want vegetables still a little larger, while the artisan or worker or allotment holder will generally need still more bulk. Finally, in the catering for schools and institutions large vegetables are most useful.

Thus, if the quality is good, every size has its uses, at some table or other, and, as the chef says, it is quite impossible to establish a standard in size without reference to the particular use of the vegetable.

The Royal Horticultural Society continued to offer this class for a number of years after 1913, but it was eventually discontinued.

"The Times" in its issue of September 22, 1920, made reference to large vegetables at the Royal Horticultural Society's show. As a result there appeared in the Royal Horticultural Society "Book of Arrangements" for 1921 (page 70) the following announcement:—

*"The experience of this year's vegetable meeting and the knowledge of the awards made at the principal shows have convinced the Council that the time has come to make an effort to reform the system of judging at vegetable shows. Vegetables are primarily grown to be eaten and not to be and cooks rightly prefer to the monstrosities which often appear on the show table."*

As regards the collection of vegetables exhibited at the October Show, I admit that the vegetables were large, but they were not coarse. They were judged strictly on the Royal Horticultural Society code of judging (1925), all done by "points," and all the specimens had quality and were suitable for someone's table.

As the rules did not confine the exhibits to being "suitable for the table of the epicure" or "for the table of a discriminating private gentleman" or even "for the table of the average householder," no objection could be taken to the size (provided the quality was perfect) except by those to whom the size exhibited did not appeal.

It must be remembered that the Royal Horticultural Society competitions are held to develop horticultural skill.

### **VEGETABLES FOR THE EPICURE NEED LITTLE SKILL IN GROWING**

Large vegetables which are perfect in quality require much skill to produce them. Those which are of the size preferred by the epicure or specialist require little or no skill in growing. They will really grow themselves without any trouble.

From a commercial crop of unions, or many other vegetables, it would be quite easy to pick out hundreds of perfect small specimens which would please those who like small vegetables. But these small vegetables have really no value from an exhibition point of view.

The beans in the collections were perfectly tender and brittle and would snap quite easily; the parsnips had much more edible matter in proportion to the size than they would have if they had been smaller; the same applies to the carrots, and I have yet to be convinced that a large tender leek is worse than a smaller one. The onions, of course, were too big to cook whole, but all of the bulb could be used in one way or another.

It seems to me that if the Royal Horticultural Society wishes the exhibits to please all the Fellows who, it must be remembered, represent all walks of life, it would probably be necessary to divide the classes into at least three sections: (1) Vegetables of a size appreciated by the epicure; (2) vegetables of a size appreciated by the average householder, and (3) vegetables of a size more suitable for large households, schools and institutions.

Whether such a scheme would be workable, even if desirable, I hardly know, but I should imagine it would be extremely difficult to fix the limit of size for each section.

WALTER F. GILES.

## A VEGETABLE-JUDGING COMPETITION

**A**N account of rather an unusual competition held at a recent produce show in Sussex may be of interest to secretaries of Horticultural Societies who are anxious to fill a gap in their programme, writes John Derbyshire in "The Gardeners' Chronicle," London. The competition followed a lecture on "The Judging of Vegetables" during which the lecturer based his remarks on the information in "Rules for Judging," published by the Royal Horticultural Society. Great stress was laid on the need for the accurate drawing up of schedules if the many pitfalls are to be avoided.

A collection of "nine distinct vegetables including not more than three of the cabbage tribe" was set up and members were invited to judge this collection. As a guide a table was issued showing for each vegetable, the type asked for (i.e., kidney, coloured potatoes), the number of specimens to be exhibited (i.e., twelve tubers) the maximum points allowed for the vegetable (i.e., eight for potatoes), and the allocation of those points (i.e., with potatoes—appearance and freedom from many eyes, three; uniformity of specimens, three; size, two).

In the course of the lecture the ideal at which to aim with each vegetable had been explained (i.e., in the case of the potato "of medium table size, free from disease; eyes few and shallow; skin clear; fresh and clean"). Various faults, such as "thick neck" in onion, had been pointed out in specimens which were displayed. The vegetables in the staged collection were not all of first-class show quality, thus giving competitors an opportunity for recognizing various faults. With Brussels sprouts, fewer than the required number were put in the dish, and only one competitor in the competition noticed this point and disqualified the dish as "not according to schedule"!

Each competitor was handed a score card on which he was required to enter opposite the name of each vegetable (a) the points awarded to that vegetable, and (b) in a "remarks" column the reasons why less than the maximum points were awarded (i.e., stained and frothy curd in the Broccoli, leaves not fresh, etc.).

