

The Plant Diseases Division has at last been brought together in its new headquarters building at Owairaka, Auckland, where there are permanent well-equipped buildings and an experimental area of 17 acres. Officers have been stationed at Palmerston North and at Lincoln College respectively to serve the southern portions of the Dominion on immediate problems. The Division continues to carry out most of the fruit-research work of the Bureau, so a considerable portion of the area has been planted in fruit-trees. Further experiments are carried out in orchards at Huapai, Havelock North, and in the Research Orchard at Appleby, Nelson.

Investigations relating to the devising of biological tests for spray specifics against various fruit diseases are being actively pursued. Special attention has also been devoted to methods of spray application, in view of the results showing that the effectiveness of control is in most cases closely associated with the completeness of spray coverage.

The demand for lucerne culture during the year has greatly increased, and despite the removal of the laboratory it has been possible to maintain a rapid service to all parts of the Dominion.

Much progress has been made in the understanding of the blind-seed disease of rye-grass, which has now been found to be caused by *Helotium* fungus. Active collaboration in the further study of this disease with a view to its possible control has been undertaken in co-operation with the Seed-testing Laboratory, Department of Agriculture, and the Grasslands Division.

PLANT CHEMISTRY LABORATORY.

The chemical changes in herbage brought about by variations in the temperature and moisture content of the soil, which depend in turn on the meteorological factors of rainfall and the quantity and quality of solar radiation, are as yet little understood. It seems probable, however, that important changes in the constituents of the plant proteins, carbohydrates, and other substances do occur, particularly under abnormal meteorological conditions, and that they may have an important bearing on certain types of animal diseases, of which facial eczema is an example.

The importance of having a much fuller knowledge of the chemical composition of the pasture species used for grazing-animals, and the changes in composition occurring under varying environmental conditions, led to the expansion of the laboratory previously associated with the Grasslands Division into the Plant Chemistry Laboratory. Although this laboratory has been established as a separate unit, it still works in close collaboration with the Grasslands Division and the Dairy Research Institute.

The past year has been largely one of preparation for an attack on the difficult problems to be studied. Methods of analysis for the various plant constituents that are to be studied have been developed, and special equipment is being obtained. A considerable number of pasture samples collected in connection with facial-eczema investigations have been prepared and stored for analysis.

The laboratory has also assisted the Dairy Research Institute in studies of the relation of pasture plants to the quality and quantity of dairy-produce by carrying out chemical analyses required.

Some very interesting work on plant-growth substances (hormones) and their effectiveness in promoting the rooting of cuttings has been carried out. A considerable improvement in the rate of rooting of cuttings of certain species has been obtained, particularly with β -indole-butyric acid which has proved the most effective chemical of its kind. Preliminary trials with vitamin B in conjunction with appropriate hormone treatment have also been encouraging.

ANIMAL RESEARCH.

Following consideration of the report on the organization of animal research submitted by Dr. John Hammond at the conclusion of his visit to New Zealand, an Animal Research Management Committee was established under the aegis of the Agricultural Division of the Council of Scientific and Industrial Research. This comprised representatives of farmers' and research organizations, and met on two occasions. Its activities have been suspended meanwhile, pending the finalizing of plans for the complete organization of animal research.

Facial-eczema investigations under the direction of the Facial Eczema Management Committee have been conducted in association with the Department of Agriculture. Soil surveys have been made in the eczema areas of the Waikato district, and the nitrate and ammonia-nitrogen content of selected soil samples has been determined. Physical and meteorological observations are also being taken in order to provide fundamental information regarding the climatic conditions associated with outbreaks of the disease. Detailed botanical examinations have been made of the pastures on farms where serious outbreaks have occurred; and chemical analyses of the herbage are being made at the Plant Chemistry Laboratory. Not only is this work essential to the elucidation of the fundamental causes of facial eczema, but it will be of considerable value in the study of the more general problem of stock thrift.

Grants have been made to Massey Agricultural College for the conduct of a series of important animal research projects. A long-term breeding experiment is in progress to determine the basis of inheritance of length in bacon pigs. Ram sterility investigations have been continued, and a convenient field test for sterility has been devised. Studies of environmental influences on the plane of fertility of rams have also been continued. A start has been made on an important sheep-grazing experiment designed to test the nutritive value of selected pastures under high and low levels of soil fertility. The wool research team at the college has been strengthened by the secondment of an officer newly appointed to the Department who is trained in wool metrology. This strengthening of the staff will expedite the elaboration of further tests for deficiencies in wool quality. A grant was made to Canterbury Agricultural College to enable one of the lecturing staff to be freed for work on the nutritional aspects of sheep diseases.