

of picking in respect to the incidence of bitter-pit in Cox's Orange Pippins, use of oiled wraps in relation to the control of superficial scald, influence of storage temperatures in the prevention of internal break-down, control of grey mould on pears, and effect of orchard manurial treatments on the keeping-quality of apples.

An interesting feature in connection with the export trade is the number of new ships fitted with the most up-to-date methods of cold storage that are gradually replacing the old type vessels. As the outcome of increased shipping trade there have been changes in the methods of dunnaging fruit cargoes in the ships' holds, with the object of increasing cargo-space capacity and reducing costs. Experiments in this connection have been inaugurated by the Department for the purpose of ascertaining the influence of the different methods of dunnaging on the successful transport of fruit overseas.

Numerous requests for advice in regard to local cold-storage problems have been dealt with during the year, and a series of illustrated addresses given to fruitgrowers in commercial areas on matters connected therewith.

INSTRUCTIONAL AND EXPERIMENTAL WORK.

In the carrying-out of orchard operations growers are continually being confronted with problems of a more or less complex nature, and in this connection the demands made on the Department for information and advice, both in regard to fruit-growing and horticulture generally, have been considerable. Every effort has been made to comply with these requests, both by correspondence and by personal visits by the Instructors as far as restricted travelling-expenses would allow. The giving of public lectures and practical demonstrations in pruning, spraying, &c., is a feature of the work of the Division, which is much appreciated by growers.

The interests of fruitgrowers have also been furthered by the conducting of classes in the grading and packing of fruit in the chief fruitgrowing centres, and the facilities given for obtaining the departmental certificate of competency in these subjects, and also in respect to orchard pruning and spraying, have been taken advantage of by a number of persons.

The programme of experiments on the manuring of fruit-trees has been maintained during the year. The trials at present being carried out number seventy-five. In the series of trials, with the exception of Hawke's Bay, nitrogen appears to be the most important element in fruit-tree manuring. Since, however, the complete manure plot is invariably the best in the majority of trials, it would appear that the elements phosphate and potash are also contributing to the improvements which have been obtained. This has been particularly noticeable during the past season, and it would appear, therefore, that the effects of phosphate and potash are slow to become apparent in contrast to nitrogen, which shows up fairly quickly in nitrogen-deficient soils. In Central Otago responses to nitrogen have been outstanding on stone-fruits. Carbonate of lime has given very little response, except in certain cases, such as in some North Auckland experiments, where the beneficial effect of lime upon the growth of the trees, and also upon the establishment of cover crops, has been noted. In Hawke's Bay during the five years the experiments have been in progress no responses whatever have been obtained from the treatments applied. The various experiments laid down two years ago in which the concentration of fertilizers about the trees in comparison with the broadcasting of the applications, and the experiments investigating the effects of injecting fertilizers in solution into the soil, have so far given no results.

The potash and sulphate of ammonia were donated by Pacific Potash, Ltd., and the Imperial Chemical Industries, Ltd., respectively, during the past season. These donations have materially assisted in the carrying-out of the programme of work which had been undertaken, and thanks are due to the donors of the fertilizers and also to co-operating orchardists for their continued interest.

The experimental plots of East Malling pip and stone fruit stocks established three years ago, and plots of seedling stocks planted out earlier in a number of the commercial fruit-growing districts, are now reaching a stage when some definite indication of their influence upon the development of the tree may be expected to manifest itself. Apple-trees worked upon the imported stocks and upon seedling stocks generally have made better growth than the trees upon Northern Spy stock. Peaches worked on East Malling plum stocks have so far shown no marked differences in growth. Cherry and plum stocks obtained from the same source were worked this season for the purpose of testing the stocks in the principal stone-fruit districts of the Dominion.

The experimental plots of hazelnuts (*Corylus maxima*) established three years ago in six districts have so far made poor growth, except in two instances in which the trees are reported to be making good progress.

Spraying experiments were conducted for the control of red scale of citrus trees and leaf-roller-caterpillar control on stone-fruits. Trials were also conducted with proprietary tree-banding materials for preventing earwigs gaining access to the fruit on stone-fruit trees, with satisfactory results.

At the Research Orchard, Nelson, spraying operations were greatly interfered with by wet weather, and as a result black-spot and Botrytis (eye-rot) considerably reduced the quantity of fruit available for export purposes.

A large amount of work of an experimental nature has been carried out at the orchard during the year in co-operation with the Department of Scientific and Industrial Research, including manuring, spraying, root-stock and variety tests, grafting, &c., and the data obtained from these investigations should prove of considerable value in the interests of fruitgrowing.

VITICULTURE AND WINE-MAKING.

Satisfactory progress continues to be made in the growing of grapes, both for wine-making and table purposes. The total area under outdoor-grown vines is now estimated at 433 acres.