a species? Strain-selection has unconsciously gone on in all arable-land farming communities in New Zealand for the last four or five decades. Quick-maturing and free-seeding types of rye-grass, for example, have been harvested and sown; harvested and sown, over and over again. The slower-maturing, tardy seed-producing, leafy strain have figured in lesser and lesser amounts until to-day a free-seeding, rapidly maturing, more or less annual rye-grass type has been developed—the outcome of unconscious strain-selection. On the other hand, areas have remained in permanent grass for decades. These have been subjected to an entirely different set of environmental conditions, and survival of the sward-components has been determined by one or two things—(1) the ability to reseed, or (2) the ability to persist by vegetative spread, as by tillering.

(*c*) The third aim is to know how best to modify or change existing conditions on the farm so that the very best species and the very best strains of those species may be provided, and the wherewithal for their optimum growth and maximum development. No consideration of species or strain is of value apart from determination of the conditions necessary for maximum production by those species or strains.

This threefold aim constitues the fundamental grassland research work of the station.

Fundamental Grassland Research Areas.—Nine areas on widely different soil-types, situated respectively at Weraroa, Marton, Manaia, Katere, Stratford, Tutira, Pembroke, Gore, and Balclutha, have now been sown. On each area fifty-four different grasses and clovers, or strains of these, have been included in these trials, and differential top-dressing of these is being carried on to determine the reactions of each under the varying degrees of fertility-upkeep.

Strain Investigation.—The research work on hand has for its objective the testing-out of strain or type, and the reinstatement and perpetuation on the market of the persistent, leafy, and truly permanent strains of herbage plants. The main species at present under trial are (1) perennial rye-grass, (2) cocksfoot, (3) brown-top, (4) red-clover, (5) white clover.

Perennial Rye-grass: Over five hundred commercial lots are now under trial at the Plant Research Station at Palmerston North, and field-grazing trials of the more outstanding types are being conducted at Marton, Manaia, and Katere. Over two thousand plots of rye-grass alone have been laid down during the year. The trials up to the present indicate the necessity for differentiation between (1) those lots that are mixed with or are dominately Italian rye-grass; (2) those lots that are what may be called pseudo or false perennial; and (3) those that approximate to the true perennial, leafy, and persistent types.

The main projects are (1) to eliminate the Italian rye-grass lots; (2) to differentiate out as rapidly as possible the false perennial lots from the true perennial lots, and (3) to locate throughout New Zealand and get on to the market as rapidly as possible pedigree true perennial rye-grass strains. It is extremely gratifying to report that certain firms of the seed trade are taking the matter up in earnest, and are growing only approved genuine perennial rye-grass types, drawn largely from Hawke's Bay, and next year it is hoped there will appear on the market seed certified to by this Department as being the true perennial type.

White clover: Approximately 150 lines of white clover are now under test, and more are being secured for planting in the spring. There are probably numerous types of white clover in New Zealand, and much work is contemplated in classifying those white-clover crops which are harvested from districts that differ markedly in the type of agriculture practised. There are those crops harvested from permanent grassland and those harvested from volunteer white that comes away in the wheat stubble or after the laying-down of some temporary crop, no white-clover seed having been sown. It is not known at the present time how we should regard these volunteer and stubble whites, and it is felt that the time is ripe for a full investigation into those different New Zealand white-clover crops, to nip in the bud any tendency to production and perpetuation of short-lived white-clover strains in New Zealand.

Red clover: One hundred and four lots of red clover are now under test, belonging to four major red-clover groups—(1) Broad Red, (2) Late Red, (3) Late Late Red, and (4) Wild Red. The work to date has demonstrated that all New Zealand red-clover belongs to the Broad Red group. English experience has shown this group to be the least permanent of all the red-clover types, and there is a big possibility of introducing from one or other of the Late Red or Late Late Red groups a type of red clover that will conform more to the grazing-pasture type than do these reds of the Broad Red group.

Cocksfoot: Some 117 lots of cocksfoot are under trial, and these fall into two major types—(1) The New Zealand type, and (2) the Danish type. There is a very marked difference in these types. The Danish is broader in shoot and leaf, and the crown is comparatively few-tillered. In the true Akaroa type the shoots are not so broad or coarse, and the crown tends to being multi-tillered. The dense, finer-leaved, multi-tillered crown types conform more to the grazing-pasture type, and there is a big danger that, unless care is taken, the excellent New Zealand type may lose its identity, particularly as cocksfoot-seed production increases on the plains country and diminishes on the hills.

Brown-top: One hundred and four lots of brown-top are under trial, the main project here being to ascertain freedom or otherwise from red-top. All the lines sown are red-top free, but there exists a distinct type of brown-top which recent field-work has shown to be a type segregated out and confined to the poorer and drier soil type of the Canterbury plains country. The specific identity of this type and its behaviour under lawn conditions is being studied. Other species from different sources of origin under trial are: Crested dogstail, Timothy, Meadow Fescue, Chewings Fescue, Danthonia pilosa, Italian rye-grass, Western Wolths, rye-grass, and Phalaris bulbosa.

Rye-grassing Experiments: Secondary-growth Country.—The experiments on rye-grassing secondary growth have been continued, and some additional 30 acres have been sown. It is very gratifying to report that the species and mixtures of these recommended for these sowings are now being widely adopted by the hill-country farmer, and the work is really progressing of its own momentum. During the past year our attention has been focussed on the menace of hard-fern (*Psaesiar scaberula*). This