The collection was judged first by the lecturer, who completed a score card. The score cards of those who competed were then compared with his and a system of marking the score cards was devised, marks being given for the points and for the remarks about each vegetable in the collection.

The competition created considerable interest, and it was felt that a closer understanding of the rules and methods used in vegetable judging would be of value both to intending exhibitors and also to those whose duty it might be to judge the exhibits.

### JUDGING COMPETITION SCHEDULE

Collection of nine distinct vegetables (not more than three of the cabbage tribe may be included).

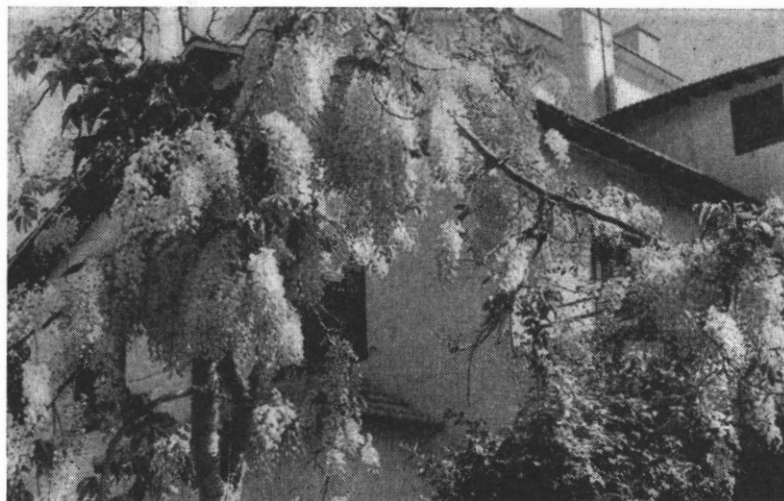
Beetroot, long, six roots: Quality of flesh, two points; colour of flesh, two; uniformity, one; condition, one. Broccoli, six heads: Purity and freshness, three points; solidity, three; size, two. Brussels Sprouts, fifty sprouts: Condition, two points; uniformity, two; firmness, two. Savoys, three heads: Freshness, two points; firmness, two; uniformity, two. Carrots, long, ten roots: Form and colour, three points; condition, two; uniformity, two; size one. Leeks, nine stems: Length and form, four points; uniformity, two; condition, one; purity and clearness, one. Onions, twelve bulbs: Size, two

points; condition, two; uniformity, two; form, two. Parsnips, six roots: Size, two points; smoothness and purity of skin, two; uniformity, two. Potatoes, coloured, kidney, twelve tubers: Appearance and freedom from deep or many eyes, three points; uniformity, three; size, two. The collection may be garnished with Parsley, for which no marks will be awarded.

**SCORE CARD.**

Vegetable.	Maximum Points.	Points Awarded.	Remarks.
Beetroot .....	6		
Broccoli .....	8		
Brussels Sprouts .....	6		
Savoys .....	6		
Carrots .....	8		
Leeks .....	8		
Onions .....	8		
Parsnips .....	6		
Potatoes—round .....	8		
	<b>64</b>		<b>Total</b>

**Note.**—In the remarks column you should point out faults for which marks have been lost. In marking the judging competition both points awarded and your remarks will be taken into account.



**THE PINK SHOWER (*Cassia grandis*):** For freedom and length of flowering period there are few trees in Egypt that would surpass the Pink Shower. The blossom, which at a distance has the appearance of apple blossom, is produced throughout the summer on long arching branches, and contrasts with a most attractive foliage.

[F. Sydenham photo.]

Book Reviews

**VIRUS DISEASES OF CROPS**

VIRUS diseases of garden plants have come very much to the fore in the past few years, and there has been a real need for a book on the subject written for the gardener rather than for the scientist. Most vegetable-growers are aware of the important part potato virus diseases can play in limiting the weight of a potato crop, and all New Zealand gardeners know only too well the disastrous effects which virus disease can have on unbroken tulips—incidentally the oldest recorded virus disease.

The extensive literature of scientific papers and textbooks on the virus diseases has not, however, so far been designed to help the farmer and gardener to understand the peculiar problems connected with these troubles. We are therefore glad to welcome a book such as "Virus Diseases of Farm and Garden Crops", written for the practical grower and extension worker by Dr. K. Smith, a world authority on the subject.

The book describes the symptoms of virus diseases which attack the vegetables and ornamental plants commonly cultivated in the United Kingdom, though it does not, of course, include virus diseases of fruits such as the tree tomato, which are grown in New Zealand and not in Britain. The importance of insects in the spread of virus diseases is stressed, and a list is given of the common insect vectors in the British Isles and the diseases they transmit. It should not be assumed that the same insects necessarily serve as vectors in New Zealand, though most of them are recorded here as commonly occurring on the plants concerned.

