

maintaining a higher fruit yield, and this is still further increased by the addition of phosphate, with PNK giving the highest yield of all. A number of weak trees have been markedly invigorated by the use of moderately heavy applications of sulphate of potash.

Cawthron Institute.—The fertilizer trials at Upper Moutere, Waimea West, and at the Annesbrook Orchard, Wakatu, continue to yield valuable data concerning the effect of specific manurial trials carried on over a period of years.

At Waimea West the effect of 1 lb. and 3 lb. dressings of ammonium sulphate per tree, in conjunction with a standard application of superphosphate and sulphate of potash, has been studied on the Cox's Orange variety. Growth of tree and yield of fruit have been greatly benefited on this soil type by the use of the 3 lb. dressing of ammonium sulphate, but improvement in this direction has been accompanied by a relatively large increase in the amount of internal breakdown in cool store.

At Upper Moutere the manurial trials with Jonathan apples demonstrate clearly the importance of a complete fertilizer for maintenance of growth, crop-production, and high quality of fruit. Trees from which phosphates have been withheld are inferior in growth and foliage development to those receiving a "complete" fertilizer. Potassic manures appear to be as important as nitrogenous manures when the trees come into full bearing.

The trials on the Dougherty variety at the Annesbrook Orchard confirm the value of phosphatic manure on this somewhat phosphate-deficient soil. The trees treated with phosphates only are showing no die-back, while many untreated trees are affected more or less severely with die-back.

Horticulture Division, Department of Agriculture.—A series of six trials was carried out in four districts—Auckland, Nelson, Motueka, and Marlborough—to ascertain if any difference could be detected between the effects of liquid injection into the soil and concentrated surface sowing of fertilizers. The tests were carried out with P and PK treatments, but no significant differences were observed except in one test in the Motueka district, where a plot receiving PK as a soil injection has remained superior to the other three plots.

In another series of experiments conducted in Auckland, Hawke's Bay, and Mapua a concentrated placement of fertilizer round the tree was compared with broadcast sowing. Treatments were P and PK as above, but no differences attributable to method of placement have been apparent. In the Mapua experiment, however, the potash-treated trees appear to have carried a greater density of foliage than those receiving no potash, irrespective of the method of placement. In a liming test on apples in the Motueka district there have been no apparent differences of any kind between limed and unlimed trees.

The test on the manuring of young trees in the Hawke's Bay area has failed to show any response to fertilizer treatments during the six and a half years since the experiment was commenced.

ROOTSTOCK EXPERIMENTS.

Research Orchard.—An area of approximately 1 acre has been planted out as a comparative rootstock test using Northern Spy, and East Malling Nos. I, XII, and XVI, worked to Cox's Orange, Jonathan, Delicious, and Granny Smith varieties.

Cawthron Institute.—The trees at the Annesbrook Orchard continue to show the superiority of Northern Spy over Double Vigour and Large's Seedling as a stock for the Cox's Orange variety. The first two are vegetatively raised types and the latter is a seedling selection from seeds taken from a single Epps' Seedling tree.

In the case of the Sturmer and Jonathan, however, the Double Vigour and seedling stocks have both given higher fruit yields than the Northern Spy stock.

Plant Diseases Division.—Trials with apple varieties on East Malling and Northern Spy type stocks have been continued, both at Mount Albert and in several fruitgrowing districts of the Dominion. Stocks under test are East Malling Nos. I, XII, XIII, XV, and XVI and a selected Northern Spy. They have been worked with the scion varieties Cox's Orange, Jonathan, Delicious, Granny Smith, Statesman, and Sturmer.

Evidence accumulating from these trials indicates the partiality of scion varieties for certain stocks. It is probable, therefore, that no one stock will prove equally satisfactory for the chief varieties grown in New Zealand.

INARCHING EXPERIMENTS.

In order to ascertain the value of inarching in invigorating old and debilitated trees, work has been undertaken at the Research Orchard, Appleby, and by the Plant Diseases Division at the Huapai and Havelock North orchards. At Huapai two-year-old clonal stocks of a Plant Diseases Division selection (N/1/19) and Large's Seedling No. 1 were used to treat Jonathan apples, using three different methods of inarching. At the Research Orchard and at Havelock North vigorous East Malling types of stock have been used.

STANDARD COLLECTION OF APPLE VARIETIES.

This collection is being prepared by the Plant Diseases Division in Auckland. Budwood of thirty apple varieties has been secured from local orchards with a view to providing a nucleus collection of standard varieties. The collection will be added to from time to time and should serve as a means of assessing the value of new introductions, behaviour of each to disease, &c.