

On cultivated land there seems to be a definite place for subterranean clover in light-rainfall districts or on poor soils where white clover is difficult to establish. An exception to this appears to occur in Central Otago, where extreme dry and cold conditions prevail in winter.

(g) *Feed-flavour Investigation*.—The work carried out previously in connection with the occurrence of feed-flavours in cream as a result of grazing clover-dominant pastures in spring has now resolved itself into studies of pasture-management. Experiments at Ruakura are designed to study the technique of pasture control and its effects on the sward, particularly from the point of view of preventing excessive clover dominance in spring.

It has been indicated, also, that herd management can reduce feed-flavours, and that when cows are shifted from clovery pastures to a bare yard for at least three hours before the afternoon milking feed-flavours are much reduced. An experiment with two herds at the Waimate West Demonstration Farm showed that no loss in production occurred when the above practice was adopted.

(h) *Hill-country-pasture Deterioration and Soil Erosion*.—Experiments are in hand to find out methods of establishing legumes on hill-country pastures. The maintenance of fertility is closely connected with the presence of legumes in the sward. It is considered that the disappearance of the latter has largely contributed to the deterioration which has taken place on hill country and to certain phases of soil erosion. The use of subterranean clover in this connection has been referred to previously. Trials have been laid down at various centres in North Auckland to introduce legumes, including subterranean clover, into danthonia pastures and to make top-dressing more profitable.

The problem of slip erosion is becoming more acute, especially on hill country, where the rock is near the surface. Information is required in connection with the development of slips, and several areas in which this type of erosion is taking place are being kept under observation.

A study is being made of the possibilities of pampas-grass as a winter fodder on hill country, and several experimental areas have been established on hill-country farms in both the North and the South Islands. Lack of sufficient winter feed for cattle is one cause of secondary-growth invasion, and pampas-grass may prove a valuable means of making up the deficiency.

The control of secondary growth is being investigated in the Taumarunui district, where various methods of dealing with hard fern are being tried out.

(i) *Grassing of Depleted or Intractable Areas*.—Following up the valuable work carried out by the late Dr. Cockayne on the grassing of depleted lands in Central Otago, an area has been established at Pisa Flats to study the behaviour of grasses and clovers obtained from arid regions in other parts of the world. The Botany Section of the Plant Research Bureau is collaborating in this work, and much material has now been collected and sown. In addition, some of the species which are growing freely in Dr. Cockayne's plots have been established in the new area in order to study their behaviour under controlled grazing.

Experiments on the ironstone soils of North Auckland were continued, and certain plots, particularly those which have received heavy dressings of basic slag and lime, have done well. The Lands and Survey Department are now breaking in an area of similar land, and the results of the experiments will be available as a guide to the development of these ironstone soils.

2. Annual Crops.

(a) *Wheat Manuring*.—Ten wheat-manuring experiments were laid down, but three of these could not be harvested. Most of the experiments were in connection with the effect of nitrogen applications on crops showing the stunted and yellow condition in spring usually associated with nitrogen starvation. Following the cold, wet conditions in the winter of 1928 many such crops were seen in Canterbury. In five experiments an application of 1 cwt. sulphate of ammonia in spring increased the average yield by 4.6 bushels per acre.

(b) *Wheat Varieties*.—Eleven experiments with wheat varieties were carried out in collaboration with the Wheat Research Institute. The work was mainly concentrated on certain new varieties evolved by the Institute, and several of these continue to show promise in various districts. Two lines of a cross which show agronomic features similar to Solid Straw Tuscan have consistently outyielded the latter, and they have almost reached the stage of distribution to farmers. A trial was established in North Otago to provide the Entomological Division, Plant Research Bureau, with material for studies on hessian-fly and stem-weevil infestation, and further experiments on these lines are contemplated for the coming year.

(c) *Oats*.—Four oat variety trials were carried out in collaboration with the Plant Research Bureau (Agronomy Division) in the South Island. These included the varieties Abundance, Markton, and Anthony. In two trials the new variety Huskless was also included. A selection of Algerian oat was tried out against the commercial seed, but the former was inferior to the commercial strain.

(d) *Barley*.—Further experiments on barley varieties or barley manuring were conducted in the main barley-growing districts of the South Island. The yields of grain from most of the centres have been received, but the quality as indicated by malting tests has not yet been determined. In the manuring trials superphosphate sown with the seed continued to prove very effective on yield.

(e) *Potatoes*.—Thirteen manuring experiments were laid down in the South Island to investigate the relative merits of superphosphate, potash, and nitrogen on the potato crop. Such experiments have now been conducted over a large number of seasons, and there is abundant evidence available that about 3 cwt. super plus 1 cwt. sulphate of ammonia is generally a profitable dressing to apply with the crop. In certain districts the addition of potash to the above can be recommended for higher production, but some of the current season's trials aim to determine the effect of potash on the cooking-quality of the produce.