

leave of absence to visit the Imperial Mycological and Botanical Conferences held in London. While abroad he obtained the latest information relative to the technical side of his subject, and on his return in September this knowledge was incorporated in the routine work of the laboratory, with marked results in so far as cultural technique was concerned. Experiments during the season were undertaken in cereal-smut control. Results obtained showed that modified hot-water treatment efficiently combated loose-smut of wheat; and that for stinking-smut of wheat and loose-smut of oats copper-carbonate dust gave the most satisfactory results. The latter treatment, owing to ease of process and cheapness of material, will replace the formalin and copper-sulphate treatments previously used throughout New Zealand. Potato-diseases are now under investigation in the laboratory. A cheap and rapid method of controlling corticium disease of potatoes has been evolved, for it was found that under New Zealand conditions the standard treatment for this disease failed to give complete control. A serious collar-rot disease of peas is now under investigation, and experiments for its control are being tested under laboratory conditions. A study of dry-rot of swedes has been undertaken and much information obtained regarding the life-history of the causal organism. As in past seasons, the mycological herbarium has been considerably added to, both by collections made in New Zealand and by specimens obtained in exchange from abroad. Routine work in connection with the diseases of agricultural and horticultural plants and their control, and naming of fungi sent for identification, occupies about three-fourths of the time of the Mycologist. This material is forwarded by farmers and fruitgrowers, Agricultural and Horticultural Instructors, State Forest rangers, and Education agricultural instructors. In addition a series of lectures and lantern-slides for the Ruakura Farm of Instruction courses has been prepared.

*Fruit Cool Storage.*—Extensive investigations have been made during the past year into the causes of the extensive losses that have occurred under storage conditions. Concerning the rotting of local and export apples attention has been directed to the following points: Over-maturity; picking into contaminated cases; puncturing or otherwise rupturing the skin in picking, grading, packing, and transport; delayed storage or "cool storage" of such fruit in temperatures over 40°F. Recommendations to thoroughly disinfect certain cool stores have been given effect to in order to avoid infection of fruit at the store. Summarizing the fourth annual report upon the research at the cool stores into the cause and control of apple flesh-collapse, it may be said that whereas in former years certain growers reported a 50-per-cent. loss amongst Sturmers (and certain other varieties) from this disease, last year the commercial loss did not exceed 2 per cent. Use was made experimentally of a new system in which the condition of certain apples was measured from time to time and the results employed as a guide as to what storage conditions to impose throughout the storage season. Further researches into cool-storage methods are being undertaken this season.

*Bacteriology.*—Much of this work has been of a routine nature, particularly in regard to diseases of bees. Much more material has been collected in the study of *Nosema apis*, but the organism so far cannot be associated with any specific disease. Another disease of bees—paralysis—has been dealt with from a bacteriological standpoint, but from many examinations the presence of bacteria which would account for the disease could not be demonstrated. In the spring of 1924 a disease of pear shoots and flowers occurred in the Nelson District, and was at first suspected of being due to fireblight. Apple twigs from trees in Auckland, Canterbury, and Hawke's Bay showing wilting have been received at the laboratory from time to time, and this disease, together with the one from Nelson, were studied comparatively. The conclusion to date of the research is that in both cases, though bacteria are always present, the trouble was due to physiological causes. Periodically the Laboratory undertakes bacteriological examination of the milk utensils and machinery of the Wellington City milk-supply. Such examinations have shown that the handling of the milk is very satisfactory, and that where improvements have been suggested these improvements have satisfactorily reduced the ultimate bacterial content of the milk. The causes of several diseases of crops have been investigated, chiefly those affecting potatoes, tomatoes, and peas, and preliminary work on the control of these diseases is now in progress. In regard to the disease of peas a control has been evolved, but further work is required.

*Agrostology.*—The deteriorated hill country of the North Island has claimed the greatest amount of attention during the past year. The experiments in regrassing laid down in the autumn of 1924 have been carefully examined, and the sowing of a further series of experimental seed mixtures, based on information gleaned from the past year's operations, has just been completed. Approximately 140 acres of hill country have been sown. From a careful detailed study of these sowings it is hoped to arrive at the cheapest and most efficient seed mixture that can be employed in this country. Besides the grass seedings, other aspects of hill country are receiving attention. Among these are—exact conditions that determine dominance and succession in secondary growth, the economics of cattle as a means of secondary-growth control, methods of management, costs of maintaining the country, methods of fertility upkeep, general economics of hill-country farming, and detailed farm surveys. In connection with the bringing-back of reverted hill country, the Agrostologist formed one of a special committee set up by the Lands Department to investigate the state and extent of deterioration and to suggest remedies. The report of this committee has been submitted to the Hon. Minister of Lands.

*Photography.*—During the year 1,800 photographs have been taken, and 5,400 prints and 1,535 lantern-slides made. This work is of the greatest value not only for recording and illustration purposes, but also for the purpose of agricultural instruction.

#### STAFF.

The staff of the Fields Division have all rendered good and loyal service, and any success that may have attended the work of this branch of the Department is largely due to the earnestness and hearty co-operation of the officers.