Recommendations are made for control measures for the various virus diseases. It is clear that amateur and commercial gardeners should familiarise themselves with the symptoms of the more important viruses (such as spotted wilt of tomatoes) as they appear on the wide range of plants attacked, and should be ruthless in pulling out and burning all plants suspected of infection. Thus there is at least hope of reducing the annual carry-over of centres of infection from one season to the next.

This book is recommended to commercial horticulturists, amateur gardeners, and extension workers alike.

"Virus Diseases of Farm and Garden Crops," by K. M. Smith, pp. 111, published 1945 by Littlebury, Worcester. Price 10/6 sterling.

—J. P. H.

"Propagation by Cuttings and Layers." By R. J. Garner. Technical Communication No. 14. 4to. 80 pp. Illus. (Imperial Bureau of Horticulture and Plantation Crops, East Malling. Sales Branch: Agricultural Research Building, Penglais, Aberystwyth.) 3s. 6d.

This book is strongly recommended to all those who are interested in the art of propagation, especially of deciduous fruit trees (pip and stone fruit).

"Uncommon Vegetables." By Eleanor Sinclair Rohde. Sm. 8vo. 94 pp. Illus. (Country Life.) 5s.

Miss Rohde's name is closely associated with the growing of herbs and vegetables, a subject she knows intimately both practically and historically. This small book, in which she describes, with cultural directions, some of the

vegetables less usually grown, will appeal to all who would like to introduce greater variety into their fare.

(Review from the Journal of the Royal Horticultural Society, January, 1944).

**"Horace Walpole: Gardener,"** with an edition of his "The History of the Modern Taste in Gardening." By Isabel W. U. Chase. 8vo. 285 pp. Illus. (Princeton University Press; in England, Humphrey Milford, Oxford University Press.) 24s. 6d.

Horace Walpole's essay was originally published in 1780 under the title of "On Modern Gardening," and since that time ten editions, five before Walpole's death and five after, have been produced. This, the eleventh, presents a text based on the 1782 edition, the spelling and punctuation of the original being retained; it has been fully annotated by Mrs. Chase, who is a professional landscape gardener in America and a scholar of English literature. The essay is followed by a discussion of Walpole's ideas on the new landscape gardening and his relations with his contemporaries, together with descriptions of actual gardens of his day—Park Place, Wooburn Farm, The Leasowes, Painshill, and his own estate at Strawberry Hill, where he put his theories into practice.

(Review from the Journal of the Royal Horticultural Society.)

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## A GIANT STOCK

Some years before the war a friend who has a garden on the Riviera gave me some seedlings of a Stock, a hybrid (*Matthiola sinuata* × *Matthiola incana*). It was a very nice garden plant with bright mauve flowers, growing about 18 to 24 inches in height, while varying considerably in its foliage between the types represented by the two original parents. The hybrid produced fertile seed and I raised a batch of seedlings every year.

In the second year of the war I noticed that one seedling of the third or fourth generation that I had raised was inclined to grow more vigorously in its pot than the rest and, when the time came to plant them out, this individual showed no sign of forming its flowering branches. It was therefore not put out with the rest but kept back in its pot.

As it continued to grow vigorously it was put out in a cold greenhouse border. It made no flower at all during the first year when the other seedlings of its batch were flowering outside, but continued to grow.

It put out its first flowers in March or April, 1942, when it was about 15 months old, and the same summer it hit the roof of the greenhouse and started to grow downwards again.

From that moment until January this year it flowered almost continuously, and when in full bloom was a grand sight. The confined space of the greenhouse unfortunately prevented me from taking a photograph of it *in situ*.

The zero temperature which we experienced this year was too much for it even in the greenhouse and it died. The dead Stock after it had been removed from the greenhouse measured from the ground to the point it turned down after hitting the roof 7 feet 10 inches, and the overall length from root to tip of branches was 16 feet 2 inches.—Lewis Palmer (From the Journal of the Royal Horticultural Society.)



## OBITUARY

### **Dr. William McKay, Greymouth**

**T**HE death occurred at Greymouth last month of Dr. William McKay, F.R.C.S. (Edinburgh), aged 70. He had taken a prominent part in public affairs for a number of years and was one of Greymouth's best-known and most respected citizens.

