linked up in the prosecution of this research. The work at Palmerston North and in the Waikato is well forward, and will be presented for publication in the near future.

The ecological field work of the Section has been extended, and for the time being is being concentrated on a mapping of pasture-types survey in the Hawke's Bay district in conjunction with a farm-management survey by the Fields Division, Department of Agriculture, and a soil survey by the Soil Survey Division, Department of Scientific and Industrial Research. This further example of collaborative field work is to be commended.

During the year negotiations with the New Zealand Golf Club were successfully finalized whereby green-keeping research was placed on a sound footing. A field advisory officer and a permanent hand for the research area have been appointed by the New Zealand Golf Council. This will enable research and extension to be fully co-ordinated.

The work of the year in detail is as follows :—

Strain-testing.

Perennial Rye-grass.—(*a*) Certification and other Plot Trials : Eight hundred and twenty-two plots were sown for study or report for certification purposes, all the latter of which have been finalized. Included in the study trials were a number of overseas lots, which were studied particularly to co-ordinate ultra-violet-light test and type test as determined by plot trial. As a result of these trials, it can be definitely laid down that the ultra-violet-light test may not be used as an international test for type determination, and that it is reliable only when taken in conjunction with type as determined by plot trial. Thus it serves admirably as a test for contamination in the Hawke's Bay and Poverty Bay strain, but it does not serve to differentiate between types of true perennial themselves. This is an important finding, and it should have a bearing on the class of certified perennial rye-grass, known as the "commercial class," which has been established on the ultra-violet test alone. None of the overseas strains under trial proved superior to the New Zealand certified rye-grass, and most were distinctly inferior. Some few Australian, some British indigenous, and two Hungarian lines were much superior to the ordinary run of lines.

(*b*) Elite-strain Work : The 1-acre block of selected pedigree rye-grass has been retained, and was again harvested for seed. A yield of 403 lb. of dressed seed was secured, and from this an additional 12 acres have been sown for increased seed-production on a contract basis. This makes 32 acres now sown out on contract from the nucleus area. A crop was secured from the 20 acres sown on contract in 1935, and a yield of 800 bushels was secured. This has now gone into commercial seed-production channels.

The breeding programme in perennial rye-grass includes a study of 6,700 single plants, the seed for the planting of which was secured as a result of crosses and selfings made in the 1934–35 season. Notes have been taken periodically on these, and will continue for another season before selection of the most promising material is made. Further selfings and diallel crosses were made of other promising plants, and studies were initiated to determine the degree of vigour that may be regained in crossing unrelated inbred plants.

(*c*) Low Germination of Perennial Rye-grass : The trial of two hundred lines conducted at Palmerston North and at Winton in connection with the investigation into the low-germination capacity of certified perennial rye-grass when harvested in a wet season yielded no data, as a result of good seed-setting and development under comparatively dry seasonal conditions which are unfavourable for the causal fungus to develop. A preliminary examination of the crop at Palmerston North revealed that there was no fungus present, and consequently it was considered unnecessary to proceed further with the investigation. The crop at Winton was harvested and the samples were forwarded to Palmerston North for threshing and testing. Representative lines were tested, but germination in all cases was high, indicating that the season in the South also was favourable to good seed setting and development. The experiment is to be continued at both places.

Italian Rye-grass.—(*a*) Certification and other Plot Trials : One hundred and fifty-nine plots were spring-sown, and have been reported on for certification purposes. It has been determined that late spring sowings give a very rapid indication of type, owing to the marked differential behaviour of Western Wolths and Italian rye-grass when spring-sown, the former bolting rapidly to seed-head and the latter tending to leafiness rather than stem. Inferior hybrid lots also show this tendency to bolt to seed when spring-sown.

(*b*) *Elite-strain and Breeding-work :* In the early autumn of 1935, 5,000 single plants, obtained by selfing and crossing sixty-two selected original plants, were set out, and notes were taken periodically until last breeding-season, when 105 of the best plants from the eight best F_1 and L_1 families were selected. These plants were selfed and crossed in intra-family groups of four by enclosing heads from the four plants in a large cellophane bag. Seed-setting was good, and 8,400 seedlings have been planted out.

To furnish more information on the relationship between the production of single plants, rows, and plots, seed was collected from seven families of known type but showing an extreme range in type between families. The seed thus obtained was used for single plants, rows, and plots, together with three known controls—Western Wolths, certified Italian, and poor Italian lines. Each lot was replicated four times. They will be cut and weighed at intervals throughout the season.

Five thousand single plants from a number of lines of certified and imported Italian rye-grass were set out for comparative study and to afford a mass of material for selection purposes.

Cocksfoot.—(*a*) Certification and plot trials : One hundred and forty-three plots were sown, and all certification lots have been reported on.