

FRUIT RESEARCH AT THE CAWTHRON INSTITUTE*

Magnesium Deficiency of Apples.—At Brachburn two applications of 6 lb. ground dolomite or of 2 lb. magnesium carbonate per tree, applied in the 1939-40 and 1940-41 seasons, have now almost completely controlled magnesium deficiency in the Sturmer. Magnesium sulphate, even with two applications of 7 lb. per tree, has not proved so satisfactory, probably on account of more rapid leaching. At Tasman, on an orchard formerly receiving liberal potassic manuring, the recovery has been rather slower.

Chemical analyses show that treatments have increased the magnesia content of the leaves, and the data correlate well with the appearance of the trees.

Micro-chemical Methods.—To determine more closely the distribution of magnesium and potassium in different parts of the leader growth, analytical methods have been elaborated to permit their determination in a single leaf or part of a leaf, using cobaltinitrite for potassium and an improved Titan yellow method for magnesium. The latter method has been developed into a quantitative colorimetric micro-method.

Distribution of Magnesium and Potassium in Leader Growth.—Striking variations in distribution have been found in magnesium-deficient and healthy trees. In magnesium-deficient trees, five lower leaves on the leader contained less than half the magnesium of the top five leaves on the same leader. The magnesium content of the lowest leaves decreased as the season advanced. In healthy trees the differences between upper and lower leaves were much less marked, usually not exceeding 25 per cent. Leaves of magnesium-deficient trees had more potash than those of healthy trees. Potassium was invariably concentrated more in the lower than in the upper leaves of the leader.

Vitamin C Content of Nelson-grown Apples.—Chemical analyses made in 1942-43 showed Sturmer to contain up to 36 mg. ascorbic acid per 100 g. fresh fruit, Ballarat and Granny Smith to have progressively less, and Rome Beauty and Delicious to be relatively poor. Further data obtained this season are as follows: Cox's Orange 6-8 mg., Gravenstein 7 mg., Cleopatra 10 mg., Jonathan 11 mg., and Delicious 12 mg., per 100 g. fresh fruit.

Apple-juice Concentrates.—Vacuum concentrates have been prepared from the juices of a number of apple varieties, and varietal differences are reflected in the products. Those from Sturmer and Lord Wolseley have a sharp acid character and make very pleasant drinks on dilution. It was thought that the products might be valuable for the Armed Forces, particularly in tropical or semi-tropical climates.

Apple-juice concentrate is now being used in the United States of America for moistening and flavouring tobacco, and samples have been furnished to a local manufacturer for trial.

Long-term Manurial Experiment at Upper Moutere.—Maintenance of the area had to be discontinued during the past season, but notes have been made on the residual effect of the past twenty years' treatments. PNK trees are much the best. Ammonium sulphate, with phosphate and potash, is still giving better foliage and growth than dried blood. Marked decline is noticeable in PN and NK trees, and the worst trees are those untreated or with nitrogen only.

Apple Rootstock Experiments at Annesbrook.—Twelve-year-old Statesman trees on Double Vigour (French Crab Seedling) stock are now carrying $\frac{1}{2}$ bushel more fruit per tree than those on Northern Spy stock. This higher yielding-capacity has been in evidence over the past three seasons.

Brown-rot and Black-spot.—The usual notification of the maturity date of ascospores of these fungi has been given for the benefit of Nelson orchardists.

Codlin-moth Parasite.—The three parasites being studied are *Ephialtes caudatus*, *Aenopler carpocapsae*, and *Cryptus scammellatus*. The first was reared in considerable numbers and liberated in an abandoned orchard early in 1943. Beyond making further liberations in 1944, it was decided not to disturb the material, but to study the extent of establishment next season. Comparatively small numbers of the other two parasites were available, so attention has been devoted to building up supplies before liberation. The rearing of these two has so far been less successful than of *E. caudatus*.

General.—Preliminary tests have been carried out with dichloroethyl ether on the winter eggs of red-mite, and some attention has been paid to the parasitic control of the mealy bug. This work will be extended next season.

INDUSTRIAL PSYCHOLOGY DIVISION

Advisory Committee.—Mr. H. E. Moston (Chairman), Mr. F. Sandys Wunsch, Mr. Adam Black, Mr. D. I. MacDonald, Dr. T. R. Ritchie, Mr. N. S. Woods, Wing-Commander Carter, Mr. E. H. Langford, Dr. E. Marsden, Mr. L. S. Hearnshaw (Director).

THE ESTABLISHMENT AND AIMS OF THE DIVISION

The Industrial Psychology Division was established towards the end of 1942 as the result of a survey carried out by the Director into firms engaged on munitions-production. The report on this survey was submitted to a committee comprising representatives from the Departments of Scientific and Industrial Research, Health, Labour, and Supply, and from the Manufacturers' Federation and Engineers' Trade-union. The report made it clear that there was a need in the industries of the Dominion for the application of the findings of industrial psychologists, and scope for research work into the human aspects of New Zealand industry. The committee to which this report was submitted recommended that an Industrial Psychology Division be established as part of the Department of Scientific and Industrial Research.

Industrial psychology sets out to make a scientific study of matters connected with the welfare and efficiency of the human being in industry. It is based on the proved truth that the human being can only give his best to his work when he is healthy, free from fatigue, happy, and interested. Therefore, the reduction of fatigue and monotony, the adaptation of the environment to the needs of the worker, and careful attention to placement, training,

* This report was received late and could not be incorporated in the main report as in previous years.