The son of the late Alexander and Euphemia McKay, he was born at Blacks Point and was an early winner of the Watkins Medal while at school in 1887. He began practice in 1908 and retired 21 years ago. At the outbreak of the 1914-18 war Dr. McKay was in England, and he served in France with the Medical Corps.

Under his will a valuable collection of rare books relating to the West Coast, or containing substantial references to it, and also books dealing with natural history in New Zealand, has been bequeathed to Canterbury University College. The bequest is to be known as the "Doctor William McKay Collection."

Dr. McKay was an authority on New Zealand plant life, and was for many years a prominent member and official of the Grey District Acclimatisation Society. He was closely associated with a number of sporting bodies and with the late Dr. McBrearty promoted the Seddon Shield Rugby Competition. He was an inaugural member of the Municipal Swimming Baths Committee, an alpinist, a past president of the Star Rugby Football Club, a foundation member of the Greymouth Golf Club, a prominent official of the Automobile Association, and a member of the Arthur's Pass National Park Committee.

### **Mrs. G. S. Nicoll, Wellington**

**M**EMBERS of the Institute of Horticulture will learn with great regret of the death of Mrs Nicoll, wife of Mr. G. S. Nicoll, Wellington, a former secretary of the institute. Mrs. Nicoll was a greatly valued and respected member of the institute and will be sorely missed.

At a recent meeting of the Dominion executive the chairman referred to the death of Mrs. Nicoll and to her interest not only in horticulture generally but in the institute's work in particular, to which she had contributed in many ways. It was resolved that the secretary should write to Mr. Nicoll expressing the sympathy of the executive in his loss.

## **NEW LEPTOSPERMUM HYBRIDS ON THE WAY**

By H. H. ALLAN, M.A., D.Sc., F.R.S.N.Z.

**U**NDER the title "New Double Flowering Leptospermum Hybrids" Dr. W. E. Lammerts has published a most interesting account in the "Journal of the California Horticultural Society" for July, 1945, of his hybridisation on **Leptospermum**. The well-known **L. scoparium** var. **Nichollsi** was pollinated with pollen from a form called "Rose Double", which is described as having "pale pink flowers and a semidwarf habit when grown in Southern California. The foliage is soft, finely cut, and looks attractive during the entire year. The flowers appear from March until May, and have been quite realistically called miniature Cecile Brunner roses."

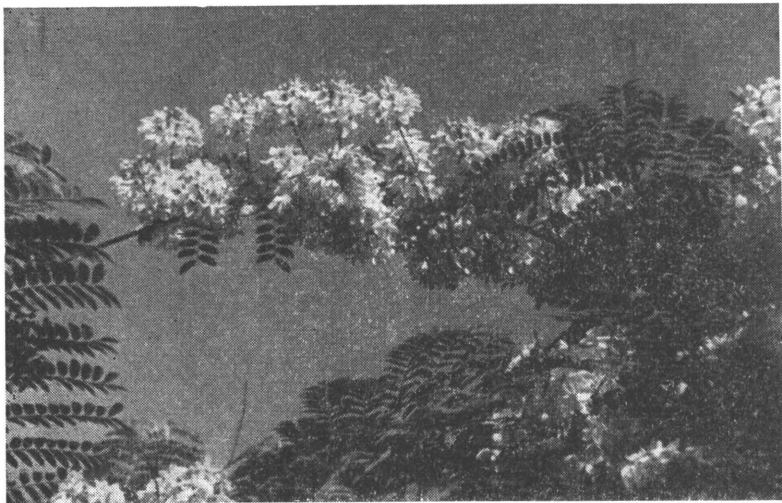
More than 800 plants were raised: "In general the variation was remarkable and an array of horticulturally-interesting types appeared which exceeded

even my fondest hopes." Some seedlings had flowers beginning to approach those of **L. Keatleyi** in size, many had a profuse blooming habit, and the blooming period was greatly extended. The range of flower colour was astonishing: "Not only are the pale pink of Rose Double and carmine red of **Nicholli** recovered in the F2 population, but also Tyrian rose, Tyrian pink, rose red, and ox-blood red, as well as a beautiful red-eyed type having a rose doree pink colour developed only at the base of the petals, the balance of the petals being white."

The variation in habit of bush was also very marked, including horticulturally desirable types. Dr. Lammerts indicates that the following named varieties will soon be available:—

1. **SNOW WHITE:** A double white with green eye, medium flowers produced abundantly on a dwarf compact plant.
2. **ROSE RED:** A double carmine red with purple eye, and habit similar to snow white. "Should be very useful for border work, being easily kept to 2 feet in height."
3. **RUBY GLOW:** "Super double" ox-blood red with very large flowers produced abundantly on a tall compact plant. "Should be very effective for cut flowers and for columnar specimen plants."
4. **POMPOM.** "Super double" rose doree red type with the colour restricted to the base of the petals, and large flowers produced abundantly on a tall compact plant.

