

*Agricultural Botany.*—As in previous years, large numbers of plants, including weeds, grasses, &c., have been received for identification and report. In answering inquiries of this kind, besides the mere naming of the specimen, a short account is given of the properties of the plant from the farmers' point of view.

*Entomology.*—The number of applicants for advice on general entomological problems has again shown a decided increase, and numerous specimens of destructive insects and their injurious effects have been collected and preserved for reference.

Orchard investigations: Soil-fumigation experiments with calcium cyanamide for the control of pear-midge are being arranged. Assistance of the greatest value has been continually given by the Bureau of Entomology, London, and that organization is going to further trouble and expense in order to secure for us the natural enemy of the pear-midge in Europe, a matter of great difficulty. Laboratory experiments with certain chemical compounds used as insecticides upon the winter eggs of the red mite have been carried out with some success, and the results obtained are now awaiting verification in the field. Colonies of the *Cryptolaemus* ladybird for the control of apple mealy-bug were received from Australia and California; from these large broods are being raised in our insectary, and are periodically despatched for liberation in various parts of the Dominion. Attempts to acclimatize two other beneficial insects for the destruction of the mealy bug have so far not succeeded. Leaf-hopper has made its appearance in our orchards in alarming abundance this year; there is a great need for investigational work regarding its successful control. Information on the life-histories and the control in New Zealand of orchard pests is being assembled for incorporation in a publication on this subject.

Field-crop investigations: The need for study of the insects attacking the turnip and other cruciferous plants has never been more keenly felt throughout the Dominion than at present. The results of the so-called "turnip-fly" investigations have been published, and further work on the diamond-back moth and cabbage-aphis is in progress.

Animal parasites: The cattle-tick investigation has advanced considerably, and has afforded the necessary foundation for much-improved measures of control. The position in regard to sheep-fly maggot has not yet materially altered, but the parasites liberated for the control of these insects have become established, so results may be looked for in due course.

Forest and timber investigations: The life-history of the gum-tree scale has been worked out, and the distribution of its natural enemy—the *Rhizobius* ladybird—in many districts has resulted in a marked improvement in infected plantations and shelter-belts. Regulations have been drafted for the control of the injurious insects in imported timber. A bulletin embodying the results of the investigations into the injurious insects of forest-trees and forest-products is now nearing completion, and negotiations are being made for its publication.

*Mycology and Plant Pathology.*—The increase in the number of trained Instructors in the Agriculture, Education, and Forestry Departments in the field has led to a better recognition of the enormous losses in New Zealand through fungous diseases and a considerable increase in the applications for investigation and advice regarding the plant-disease problems of all branches of agriculture. To the mycological and plant pathological herbaria have been added many specimens, collected as opportunity offered, or obtained by means of exchanges with authorities in various parts of the world. The manuscript of a book on the fruit-tree diseases of New Zealand has been completed by the Mycologist in collaboration with the Plant Pathologist and the Director and officers of the Horticulture Division, and now awaits publication. This manual will be the most complete practical guide to the diseases of fruit-trees and their control that has appeared in any country, and the placing of this information in the hands of Instructors and Graders should result in a reduction in the routine work, and thus admit of increased attention being devoted to the diseases of field crops. The increased area of distribution and virulence of certain field-crop diseases, more particularly club-root and dry rot in the cruciferae, smuts in the cereals, and fungous and bacterial diseases in potatoes, are proving such a menace to production in New Zealand that farmers and farming organizations are demanding investigations for better methods of control. Researches into the control of cereal smuts are in hand, and a very complete series of field trials have been started on the Ashburton Experimental Area. The preliminary results of this work has already been published. During the ensuing seasons it is proposed to devote the main strength of the mycological service to the investigation of means for the control of field-crop diseases.

*Microbiology.*—A number of bee specimens have been sent in to be examined for the presence of *Nosema apis*, a protozoon occupying the epithelial cells of the chyle stomach, but otherwise it has been impossible to bestow much attention to bee diseases and honey fermentation during the year. Work has been done in connection with wet starters for dairy-factory use, and useful data secured regarding the progressive increase of acidity and bacterial numbers in a developing starter. At the Wellington City Milk Depot, bacteriological tests of apparatus and the efficiency of the sterilizing process have been made. Further progress has been made with the study of bacteria for the conversion of insoluble to soluble phosphate.

*Fruit Cool Storage.*—In connection with export fruit shipments this (1924) season, the Plant Pathologist was appointed to the Cool Storage and Fruit Carriage Committee in connection with the Fruitgrowers' Federation. This committee acted in concert with representatives of shipping companies in endeavouring to see that the best arrangements possible were made to avoid the risk of loss through brown heart and other diseases. The estimated damage through apple flesh-collapse in our local cool stores this year has again been heavy. Experiments in the temperature-humidity ratio of cool stores involving over five thousand cases of apples are now being initiated. The results of preliminary investigation along these lines have been published under the title of "Loss in Weight of Stored Apples." There are some prospects of heavy demands being made on the carrying-capacity of the cool stores this season, and if this eventuates the utmost vigilance will be required in certain stores to avoid a repetition of the losses in past years.