in germination tests. The design and analysis of a number of trials and surveys for other Divisions of the Department have been undertaken. The value of a competent group for experimental statistical analysis is recognized and increasing demands are being made for its services.

The research work of the Extension Division has the primary aim of providing the extension officer in the field with reliable information for passing on to farmers. It has, therefore, in the majority of cases, a practical and local rather than a fundamental or general approach to farming problems. In this field of work the scheme of conducting co-operative experiments on farms has given fruitful results with a minimum expenditure of time and money.

(1) *Pasture Top-dressing*

Nutrient Requirements of Soils for Pasture Growth.—This is a long-term investigation by means of a limited number of pasture-production measurement trials in selected localities and a large number of observational top-dressing trials to cover the major soil types of the Dominion. The grouping and naming of New Zealand soils by officers of the Soil Bureau of the Department of Scientific and Industrial Research have provided the basis for the mapping of the pasture lands according to their manurial requirements. In a number of districts the work has progressed to a stage where the best fertilizer practice for all the major soil types may be confidently advised. However, in those areas, such as most of the South Island, where the soil survey is incomplete, much additional experimental work requires to be done.

Trials With "Concentrated Phosphates."—Superphosphate is easily the most widely used phosphatic fertilizer in New Zealand, as it is in most overseas countries. However, for top-dressing from aeroplanes, which is now being developed, and for districts where transport charges are heavy, a more concentrated form of phosphatic fertilizer than superphosphate would be advantageous in reducing distribution costs. Pasture measurement trials have therefore been commenced at the Rukuhia Soil Research Station and the Marton Experimental Area and a number of observational trials have been laid down in various parts of New Zealand to compare these concentrated fertilizers with superphosphate on the basis of equivalent rates of phosphate applied. In general, most products tested have given results equivalent to superphosphate per unit of phosphoric acid applied, and one or two of the products made by the fusion of raw rock phosphate with other materials, such as serpentine, compare more than favourably with superphosphate. Unfortunately, the cost per unit of phosphoric acid of concentrated fertilizers is generally much higher than that of superphosphate and the new materials would have to show considerable advantages in efficiency or reduced application costs before they could compete with the standard fertilizers.

Comparisons of Other Forms of Phosphatic Fertilizers.—A large number of measurement and observational trials compare various commercially available phosphatic fertilizers such as basic slag, ground rock phosphates, serpentine-superphosphate, reverted superphosphate, and organic fertilizers with superphosphate. Trials are conducted under a variety of differing conditions on hill and flat country. In general, ground North African rock phosphates and basic slag have proved to be valuable fertilizers in high-rainfall country where adequate liming is difficult and the soils are naturally acid. Under most conditions other than these serpentine-superphosphate, reverted superphosphate, basic slag, and superphosphate do not give greatly differing results, but ground-rock phosphates are less effective. Ground-rock phosphates of the Nauru type have given disappointing results in practically all cases.

Liming Trials.—In a number of measurement and observational trials the following factors are studied: Rates per acre of lime applied, fineness of grinding of limestone, purity of limestone, and reactivity of the limestone. The effect of liming on the availability of soil nutrients and on the responses shown by fertilizers is also being evaluated. It