Dr. Lammerts gives a detailed genetical analysis of the seedlings raised. With the abundant material available to them, horticulturists and geneticists in New Zealand should be spurred on by his work to produce a still wider range of beautiful forms than we have at present.



**THE GOLDEN SHOWER (*Cassia fistula*):** Yellow wistaria growing from the trunks and branches of a small tree is a fair description of the Golden Shower. In Cairo this tree blooms for several weeks late in the spring. In and about Suva, in the Fiji group, it is much freer with its blossoms; at least a portion of the tree is in full bloom throughout the year.

[F. Sydenham photo.]

Plant with a History

## WIDE VARIATIONS NOTED IN THE AURICULA

By E. O. PETERSEN, Head Gardener, Mental Hospital, Porirua.

**T**HE auricula is a plant with a history, but this history is scattered throughout many books and journals, and these in many languages, and is accordingly not readily available to the general reader. Though I propose in the main to write of the variation in this plant as it occurs at present, the origin or cause of this variation is so bound up with the history of the plant's development or evolution that it is impossible to separate the two aspects. The auricula to-day is the offspring of a natural hybrid, but its history shows that it has also been the subject of much cross-fertilisation and a great amount of selection, and there may be a considerable amount of variation because of cultural methods and soil conditions.

**I**T is generally admitted that a plant propagated vegetatively can be only a replica of the parent plant—it cannot be better, though it can easily be not quite so good because of poor cultural methods or the presence of some plant disease. That is to say, if the cutting or offshoot is given precisely similar conditions of soil and climate to those surrounding the parent plant, and if it is vigorous and disease-free, it should become a reproduction of the plant from which it was taken.

### VARIATION IN OFFSHOOTS

That is generally accepted, but it does not always follow. I have propagated offshoots of an auricula which did not turn out to resemble the parent exactly. Thus, a two-year-old seedling plant with the leaf edges or margins perfectly entire gave several offshoots which grew into plants with the leaf edges deeply and regularly toothed in outline.

And that was not all. The flowers of the parent plant were deep buff coloured with a clear ring of white farina around the central tube—an important property in the old-time show auricula. But the flowers produced by one offshoot were a clear pale buff without any trace of the ring of white meal. And these were potted plants growing in the same soil mixture in the same garden frame.

Another instance along these lines: Normally the auricula has entire green leaves, though some few plants have the leaves edged with a narrow yellow margin. I have had only three such plants in a collection of 350. From seven offshoots from one of these plants with yellow-edged leaves I obtained only two with yellow-edged leaves, the other five bearing fully green leaves.

The variation may be dealt with under several headings: 1. Variation in growth habit; 2. variation in leaf shape; 3. variation in amount of mealiness; 4. variation in flower colour; 5. variation in number of pips, or individual blooms making up a flower head; and 6. the production of monstrous flowers, with partly double, fully double, and treble rows of petals, and also an increased number of petals in the normal one row.

Nearly all my plants are of seedling origin, some seed from local growers and some from England and Scotland, and they are all grown under almost similar conditions of soil, shade and shelter.

### GROWTH HABIT

The old gardening books say the auricula should be propagated by slips, divisions, offsets, offshoots, or side growths. I think offshoots the most suitable word, for the young growths are actually offshoots of the main stem of the parent plant. Some plants go on for years and produce only one or two; others start to develop offshoots long before they have produced flowers and when they are only three to four months old from seed. Many strong and well-grown plants will give only one or two offshoots as large as the original plant, and that perhaps only every second year. Indeed, in some plants it is difficult to know which is the parent and which the offshoots. In other instances, however, small plants—merely a rosette of leaves not more than three inches across, and in some cases much less—will throw out from six to ten, or maybe more, little side growths, and if these are taken off and potted up at the correct season they will go on and do the same thing again and again. I have had plants do this over a period of five years, and only a few, among many under special treatment, have produced a stalk of bloom. This applies to both the parent plant and to the many offshoots.



**LICHEN in the New Zealand Bush.**

[Photograph by D. Elliott, New Plymouth.

Many methods have been tried to induce flowering. A soil rich in available nitrogen is occasionally successful. Watering with nitrate of soda, one ounce to one gallon of water, does not give as much success as the addition of well-rotted cow manure and leaf mould to the already rich potting compost. But the addition of sulphate of potash has shown more consistent results, though in these cases also the plants flowered always at a smaller size than did normal plants. However, it must be remembered that these over-prolific offshoot producers were in the first place growing in the same soil mixture and under the same conditions as the normal plants.

