

windows. Tests made in England at the time showed that the spotting was brought about under the influence of light, direct sunlight being a particularly active promoter. At Dr. Barker's suggestion, the trouble has been investigated on a small scale by the Cawthron Institute both last season and this, and a definite temperature response of the trouble has been found. If a storage temperature of 32° F. is employed, the subsequent development of the trouble on exposure of the fruit to light is much less than when the fruit has been stored at a temperature of 38° F. The use of oiled wrapping-paper has effected only a small decrease in the severity of the disease—probably not enough to warrant the additional expense involved. As regards the response to oiled wrapping, the disease would appear to be much more closely related to Jonathan-spot than to superficial scald.

The second section of the work, dealing mainly with the influence of pre-storage factors, has been continued on lines similar to those now employed by the Cawthron Institute for a number of seasons. Jonathans and Sturmers from trees which have provided material for storage studies for a number of years have again been put into store. By following up in this way the history of the storage characteristics of fruit from specific blocks of trees it is hoped that much will be learned of the effect of orchard, soil, and climatic factors in relation to storage quality.

An indication has been secured that the use of a nitrogenous fertilizer on the Jonathan, unbalanced by other fertilizer constituents, tends to produce an apple rather more susceptible to breakdown in storage than Jonathans not so treated. The use of potash, on the other hand, appears to effect an improvement in the resistance of the Jonathan to breakdown. A similar response has been recorded in other countries with certain of the varieties grown in those countries, but with New Zealand varieties grown under New Zealand conditions the whole field of research along these lines is as yet almost untouched. It seems very probable that widely varying results may be obtained with our varieties. For instance, it is by no means certain as yet that the use of an unbalanced nitrogenous fertilizer on the Sturmer variety is in any way detrimental to the storage quality of the fruit. Delicious, which have received heavy nitrogenous dressings additional to that normally included in the standard manurial programme, in this season's work have shown absolutely no inferiority in storage quality as a result of the treatment. It should be stated here that the grower concerned has regularly incorporated liberal dressings of phosphate and potash in his manurial programme on Delicious. A very definite indication has been given that the use of heavy applications of nitrogen on the Statesman variety, on the other hand, is extremely detrimental to the keeping of the fruit. In fruit from Statesman trees which have received extra nitrogen a very marked increase occurred in the amount of breakdown and of fungal disease, the severity of the diseases increasing step by step with increase in the quantity of nitrogen applied. The relationship of nutrition to storage quality is being studied in rather greater detail in the 1931 storage season, and, ultimately, the Research Orchard should provide additional material for the study of the problem.

The storage tests with fruit from the Cawthron Institute rootstock blocks have been continued, and results are in accordance with earlier findings, particularly in that the superiority in resistance to breakdown exhibited by the Jonathan grown on a specific Seedling stock has again been maintained. Those of the other stocks under experiment that have produced sufficient fruit for storage tests—viz., Northern Spy and a French Crab—have up to the present appeared to be without any marked influence on the storage characteristics of the fruit they carry. In the course of the next few seasons additional material will become available for the furtherance of the rootstock studies.

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#### FRUIT RESEARCH.

Advisory Committee: Mr. H. Vickerman (Chairman), Messrs. F. S. Pope, Thomas Waugh, J. L. Brown, W. Benzies, T. C. Brash, W. J. Rodger, A. H. Cockayne, J. A. Campbell, T. Rigg, F. Firth, and Professor T. H. Easterfield.

During the year advice was received from the Empire Marketing Board to the effect that the Board was prepared to make a capital grant of £2,350 and an annual grant of £1,860 for the purposes of a scheme of fruit research extending over a five-year period in New Zealand. In consequence, steps have been taken to establish a fruit-research organization in which representatives of the industry will have a voice, and the work of various research organizations which have concerned themselves with fruit will be co-ordinated. A generous grant of £1,250 made by the New Zealand Fruit-export Control Board, together with a subsidy received through the Government, and the Empire Marketing Board funds enabled the purchase of an experimental orchard at Appleby, Nelson. This orchard consists of some 29 acres of apple and pear trees in full bearing, while the remaining area is available for new field experiments which it is proposed to establish.

The orchard is situated on a type of soil which is representative of a large area of land used extensively for fruitgrowing. As the orchard was acquired too late in the season to enable a full scheme of research to be inaugurated, it was used merely for a series of spray experiments, while a careful record was made of the individual tree yields which were essential as a preliminary to the interpretation of any further work that will be done.

In the meantime, arrangements have been completed for a co-ordination of the research investigations to be undertaken by the staffs of the Cawthron Institute, Plant Research Station, and the Horticulture Division, and a scheme of experiments concerned with disease problems, manurial, and nutritional problems, and rootstock problems has been decided upon. These investigations will be conducted at the Research Orchard, the Plant Research Station, Cawthron Institute, and at a number of selected points throughout the fruitgrowing areas of the Dominion.