

(c) *Field Trials*.—The Fields Division of the Department of Agriculture, the Cawthron Institute, and Canterbury Agricultural College have collaborated in an extensive series of field trials with serpentine-super as compared with super, super-lime, reverted super, and certain fertilizer mixtures. Observational trials with pasture and yield trials with such crops as potatoes, brassicas, wheat, barley, and tobacco are at present in progress, but it is not yet possible to give the final results. It can be said, however, that so far as the trials have gone, serpentine-superphosphate has on the whole given results at least as good as those obtained from superphosphate.

Observational and yield trials with pasture and certain crops such as potatoes, brassica, wheat, barley, and tobacco, have been made, but final results are not yet available. In general, the results from the pasture trials confirm the work done by the Department of Agriculture in the previous year, indicating that certain districts—namely, Waihi, North Taranaki, and Southland—were associated with a special response when pasture was top-dressed with serpentine-superphosphate. Results at Nelson likewise suggest that certain granite soils gave a valuable response with serpentine-superphosphate when used in the presence of potassic manures. Good results were obtained with tobacco in the control of sand-drown or magnesium deficiency by the use of serpentine-superphosphate. Although yield trials in the case of potatoes and cereals did not suggest any important increase in yield, the results were in many cases comparable to those obtained with superphosphate. Arrangements are being made to continue the experiments next season.

(2) GLAUCONITE (GREENSAND) AND SEAWEED (MACROCYSTIS) AS POSSIBLE EMERGENCY SOURCES OF AGRICULTURAL POTASH.

(a) *Glauconite (Greensand)*.—It was thought desirable to explore the possibility of utilizing local deposits of greensand, particularly in North and South Canterbury, as an emergency source of agricultural potash. A number of samples from these deposits were collected and examined, but it was concluded that the low potash content and the cost of concentrating the potash would rule the material out as an emergency source of potash, particularly in view of the greater promise shown by *Macrocystis* seaweed, which is dealt with in the following paragraph.

(b) *Seaweed (Macrocystis)*.—A variety of large brown seaweed (*Macrocystis*) which grows in fringing beds along certain parts of the New Zealand coast-line contains about 15 per cent. of potash (K_2O) on the dry matter and therefore was considered to be well worth investigation as a source of emergency supply of potash. Roughly quantitative surveys of the quantities of weed available in the Tory Channel, in the vicinity of D'Urville Island, at Cape Campbell, and in Foveaux Strait were instituted by the Committee. The Marine Department gave most valuable assistance by making Mr. A. M. Rapson available to conduct these surveys. Miss L. B. Moore, of the Botany Division, collaborated in certain of these surveys, and has also been studying the rate of regrowth of the seaweed after cutting, which is an important factor in assessing commercial possibilities. During the year surveys at D'Urville Island were completed, and these are to be extended in the coming year to the other areas already mentioned.

At the same time field trials with dried and ground seaweed, as compared with potash salts, have been initiated, but results were not available at the time of writing this report.

MINERAL CONTENT OF PASTURES.

INVESTIGATIONS AT THE CAWTHRON INSTITUTE, 1940-41.

H. O. ASKEW, Officer in Charge.

INTRODUCTION.

During the past year work has been continued on the determination of the cobalt content of samples from pasture and soil surveys of the northern half of the South Island. Further analyses have been made for cobalt content of South Island limestones. A few commercial cobaltized fertilizers have also been analysed. Field experiments and animal trials at Glenhope and Sherry River have been continued.

Arising out of the identification of magnesium deficiency in certain crops in the Nelson District a considerable amount of field and laboratory work has been carried out. Field work has covered trials with various magnesium-containing fertilizers on pasture, potato, and turnip crops. Laboratory work has been largely concerned with an examination of reactions occurring between superphosphate and finely ground serpentine.

COBALT INVESTIGATIONS.

(a) *Pasture Surveys.*

Surveys of pastures and soils of the Marlborough, North Canterbury, and Golden Bay districts have been extended. In Marlborough the soils seem to be satisfactorily supplied with cobalt, the minimum figure found being 3.8 p.p.m. and the maximum 18.8 p.p.m. For pastures the range was from 0.04 p.p.m. to 0.16 p.p.m. Low values have been found mainly for the hill-country or river-terrace pastures. On these soils there does not appear to be much correlation between cobalt content of the pasture and the soil on which it is grown. Unsatisfactory stock health due to the low cobalt of pastures has not been recognized in this district. Farther south on the coast road and along the inland road through Waiatu to Christchurch very few samples have given low values for cobalt in either soil or pasture. The lowest two figures for Canterbury soils were 3.6 p.p.m. for a sample from the limestone formation of the Weka Pass and 2.6 p.p.m. for a sample from the rhyolite formation of Gebbie's Pass. The corresponding pasture samples gave 0.05 p.p.m. and 0.08 p.p.m. respectively. Other North Canterbury pastures gave on analysis 0.04 p.p.m. to 0.41 p.p.m. of cobalt, with the majority falling within the range of 0.1 p.p.m. to 0.2 p.p.m. of cobalt. As with the Marlborough samples, there does not appear to be any direct correlation between the cobalt content of soil and pasture.