Again, the offshoots of some plants root readily, but others similar in appearance root very slowly, and I have had many which showed traces of side shoot development even before they produced roots.

One other point may be mentioned. Some plants tend always to lift out of the soil, but others remain as a rosette closely in contact with the surface of the soil. Firmness of plant bed or of planting seem not to influence this, and those plants that lift out of the soil develop offshoots which are usually backward in rooting.

**It is therefore recommended that auriculas should be increased only from plants which flower well and develop only a few large offshoots; plants which show a tendency to lift out of the soil should be avoided.**

#### LEAF SHAPE

Botanical writers say "the leaves obovate, fleshy and succulent, with the edges mealy; the young leaves entire, the adult leaves serrate above the middle." This seems not to apply to plants which have flowered and have produced a varying number of offshoots. In my collection the leaves vary from long and narrow and outward curving through all degrees to short rounded and spoon-shaped or inward curving. Some leaves are deeply toothed in outline, and at the other extreme quite as many leaves have perfectly smooth edges.

In some plants the leaf tips are flatly rounded, some fully rounded, and in a few the tips are definitely pointed. Many plants have leaves fully as broad as long; at the other extreme some plants have leaves nearly four times as long as wide. Again, many leaves have a decided petiole or stalk; others show hardly any stalk at all. Many plants have stiff and brittle leaves which snap almost at a touch; others have rather soft leaves which bend without breaking.

Some adult plants carry the leaves at an angle of about 45 degrees, but in others the leaves lie almost flat and often in contact with the soil for rather more than half their length. When in full bloom some plants have only five to seven leaves; others have from ten to as many as fifteen. These figures do not include the leaves, large or small, of any developing offshoots.

#### MEALINESS

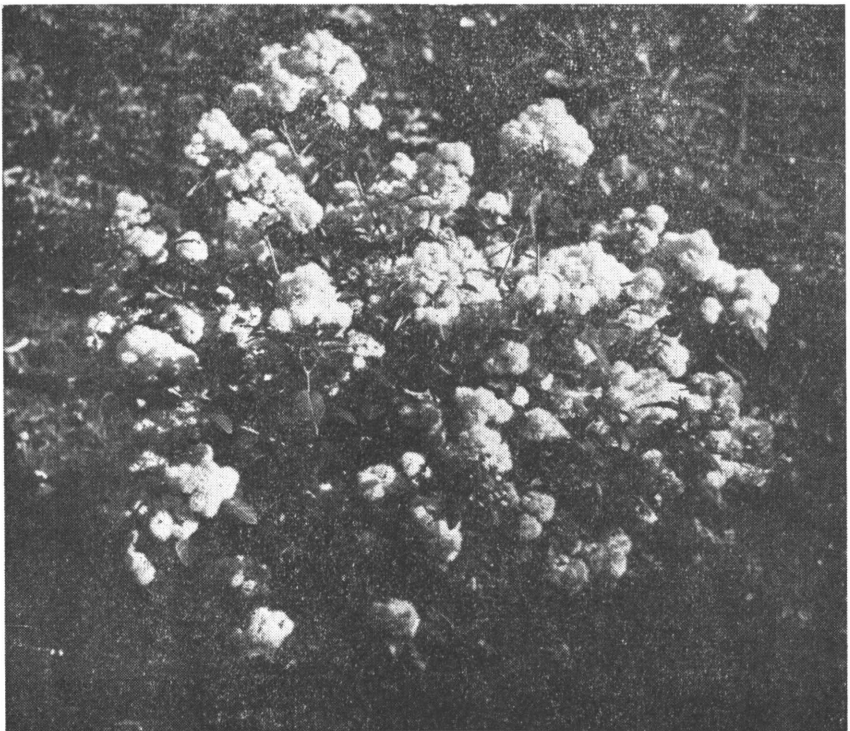
In 1846 J. W. Johnson wrote: "In the wild state the auricula is much less mealy than when cultivated." Many of my plants, which must have arisen from plants long in cultivation, show no trace of mealiness. Indeed, some have leaves deep green, smooth, and glossy. At the other extreme are plants in which the leaves, flower stems, and the ring about the central tube of the blossoms are densely coated with a fine whitish meal that may be readily brushed or washed off. In these plants the leaf surface, when cleaned of meal, may be either downy or smooth.

