The need for changing over to the almost universally adopted Continental system is evident, especially in export and import business, where it becomes necessary to compare overseas with New Zealand analyses.

Laboratory work in connection with the pre-drying and sealed storage of seeds, the causes and extents of variations in germination tests, and co-operative tests with other countries, have been undertaken during the year.

Agrostology.

General work on the grass-lands of New Zealand has been steadily pursued. This general work is directed largely towards the classification of grassland types, towards the evaluation of each type, and towards the determination of successional development of those types under the varying factors that operate or may be brought to operate upon them under the respective types of farm-management in vogue.

The pasture type growing on any one soil is affirmed to be an exact measure of the environment summed up in the soil, the climate, and in the pasture-management conditions under which the pasture sward is growing. The determination and measuring of the exact biological phenomena that guide the increase or decrease of species in the change or successional development of grassland associations is fundamental to the production and utilization of grass on the best possible lines. Up to the present time the determination of the part played by each of the various factors that operate to produce change in the composition of the pasture sward has been made almost entirely by eye. Work along the lines of exact measurement is most desirable and during the year some progress has been made in this direction by the application of the point method of pasture analysis. This consists of taking a large number of points with a small instrument called the point-analyser and calculating from the figures secured not only the species present in the pasture, but also the percentage of ground that each species is covering. By this instrument the increase or decrease of the component species of any pasture sward over a number of years may be measured and recorded. Changes in composition induced by alterations in the plant-food content of a soil may be measured, and it seems possible to express in terms of increase or decrease of the components of the sward virtually all those factors that operate in the production of grass.

Mineral Content of Pastures.

A committee has been set up by the Department of Scientific and Industrial Research to advise on work in this connection in New Zealand. It would appear that most of the work performed in Great Britain and elsewhere on the mineral content of pastures has for its objective the determination of definite mineral deficiencies that lead to definite malnutrition of stock. This work also is of importance to New Zealand, but doubtless it should form but a part of a larger and fuller scheme that has for its objective the total nutrient content of pasture herbage.

The determination of the nutrient content of the constituent species of pastures is important mainly from four aspects: (1) From the point of view of formulating the highest potential food-value pasture mixture possible to secure on each soil-type; (2) from the point of view of determining the optimum milk-producing life-form stages, as distinct from the non-milk-producing life-form stages, fattening and non-fattening life-form stages, of the herbage of the component species of the pasture on each soil-type; (3) from the point of view of determining nutrient (including mineral) content alterations that occur on top-dressed land; (4) from the point of view of determining on certain soil-types mineral deficiencies that result in definite stock malnutrition.

Before we can really claim to be in the best position possible we must know the species thoroughly—(1) morphologically, (2) ecologically, and (3) chemically. Determination of relative nutrient content will help towards maximum efficiency in regard to mixture formulæ. The determination of nutrient content at different stages in the life-form of the individual should throw much light on why certain farm practices are preferable to others. The stage of growth underlies a fundamental principle in pasture-management, and virtually the whole of efficient pasture-utilization has for its objective the maintaining of the pasture herbage in that condition of growth that stock produce their best when grazed upon it. In other words, there is a stage in the growth of all species when nutrient content is at a maximum. The determination of this maximum point by chemical analysis would be of infinite value towards directing pasture-management on the best possible lines.

The part played by top-dressing in providing a better-balanced mineral ration to stock may be to some extent measured from chemical analyses of the herbage from top-dressed and un-top-dressed soils, and in the case of definite malnutrition areas the determination of some mineral shortage may lead to corrective methods along the lines of top-dressing the pastures with suitable fertilizers.

The work relating to regrassing experiments on hill country has been carried on, and a great deal of careful analytical work in regard to the growth and covering-capacity of each species sown has been accomplished. The experimental sowings have been written up in the *Journal of Agriculture*, and a preliminary report on the sowings up to the end of the third year has been published. Included in this report are given seed-mixtures for secondary burns which are compiled from the statistical figures secured from the botanical analyses made of the sowings, using the point method of pasture-analysis.

A prominent feature of last year was the visit of Professor Stapledon, Director of the Welsh Plant-breeding Station, Aberystwith, Wales. Many special and general topics relative to grassland research were discussed, and many mutual benefits were secured as the outcome of his visit.