

growth country. It matters little whether cocksfoot is sown or not; the essential thing is to get from $\frac{1}{2}$ lb. to 2 lb. brown-top, 3 lb. *Danthonia pilosa*, and $\frac{1}{2}$ lb. *Lotus major* included in the mixtures sown. Crested dogtail is of outstanding merit for the first three years, and from 3 lb. to 4 lb. should be included; $\frac{3}{4}$ –1 lb. white clover, and 6–8 lb. perennial rye-grass included in the mixture provide rapid feed, but these will not last excepting under top-dressing. Other species, such as *paspalum*, yarrow, kikuyu, and subterranean clover, may also be worth while. A large amount of experimental plantings of kikuyu has been made on hill country in Taranaki.

In hill-country work, as compared with that on easy ploughable country where modification of the soil habitat by ploughing, reseeding, manuring, and tripod-harrowing is possible, it is a question of choosing species adapted to the soil conditions as they exist or come to exist after the burning-off of the rubbish, and the more the question is studied the more important loom those species that can persist and spread under low soil-fertility standards; those that will persist in the shade of secondary growth should this get temporarily out of control; those that will carry a fire and that will recover rapidly once the area has been burned off. *Lotus major*, *paspalum*, brown-top, *Danthonia pilosa*, yarrow, New Zealand rice-grass, and *Poa pratensis* are outstanding in this respect.

Systematics of Grassland Associations.—The systematics of grassland associations has received some careful consideration, and it is hoped ultimately to map each district according to the natural grassland associations that the soil of that district can support. The classification of association type is a piece of fundamental groundwork that should be done prior to the inauguration of any work that bears on grassland. It is fundamental to such work as—(1) Soil survey, chemical: From a grassland point of view it is the chemical relationship of the soil to the grassland association that that soil is producing that is all-important. It is a soil survey of soil-types defined by the sward that that soil-type is producing that is required. (2) Soil survey, biological: The bacterial and other life of grassland association types should go hand in hand with the chemical, and here again it is the fauna of the grassland associations and the differentiation in the life of the various association types that need determination. (3) Mineral and total foods content of pasture herbage: It is fundamental to the determination of mineral and total foods content of pasture herbage that the herbage of each species analysed be collected from known and recognizable grassland associations. An analysis, for example, of cocksfoot growing within a rye-grass - white-clover dominant sward may be an entirely different thing chemically from a cocksfoot growing in a *danthonia*-dominant sward. Soil surveys and pasture-herbage analyses are being made by the Chief Chemist, and to my mind it is imperative that this work should be correlated with association type. (4) Top-dressing response: The co-ordination of association types with response from application of artificial manures may lead fairly rapidly to generalization of just which association types pay best to manure, and approximate cost of changing by manuring of one association type to another. In all this work it would seem imperative that some measure of the association should be made prior to any of the foregoing work and during the course of such experiments. The identification of the association then is fundamental.

Point Quadrat Method of defining Grassland Associations.—Several inquiries from abroad for information regarding the above method have been dealt with, and some work has been done during the past year towards proving mathematically the efficacy of the method.

Modification of Grassland Soil-types.—During the past year the Department has initiated experiments that ultimately it is hoped may be carried out on all the leading soil-types to determine under ordinary grazing just what are the conditions necessary on each soil-type to attain rye-grass and white-clover dominance. The scheme consists in sowing rye-grass and white clover and one other additional species per plot, and in manuring these on each soil-type to the point that rye-grass and white clover become the dominant herbage of the pasture irrespective of what was sown. The modification of the habitat so as to provide conditions suitable for high-production species to thrive lies at the root of pasture-improvement.

Consideration of Strain in Relation to Pasture Plants.—The conditioning of all the better soil-types at least towards the rye-grass and white-clover ideal is looked upon as being the best immediate method of increasing production from the sown grasslands of New Zealand. An aspect of equal importance for areas to be sown in the future is the consideration the farmer should give to strain. Work has already been initiated to test out all the commercial strains of grasses and clovers at present securable in New Zealand, both locally grown and those imported. As the work develops it is hoped to segregate the best commercial strains of each and ultimately to work up pedigree strains.

Official Seed-testing Station.

During the twelve months ended December, 1927, 10,768 seed-samples were tested, representing an increase of 2,141 samples over the number for 1926. The total was made as follows: Commercial samples, 8,959 (2,107 increase); farmers and seed-growers, 233 (166 decrease); Government Departments, 351 (62 increase); laboratory tests, 1,078 (134 increase); retests, 147 (4 increase).

This work entailed the making of 10,509 germination tests and 3,127 purity tests, showing an increase of 23 per cent. in germination work, 65 per cent. in purity work, and an over-all increase of 31 per cent. over the work done in 1926. Owing to the lack of additional accommodation, the staff could not be increased, so that the handling of this large number of samples must be regarded as an indication of the high efficiency of the members of the staff, who gave up a considerable amount of their own time throughout the year.

The distribution of the samples received was as follows: Southland, 3,377 (1,398 increase); Wellington, 2,323 (423 increase); Canterbury, 1,680 (538 increase); Auckland, 1,066 (254 decrease); Otago, 602 (3 increase); Marlborough, 228 (99 increase); Hawke's Bay, 213 (15 decrease); Taranaki, 129 (70 increase); Gisborne, 47 (38 increase); North Auckland, 24 (21 increase); Nelson, 1 (7 decrease); Westland, nil.