**Between the plants entirely without meal and those heavily coated may be found every degree of mealiness, from a light dusting over scattered parts of leaves to a fine dusting over the entire plant, and from a heavy one over parts up to the densely-coated entire plant.**

There are also intermediate plants which have downy leaves either with or without mealiness; that is, the actual leaf surface is dull, not glossy, and is of a velvet-like smoothness. The colour, too, is dull green. When mealiness occurs in this type the meal may be brushed off, but the surface remains downy. In some plants with densely-coated leaves the mealiness does not extend to the flower stalks or to the flowers, and I have several plants the leaves of which are so heavily powdered as to appear always as whitish-grey, yet these plants bear flowers of a clear, pale primrose yellow without meal, on clean green stems.

### **FLOWER COLOUR**

In my collection I have not so far such a wide range of colours as can be found recorded in the many old books and lists. John Parkinson, writing in 1629, described yellows, purple maroons, reds, violets, whites and tawnies.



**POMADERRIS ELLIPTICA in flower.**

[Photograph by D. Elliott, New Plymouth.]

Of the last-named he wrote: "Each flower is of as deepe a murrey or tawnie colour when it is blowne, having a white circle at the bottome of the flowers and yellowish in the middle below the circle." Thomas Johnson, in his revised edition of Gerard's "Herbal", 1633, wrote that "some have the flowers white, red, yellow or purple, with the leaves either green or hoary."

The colour range is perhaps somewhat wider than in the polyanthus and is from white right through to deepest purple, almost purple-black. Some colours are uncommon, and fairly good pinks, deep buffs and bright blue-purples may be mentioned particularly. But flower colour is not the most important point in an auricula, and before it is possible to understand the finer points it is necessary to be clear about the meaning of a few terms so casually used by the old-time writers.

They wrote of the pip and truss, of the thrum, the paste, the ground colour, and the edge. A pip is a single flower; a truss is the complete inflorescence, made up of from five to twenty individual flowers or pips. The other four terms apply to the blooms. The thrum seems to be a collective name for the male and female parts, the stamens and pistil in the centre or tube of the flower, which had to be yellow or lemon colour. Round the upper part of the central tube is the paste, a circle of white mealy substance, sometimes called the eye. Next to the paste comes the ground colour, which may vary from pale yellow to deep purple, and next to this again comes the edge, the outer colour of all, forming the border of the flower.

**The proportions of an ideal flower may be realised by drawing four circles round a given point, the distance between the circles being equal. The first or inner circle formed the thrum, the second the white mealy paste, the third the ground colour, and the fourth the outer edging of the flower; the nearer the flower characteristics approximate to this ideal the better the bloom was considered to be.**

The pips were required to be of equal size, alike in colour and form, and on stalks so proportioned in their number and size as to give room for the flowers to show themselves, to form a close, compact head with not fewer than seven pips, and without the flowers lapping over each other. The stem supporting the truss had to be strong, round, and upright, and not less than seven inches high so as to carry the truss well above the leaves. The leaves, referred to as the grass, had to be so developed as almost to cover the soil and the rim of the pot in which the plants were grown.

### CHANGE IN SHOW METHODS

In the early days of the showing of the auricula it was customary to exhibit ten or a dozen pots in a specially-prepared stand or theatre, and as these plants could be of different colours it is easy to imagine the difficulty of judging. This system soon gave way to the showing of three pots of the one variety, and later still only one plant. In course of time the types and colours were divided into classes, and an early show schedule runs as follows: Green-edged, grey-edged, white-edged, selfs, and alpines, with each of these main groups divided into many separate colours.

Seemingly in the middle years of the auriculas' popularity the green-edged forms were the most highly thought of, but nowadays they are rarely seen. The grey and white-edged forms are perhaps a trifle more showy, and are, of course, still often seen. The selfs are those with blooms of one colour—that is, without a distinctive edging—but they have white paste around the central yellow thrum. When grown to perfection they are strikingly beautiful flowers, and deep yellow or buff with a pure white paste were, and

still are, plentiful. In the so-called alpines the outer part of the petals was shaded by a mixture of two colours not separated into distinct bands as in the edged varieties, and the paste around the thrum was yellow instead of white. In some form or another these are the auriculas usually met with in gardens to-day.

Let me refer again to the old rule that the pips were required to be of equal size and alike in colour and form. I grew auriculas for several years before I realised the need for this rule. One of my seedling plants bore a truss of 18 pips, but they were odd in size and of three distinctive colour forms. Nine of the pips were deep yellow centred, had well-developed, perfect, white paste, the ground colour being deepest purple edged with grey. Five of the other pips had lemon centres and only a faint trace of the white paste, the ground colour was pale mauve, and there was no clearly defined edging. The remaining four pips had yellow centres, no trace of white paste, and were bright purple to the very edge. And these vari-coloured pips were mixed together and not arranged in any particular order.

