

As a result of previous work a treatment had been evolved for the control of corticium. Although this has not proved a practicable one for farmers, it has been used successfully for eliminating this disease from all the pedigree lines now growing on the Station farm.

Previous experiments in the control of corticium disease tended to show that the disease may possibly carry over in the soil from season to season, and this has led to conflicting results being secured in control experimental work. Consequently a series of experiments has been planned to determine whether the disease does really carry over in this manner; and, if so, whether any rotational, manurial, or soil treatment will tend to shorten or eliminate this period of persistence. For this purpose 1 acre has been planted with tubers known to be infected with corticium disease, with a view to infecting the soil, to enable subsequent experiments to be undertaken. Experiments on these lines have been planned to cover four seasons.

The diseases of the second group, usually termed "wilts," are due to the following organisms: (1) Vascular wilts (due to one or more species of *Fusarium*); (2) mattery-eye (a bacterial disease due to *Phytophthora Solanacearum*); (3) sclerotium disease (due to the fungus *Sclerotinia sclerotiorum*). Their presence is shown by sudden wilt of the foliage of one or more stems, followed by death of the part affected, or often of the whole plant. Often the tubers show a brown discoloration in the vascular ring, but this is not a definite character, since it may be due to other agencies. Nevertheless, when such discoloration is noted it is an indication that the tuber is diseased; consequently such tubers should not be planted for seed. Mattery-eye is expressed in an aggravated form, wilt of the whole plant being rapidly followed by its death; the tubers show a strongly discoloured vascular system, and in addition often decay rapidly, emitting at the same time an unpleasant smell similar to that of decaying fish. The vascular wilts are present in most commercial lines to the extent of between 10 and 20 per cent.

The third group contains what are now known as virus diseases. Such are not due to bacterial or fungous agency, but to some infective principle, the nature of which is at present unknown. Virus diseases are transmitted in the tuber, and may be carried from plant to plant by insects such as aphids. Consequently if clean seed is used, and insects vigorously excluded from the crop, a clean line may be obtained. This group of diseases may be detected in the crop by their effects upon leaf, stem, and tuber; but, as the symptoms are numerous and complex, a special training in virus work is necessary before roguing of infected plants can be successfully practised. In New Zealand several types of virus disease are present; but whether these are different diseases, or different expressions of the same disease, is not known, nor is there any agreement among those working on the plant-virus problems. Mild-mosaic, rugose-mosaic, aucuba-mosaic, leaf-drop, stipple-streak, spindle-tuber, curly-dwarf, leaf-roll, streak, and wildings are all present in New-Zealand-grown commercial lines. This group of diseases is chiefly responsible for a very considerable decrease in the annual yield of the potato crops of the Dominion, some lines having depreciated to such an extent that they are commercially unprofitable, producing less than 3 tons per acre; consequently, economically, this group is the most significant of those attacking the potato.