

The structure of many of the older buildings makes control of insects difficult without constant work, and advice was given as to the design of new buildings where they are contemplated.

While most grain-stores have the insects under fair control, it was found that all of them are infested with rats and mice, which cause considerable worry to the storemen. Cats are relied on to a great extent, and poisons are disliked because they tend to kill the cats as well as the rats. Trials with red squill, a poison which is fatal to rats but harmless to cats, have proved quite efficacious, and arrangements have been made to import several hundredweights of the poison for distribution to grain stores and mills.

Mr. Morrison visited the Australian Entomological Stations during January and observed the methods used there for control of the insect and other pests found in New Zealand.

#### IV. FARM ECONOMICS.

The ordinary researches into farm management, costs, and production are being continued.

A special survey of the farm activities of the Ashburton County is being made with the aid of five honours students, who are carrying out the following investigations:—

- (1) A general farm-management survey of the whole of the plains district, and especially of that area of 25,000 acres which is to come under irrigation.
- (2) Wheatgrowing methods and practices.
- (3) Cocksfoot-growing methods from the points of view of both grazing and seed-production.
- (4) Sheep-farming on the plains area.
- (5) Sheep-farming methods, costs, production, &c., on the mountain runs.

The figures and experience gained from these surveys will give a basis for a national survey of land-utilization in the island, and a means of measuring changes that take place.

#### V. WOOL RESEARCH.

All the fleeces of all the stud ewes and rams have been weighed as usual, with the object of tracing the method of inheritance of wool-production, and of selecting the best sires and dams. The results for seven years are now available. They show considerable variation from year to year, but the fleeces shorn in 1935 of all except the Southdowns averaged over 10 lb. This is no indication that the hogget produces any heavier fleece than the same sheep when mature, and there is again no indication that the third fleece of any sheep is its heaviest. Feed conditions are the governing factors in wool-weights.

Scouring of fleeces is being continued as a check on wool-weights, since different sheep of the same flock carry different proportions of grease, and the weight of clean wool is wanted. It has sometimes been assumed that the proportion of grease in the shoulder wool will give a correct measure of the proportion of grease of the whole fleece. This we have proved incorrect, and we are now engaged in finding out what quantities of the wool from different parts of the fleece are necessary to give a reliable sample for the whole.

#### VI. SOIL-TEXTURE RESEARCH.

The means of describing soil texture are at present inadequate. The terms loam, sandy loam, &c., are inexact, and give little indication of their suitability for the numerous purposes to which soils are put—*e.g.*, foundations for buildings, bases for roads, stop-banks, irrigation ditches, irrigation watering, as well as for cultivation by agricultural implements. There are very few overseas workers on this subject, and the tables they have published are short and incomplete.

Five or six years ago, therefore, work was started on this subject, and a great number of determinations have been made on the physical properties of thirty soils of different types collected in various parts of Canterbury and Otago. The constants determined are—(1) grain density, (2) angle of friction, (3) loss on ignition, (4) lower plastic limit, (5) lower liquid limit, (6) sieve analysis.

A report on this work has been completed, and the remainder of the work dealing with other constants is in course of preparation. It is hoped to show that a soil can be completely described for all engineering purposes by the numerical expression of a very few factors.

#### VII. FARM ADVISORY SERVICE.

The work has continued along the lines of previous years. Eleven farms are under complete control and twenty-one are under co-operative supervision. These researches into methods of management of farms as units have now reached the stage at which generalizations can be made, and great use of these generalizations can be made in the training of students. Agricultural students usually learn a good deal about crops, and stocks, and soil, but they have little chance to learn about farms and their organization. The research into farm-management then reaches its fruition in the students who go out into life as agricultural instructors. A considerable number of farms on different types of soils must be kept under supervision to produce the necessary material for this teaching-work, and to give examples from current experiences.

The Service suffers from lack of funds. Every assistant so far trained has left after about two years for much more lucrative employment, since other employers realize that the training received in the Service is of the very highest value.