### NUMBER OF PIPS

So many of the older botanists describe the wild plant as having five separate blooms forming a cluster of flowers that this number may be accepted as the usual and natural order. In cultivated plants I find the number varies from one to 23. On one plant in one season I have noted flower stalks with 14, 17, and 9 respectively. Many plants produce from three to five stalks of bloom, others never more than two, and about 30 of my plants—three and four years old from seed—produce only one. I have one four-year-old plant which regularly produces a single pip on a strong stalk five to six inches high.

Considering all my plants, I would say that the tendency is to produce more pips than the normal number of the original wild plant, and 9 to 12 is the most usual, these plants producing more than the one flower head. There appears to be no relation between the number of pips forming a head and the number of flower stalks, so that, though the plant which produces only one pip and one stalk may be cited as an exception, there are many at the other extreme that develop five stalks each bearing from 10 to 22 pips. While some plants bear one pip, others have borne up to 73, and these are plants growing in similar soil mixtures and under the same general conditions, and raised from the same packet of seed.

The diameter of the individual blooms is also widely variable; it ranges from just under one inch to slightly over two and a-quarter inches. Frequently all the pips forming a truss are not equal in size, though the size range in the one head is never so extreme as that between flowers on a number of separate plants.

### MONSTROUS FLOWERS

Semi-double, fully double and even treble forms are of quite frequent occurrence. One remarkable bloom had 14 extra large flowers of a deep mahogany ground colour with a lighter edge, the paste was creamy yellow, and the central eye or tube deep yellow. But out of the tube of several of the pips other petals developed, and these were of dark mahogany brown, without any lighter edging. Some of the extra petals were so slow in developing that the original flowers had withered and fallen before the extra ones were fully opened.

Another unusual seedling had flowers consisting of three whorls of petals, all ruffled and frilled. It bore only four blooms of an even pinky-rose colour without distinctive edging, and there was no development of paste.



In going through the literature I find the first record of a double auricula occurs in John Rea's "Complete Florilege", published in 1665. It is described as "having a short stalk bearing four or five double flowers with three rows of leaves in each flower".

I have a fine double duff which bears six or seven pips in each head. At first these appear as ordinary singles with a clear ring of white meal around the central tube. Before they are quite fully expanded other petals issue from the inside of the tube, and as these secondary petals spread out they obscure the white ring. The extra petals give the flower head a frilled appearance.

Another plant I have does not develop a complete set of secondary petals but only a single one which issues from the tube and hangs down like a bib or miniature apron. This plant develops only two flower heads, each of only three or four blooms, and is a pale mauve-blue with lighter edging; the extra petal in each bloom is always lighter in colour and has a frilled edge.

One other plant I have is extra strong and vigorous, with broad and thick leaves heavily coated with white meal. So promising in appearance is this plant that one is led to expect a really superb head of bloom, but it produces regularly each season a single pale, whitey-mauve bloom on so short a stalk that the flower appears as if pressed down in the centre of the rosette of leaves. This bloom measures nearly two and a-half inches across and its outer edge is frilled or waved.

Auricula plants are decided individuals, for even in a large collection it is difficult to find two alike.

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## EXPERIMENTS IN PRESERVATION OF PLANT BOXES

A MOST interesting report by Messrs. W. C. Moore and J. Bryan appears in the "Journal of the Royal Horticultural Society" for March, 1946. Ordinary plant boxes 5 inches deep of Scots pine (*Pinus Sylvestris*)  $\frac{3}{8}$  inch thick were used and treated with various preservatives. Controls were established with untreated boxes of both Scots pine and western red cedar (*Thuja plicata*).

The untreated boxes of Scots pine were the first to rot, and none were serviceable after six years, but the western red cedar were still good after ten years, and apparently serviceable for at least a further five years. The treated Scots pine boxes, dipped for 15 seconds in a proprietary solution that contained 25 per cent. copper naphthenate solution, were also serviceable after 10 years, though only for, say, two more years.

In each group of five boxes two were made with ordinary steel wire nails and three with galvanised nails. The results were very much in favour of galvanised nails.

These results with timber not usually available in New Zealand suggest that similar experiments here would be useful and give a pointer to the best timbers for use in making the boxes for horticultural work and their treatment to prolong their life. This would be valuable because of the increased cost of plant boxes in New Zealand and the heavy wastage by seedling plant growers.

(Summary supplied by Mr. N. L. W. Thomas, Auckland)

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