

in the climatic conditions prevailing in these districts, and to ascertain its capacity for over-wintering. Reports indicate that it has apparently become successfully established where liberated; and if this proves true, then it is hoped that generous supplies will be available for wholesale distribution in all of the main ragwort areas of the Dominion next summer, so that a reasonable effect may be obtained before the insect becomes too heavily parasitized.

(b) *Homocosoma vagella*.—This insect was secured from Australia, but was found to be well established in New Zealand, where, though at times temporarily checking ragwort, it did not act as an efficient control and was subject to severe parasitism. The work with this insect has been discontinued.

(c) *Gortyna ochracea*.—Tests with the larvæ of this insect showed that they damage the foliage of tomato and potato. In consequence, all the stocks were destroyed.

Gorse.

During the year five consignments of *Apion* were received. From the experiences gained from the researches during the year there is no doubt that the acclimatization of *A. ulicis* in New Zealand will prove a difficult problem. The two main difficulties are: (1) The flowering of gorse out of season in most parts of New Zealand, and (2) the high percentage of sterility among the weevils on arrival in the Dominion. As it was found that gorse flowered according to season in the neighbourhood of Dunedin, a field station was established there and some better results secured. It is intended to carry on the work with flowering gorse during the winter in the new heated glasshouse just erected. Experiments are being undertaken to ascertain, if possible, the cause of sterility. Another difficulty is due to the necessity of keeping the weevils on gorse under close confinement to prevent their escape, and there is no doubt that this has an ill effect on both the insect and the host plant.

Piripiri.

A correspondent in Chile has sent word that he has located the larvæ of a saw-fly that does considerable damage to Chilean species of *Acaena*. The correspondent has been engaged in working out the life-history of this insect and in making tests on its food range; he found that it did not attack strawberries, which is an important point. He has sent two consignments (one received during October and the other in November), but, owing to faulty packing, the material did not arrive in good condition. However, better arrangements are being made, and this insect will probably be of great value in the attempt to control piripiri. The insect has been identified as *Antholcus varinervis*.

Foxglove.

Although it has been decided to discontinue the work with foxglove, a very small unsolicited consignment of two species of insects—*Eupithecia pulchellata* and *E. pyrreolata*—were received during December. These are being kept under observation, but no adults have so far emerged.

MINERAL CONTENT OF PASTURES RESEARCH.

Advisory Committee: Professor H. G. Denham (Chairman); Mr. Q. Donald; Mr. S. Fletcher; Professor W. Riddet; Mr. Bruce Levy. Directors of Research: Mr. B. C. Aston and Mr. T. Rigg.

Systematic investigations into the mineral deficiencies recognized as appearing in the pastures of the Dominion were commenced in April, 1928. The work has been confined to the Auckland and Nelson Provinces. In the Rotorua, Waikato, and King-country districts, as the result of deficiencies in iron, phosphorus, calcium, and, possibly, other essential mineral ingredients of animal diet, various forms of stock unthriftiness and diseases appear. In most cases the cause of the complaint is obscure, and can be ascertained only by a carefully planned series of field trials and laboratory experiments conducted over a period of several years. Throughout these areas, therefore, and on top-dressed areas in the same localities, numerous samples of pastures and soils are being analysed. In the Nelson area somewhat similar deficiencies occur, but in some respects these are markedly different from those occurring in the Auckland District. The most remarkable characteristic of the disease in the Nelson District is the occurrence of large granular masses—xanthine calculi—which are found in the kidneys of sheep that have grazed on deficient areas. In this district soil and pasture analyses are also being combined with stock-feeding experiments.

The funds for this research are provided as follows: Empire Marketing Board, £2,000 for five years; New Zealand Government, per Department of Scientific and Industrial Research, £1,000; New Zealand Government, per Department of Agriculture, £1,000: total, £4,000. Advice has been received from the Empire Marketing Board that its grant, originally made for a period of two years, has been extended for a further term of three years. The Cawthron Trust Board, through the services of its staff and laboratory, has been actively associated with and has co-operated in this research in the Nelson District. The grant received from the Empire Marketing Board and from the Department of Scientific and Industrial Research, together totalling £3,000, is apportioned to the Department of Agriculture and Cawthron Institute in the ratio of 2:1.

During the past year Dr. J. B. Orr, Director of the Rowett Institute, Aberdeen, paid a short visit to the Dominion, and, after visiting some of the areas where inspections were being made, furnished a helpful report. Dr. Orr's visit also has rendered possible a greater degree of co-ordination with similar investigations being conducted at Rowett Institute. The establishment of a Bureau of Animal Nutrition, with its headquarters at Rowett Institute, will enable the Dominion to participate further in the advantages secured from an Empire-organized attack upon the very difficult problems of animal nutrition.