*Plant Indicators.*—The search for a plant indicator for phosphorus, comparable to virginia stock in respect of calcium, was continued. A search for a plant indicator for potash in soils has been recommenced.

*Ironstone Soil* (Okaihau Clay Loam).—An experiment with rye-grass and white clover, sown out last year on ironstone soil raised to various levels of phosphorus and calcium, was under observation throughout the current season. This soil would appear to require heavy liming before a rye-clover pasture will respond to phosphate. A marked falling-off in the quality of the pasture was noticed six months after the inception of the experiment. One set of pots was treated with further dressings of superphosphate, and this gave an immediate and very marked improvement in growth of both rye and clover, suggesting that the initially added phosphate had been strongly fixed by the soil.

A new series of pots was laid down with ironstone soil, treated with phosphate in various forms and amounts (including superphosphate pellets and ammonium phosphate), and sown with white clover. At the end of a month, best growth has been made at the highest levels of phosphorus.

A third ironstone experiment has been laid down with white clover and suckling clover on soil treated with various minor elements. The purpose of this experiment is to see if any of the agricultural problems on this soil are related to mineral deficiencies.

*Sand Podzol* (Te Kopuru Sand).—To the farmer the strongly leached sand podzol is a " problem soil " second only to the ironstone. An experiment has therefore been laid down using this soil with various minor element additions. Molybdenum (with boron) is showing a good response on this soil.

*Lime and Seedling Emergency.*—Information has accumulated on the accelerating effect of lime on the rate of seedling emergence and the rate of cotyledon greening in different plants growing in various soils. Accelerated emergence of cotyledons is most marked in the podzol soils and least marked in the red-brown loams. Virginia stock and linen flax are plants that can be used to demonstrate this effect. Further investigation is required to discover the causes of this phenomenon.

## MAGNETIC OBSERVATORY, CHRISTCHURCH

Director: Mr. H. F. Baird

Customary observational and recording programmes have been maintained. Magnetic resurvey operations were extended to remote parts of the South Island, but staff shortage and rearrangement temporarily halted this work. However, geomagnetic and geological reconnaissance was started near Oxford as a preliminary to mapping the basement rocks of the Canterbury Plains. A geophysical survey of these rocks is expected to solve fundamental geological problems which will be of wide economic application throughout the Dominion.

*Terrestrial Magnetism.*—At Amberley the three types of magnetographs gave continuous record throughout the year. Absolute observations were made every week, and, when possible, twice weekly to instruct junior members discharged from the Armed Forces. Scale-values were determined on most days, and measurement of hourly values is well forward. Local data of international magnetic character figures have been supplied quarterly to the Secretariat de l'Organization Meteorologique, Lausanne. These, and " K," the important three-hour range index of geomagnetic activity, were sent monthly to Carnegie Institution, Washington, D.C., United States of America. " K "-indices were supplied daily to the Defence Development Section, Christchurch. Steps to install the ionosphere training set in the Observatory grounds are well under way, and the necessary close link between workers in geomagnetic and ionospheric disturbance fields is being welded.