

of dealing with such diseases is to eliminate them from the seed. Consequently, if the lines used commercially were disease-free, then not only would the resultant crop be disease-free, but the necessity for practising any seed-treatment would be obviated. Theoretically, in the course of a few years such a practice, if followed up consistently, would result in the elimination of all seed-borne diseases from the agricultural crops of the Dominion, a matter which would not only assist in securing a sound economic basis for farming, but would also result in direct saving of a very large sum of money annually. Unfortunately, the matter is not merely one of treating all seeds with some panacea; for experience has taught that practically each disease requires its special treatment; and it must be admitted that no control is at present known for many. Then again, constant reinfections occur in the field from volunteer host-plants, weeds, soil-contaminations, and the like; from threshing-plants, bags, and other containers; drills and other farm implements. And, what is of greater significance, many of our diseases are annually imported from overseas with the seed. Consequently, before elimination of seed-borne diseases can successfully be undertaken a control has to be evolved for each disease under consideration, necessitating careful work on each and every one attacking our crops; the whole of the farming technique has to be reviewed and possibly revised, and especially provision made for the prevention of entry of imported seeds carrying certain diseases of economic importance.

Such work calls for a completely equipped pathological research station, with laboratories, glasshouses and land, and a staff of specially trained pathologists with adequate equipment. Such has been or is to be provided at the Plant Research Station. Work was commenced in April last, investigations being conducted upon the diseases of cereals, potatoes, peas, brassicas, tomatoes, and certain timber-trees and timbers.

### Cereal Diseases.

As the past four seasons' work\* has led to efficient control methods with the smuts, work this season has principally been along the lines of combating other major diseases, such as stripe of barley and take-all of wheat.

Barley-stripe (*Helminthosporium gramineum*) is carried with the seed, as preliminary work has demonstrated; consequently control experiments have been directed towards the evolution of a treatment for its elimination, since the hot-water treatment so successful against loose-smut of barley and wheat is not effective against stripe. A large series of different treatments has been carried out, the treated seed being sown on the Station farm. Since practically the whole of the commercial malting-barleys of Canterbury have been rendered smut-free as a result of the practice of the methods at present adopted—that is, by the treatment of nucleus lines, and bulking these subsequently under aseptic conditions—stripe remains the only other serious disease of this crop with which we have to contend.

Take-all (*Ophiobolus graminis*) has proved the most serious disease of wheat in the Dominion, since in certain localities it may cause an annual loss of up to 70 per cent. Despite the amount of investigational

\* This and several other branches of mycological work were previously carried out in connection with the Biological Laboratory of the Department of Agriculture, at Wellington.