(5) *Grazing Trials.*—There are nine experiments in which the production as measured in grazing-days of one field is compared with that of another differently treated. Four trials investigate the relative production of good rye-grass strains and poor rye-grass strains respectively, one trial in Canterbury compares fields treated with lime with an unlimed field, while two experiments in Taranaki are designed to further investigate the use of potash. At Marton Experimental Area records are being kept from fields under different methods of management.

(6) *Legume-inoculation Trials* (in collaboration with the Mycologist).—About one hundred simple experiments are being carried out to determine the effect of inoculating red and white clover, lupins, and field peas. Positive results from inoculation in a small number of the earlier trials resulted in an extension of the experiments during the past season, particularly those including clover. In a few trials on peas outstanding responses have been secured, although in others no differences have been observed. The evidence available so far, however, does not warrant any general recommendation regarding the inoculation of any of the crops mentioned.

(7) *Wheat-manuring.*—Only one experiment was laid down during the past season. During the coming year a large programme of work has been planned to investigate the use of nitrogenous fertilizers on wheat crops sown after a previous stubble crop. Experimental results in the past have indicated that under the latter conditions nitrogen applications are most likely to be effective, but that results vary considerably according to the season. Results from trials in Australia have indicated that response to nitrogen is largely bound up with the nitrogen-content of the soil, and this aspect will be investigated in the trials to be carried out by this Department during the coming season.

(8) *Wheat-variety Trials.*—Trials were carried out in collaboration with and on behalf of the Wheat Research Institute on twenty-five farms in the South Island, but seven of these experiments could not be harvested owing to lodging. In the majority of these the new variety, Cross 7, was compared with Solid-straw Tuscan.

In seven trials, including three in Marlborough, Cross 7 was superior to Tuscan, while in nine experiments it was lower in yield than Tuscan. The average difference was in favour of Solid-straw Tuscan to the extent of a quarter of a bushel per acre.

Seven trials included a comparison of a selection (13/28) of Solid-straw Tuscan brought out by the Agronomist with ordinary commercial Solid-straw Tuscan. Although there was no difference between the two when the average of all trials are taken into account, the superiority of the selection in a trial at the Pure Seed Station, Lincoln, suggests that it may be superior on certain soil types. Further trials in selected localities are to be laid down during the coming season.

Other varieties under trial were Jumbuck, Marquis, and certain Portugese varieties. The latter show promise of being very suitable as varieties for spring sowing, since at both centres where they were tried their yields were considerably better than those from Solid-straw Tuscan. They are to be under further trial during the coming season.

(9) *Wheat-rate of Seeding Trials.*—Nine trials were laid down in each of which seedings of 60 lb., 90 lb., 120 lb., and 150 lb. per acre were compared. Three of these had to be abandoned on account of lodging. The average increase in yield of 90 lb. seeding over 60 lb. was 1·7 bushels per acre, the 120 lb. seeding was better than 90 lb. on the average by 0·5 bushel, while the 150 lb. seeding showed an average increase over the 120 lb. seeding of 1·3 bushels per acre. These results tend to confirm those secured in previous seasons and support the contention that more rather than less seed should be used in practice.

(10) *Seed-treatment of Cereals* (in collaboration with Mycologist).—Further observational experiments were carried out to investigate the merits of Ceresan New as a seed-dressing for cereals. In several of these the thicker and more vigorous germination of the Ceresan-treated cereal was apparent in the early stages, but as the dry season mitigated against the occurrence of disease in any of the trials no data as to the effectiveness of Ceresan in combating smut as compared with formalin, copper carbonate, or no-treatment was available.

Mycological Laboratory.

(By Dr. G. H. Cunningham.)

(1) *Brassica Diseases.*—(*a*) Dry-rot (*Phoma lingam*): An investigation of the host-range of this disease has been completed and the results published. It is concluded that infection of swede crops from weed or cultivated crops is rare, except when following an infected swede crop. The variety of swede, Wilhelmsburger Otofte, has been substituted for Herning on the commercial seed-growing area at Colyton. It has proved under New Zealand conditions to be a better cropper and more resistant to club-root. The seed crop was exceptionally good, over 6,000 lb. of first-class seed being harvested from 2½ acres. Unfortunately, an inspection before harvest disclosed the presence of five plants infested with *Phoma lingam*, so that the seed cannot be certified as disease-free.

Stock seed has been produced for next season's seed-crop from bulbs selected on club-root-infected land.

(*b*) Club-root (*Plasmodiophora brassicae*): It has been found that the control of this disease by means of applications of lime is dependent on the type of soil. Dressings with lime which give satisfactory results on some soils are quite useless in others, thus accounting for the contradictory field results obtained in the past. An investigation is in progress to find the conditioning factors.

It has also been found that selected strains of rape, turnip, and swede that resist the disease in one locality may fail to do so in others. This has greatly complicated the work of selection, breeding, and testing of club-root-resistant lines.