

they require a high degree of technical skill on the part of the observer. Supplemented by soil and plant chemical analyses, by more accurate sward-evaluation techniques, and by a comparison of results with those from comparable measurement trials, they have proved a valuable and reliable means of evaluating the responses of pastures to fertilizers. Including a survey of soil types of Taranaki for potash responses and various trials with "minor elements" on those soil types where the more commonly-used fertilizers have not given promising results, a total of 224 trials of this type is now open.

The majority of these trials continue the study of the responses shown by pastures on the various soil types as defined by officers of the Soil Bureau of the Department of Scientific and Industrial Research. As the soil surveys throughout New Zealand are able to classify and map the soil types of the farming districts it becomes possible, by adequate field experimentation, from soil and plant chemical analyses, and from botanical and geological studies, to classify and map farming-land throughout the Dominion according to its mineral requirements and likely responses to fertilizer and lime applications. As is the case with most other lines of field research work, the closest collaboration between the laboratory worker and the field worker is essential.

Other types of top-dressing trials include comparisons of various phosphatic fertilizers, in particular of serpentine-superphosphate, reverted superphosphate, and various concentrated and fused products, some of which are giving promising results and whose concentrated form is of particular merit where freight charges are heavy. A series of trials on peat soils is extending the results found by workers at the Rukuhia Soil Fertility Research Station into differing classes of peats. A number of trials are required each year to compare with standard fertilizers various types of proprietary fertilizers for which optimistic claims are frequently made but which rarely stand the acid test of the field experiment. Liming trials of various types, trials with nitrogenous fertilizers, and trials on seed-producing pastures are other types of experiments in progress. A new and interesting venture is the investigation of the pelleting of seed with various inert and fertilizing materials to improve establishment and early growth, more especially of surface-sown clovers.

(c) *Pasture Species and Strains*.—Investigations under this classification cover a diverse assortment of problems associated with the establishment and maintenance of a vigorous pasture sward under the various farming soil and climatic types of New Zealand. The production of such a sward not only results in increased carrying-capacity and increased primary production generally, but also is a direct and important means of assisting in the conservation of the soil.

Many trials are laid down with the co-operation and assistance of officers of the Grasslands Division, Department of Scientific and Industrial Research, and are a valuable means of demonstrating the value of improved strains of pasture plants to the farmer. Other experiments are of a more exploratory nature and may not reveal anything of immediate benefit to the farmer. A total of 256 trials is open at present, the majority (142) being trials of various strains and species and rates of seeding of pasture plants. The 22 pasture-establishment trials are of various types, but most are concerned with the establishment of a sward on hill country after the clearance of secondary growth or with the introduction of pasture species into some types of hill-country and tussock-land associations. Most of the 72 trials with surface-sown legumes have as an objective the improvement of hill-country swards deficient in clovers and are associated with different types of top-dressing treatments to achieve this end. It is felt that, although this work is achieving valuable results, there is a definite need to extend it on to large-scale experiments on which controlled grazing of stock can be made and the full value realized by the correct utilization of the feed produced. To do this it is probable that research areas will be required where the part that the animal plays in improving or depleting hill country can be adequately investigated in conjunction with other methods of improving hill-country pastures.