The following are the reports of the Director and associated Director of the Mineral Contents of Pastures Research :—

Director's Report.

Historical.

In October, 1926, an offer was received from the Empire Marketing Board, through the High Commissioner for New Zealand, advising that a grant would be made by the Board towards work on the mineral content of pastures in New Zealand, provided that such a grant could be supplemented by others from New Zealand sources. Subsequent negotiations resulted in the Empire Marketing Board agreeing to a grant of £2,000 a year, on the understanding that the New Zealand Government would increase its grant of £1,000 (which was already being expended on this class of work through the Department of Agriculture) by another £1,000. Accordingly £4,000 became available for mineral content of pastures investigations, which were to be carried out under the direction of the Chief Chemist (Mr. B. C. Aston), of the Department of Agriculture, in association with the Cawthron Institute. It was agreed that the work should be under the general control of an Advisory Committee of the Council for Scientific and Industrial Research. Accordingly a Mineral Content of Pastures Committee was constituted by the Council.

This committee made the recommendation that the funds available from the Empire Marketing Board and the £1,000 received from the New Zealand Government through the Department of Scientific and Industrial Research should be allocated for the purposes of the researches, as follows : Department of Agriculture, £2,000 ; Cawthron Institute, £1,000—and this suggestion has been adopted and followed out since the definite institution of the research on the 1st April, 1928.

All the investigations are being carried out under general directions laid down by Dr. Orr, Director of the Rowett Institute. These are briefly as follows :—

(1) That any scheme of work adopted should be in general accord with similar schemes which are being operated in similar parts of the Empire on this problem ; such technical work or other as could not be done in the country where the investigation is being carried out would be carried out at the Rowett Institute.

(2) To ensure that the data from the different parts of the Empire will be comparable, it is necessary that the analytical methods, and as far as possible the experimental methods employed at different centres, should be uniform.

(3) For this reason it was asked that one of the chemists and one of the workers engaged in feeding-tests should have a training for six months in the same laboratory where the other workers have been trained, and that the training should include—(*a*) The analysis of samples of pastures, and, where considered desirable, of soils, to determine the mineral content of pastures in different areas and in different seasons ; (*b*) the correlation of the minerals with the other constituents and with the nutritive value of the pasture as determined by its carrying-capacity, and the health, rate of growth, and production of the animals grazing on it ; (*c*) feeding-tests to determine the effect of feeding to grazing-animals mixtures of mineral salts or foodstuffs rich in minerals found to be deficient in the pastures.

Dr. Orr then made proposals referring to the ways and means of carrying out this part of the programme, which were discussed by the Scientific and Industrial Research Council and the Cawthron Institute. It was finally agreed that Mr. T. Rigg, M.Sc., F.I.C., Agricultural Chemist to the Cawthron Institute, should spend some months at the Rowett Institute, and that Mr. R. E. R. Grimmett, M.Sc., who had been in charge of field-work and experiments with animals for over a year at Rotorua, and had been employed in the Chemical Laboratory for some years previous to this, should at once proceed to the Rowett Institute for a six-months course of training there. This arrangement was duly carried out. Dr. Orr, in the same letter, laid down the broad principles governing the investigation into the nutritive value of pastures, as follows : "The first work to be undertaken is the analysis of samples of pastures and the collection of information on the nutritive value of the pastures on the grazing-ground sampled. The samples should be collected by the method described in the paper by Godden (*Journal of Agricultural Science*, Vol. 16, Part 1). Two whole-time chemists and two whole-time field-workers will be required to begin the work. There will be an exchange between the various centres of experimental data and other information bearing on the subject. The Rowett Institute, for the time being, is acting as the collecting and distributing centre."

At a subsequent meeting of the Research Council on the 19th April, 1927, it was agreed that no utilization of the Empire Marketing Board's funds other than those expended in sending Messrs. Rigg and Grimmett to the Rowett Institute should take place until these workers returned to New Zealand. This date of commencement was afterwards fixed at the 1st April, 1928, so that the following report is for the year's work from that date. A scheme for work on the mineral content of pastures for 1927–28 was drawn up and submitted to both Dr. Orr and the New Zealand Research Council. The salient features of this scheme were :—

(1) *Iron Starvation* (*Bush Sickness*).—Work on pasture and soil analysis to be continued, and the staff and equipment engaged to be increased ; work determining the effect of the various top-dressings of pasture to be continued.
(2) *Phosphorus-deficiency Diseases.*—Analysis of pasture samples to be undertaken when possible.
(3) *Mortality from Renal Congestion in Young Lambs.*—(This was subsequently deleted from the programme as not coming within the scope of the investigation.)
(4) *Calcium Starvation.*—Analysis of soils and pastures to be continued in districts where marked deficiency exists, resulting in sheep mortality.

Dr. Orr (in a letter of the 13th May, 1927) approved of this programme of work and of the two men selected to go abroad, and expressed pleasure that preference should be given to analysis of pasture upon which deficiency diseases occur, and hoped that feeding-tests with cattle to determine whether supplementary feeding of mineral salts will prevent the occurrence of deficiency diseases would be successful. He suggested that the work on soils should be developed according to local requirements.