wind-carriage is a factor it is not the most important one. It would appear that seed is in general not carried far by wind, and spread by this means is comparatively slow. Of more importance is carriage by stock. It is proposed to make more detailed studies next season.

A commencement was made, at the request of the Division of Horticulture, with investigations of anemone and ranunculus bulbs. The object is to secure a better grade of bulbs than has hitherto been available from New-Zealand-grown plants. From the areas planted a supply of bulbs and seeds has been obtained for experimental purposes.

The section of the fruit-research work entrusted to this section has occupied the full time of Mr. Woodhead, and his report is included under "Fruit Research."

Chemical Section.

(By B. W. Doak.)

Marton Experiments.—Routine determinations of the percentage of dry matter in the herbage from all the mowing-experiments have been carried out. In addition, the analysis of herbage from some of these trials has been continued. Soil-samples have been regularly taken from several experiments, and the results of the analyses so far carried out show that some valuable information concerning lime and phosphate fertilizing is likely to be obtained.

Mangels.—An investigation of the dry-matter and sugar content of several varieties of mangels was carried out on material supplied by the Agronomist. These samples showed that the dry matter and sugar of mangels under the conditions prevailing in this trial are considerably lower than the figures given by English investigators for the same vareties. This may be due largely to the difficulty of maturing mangels in this district.

HCN in White Clover.—Determinations of the HCN content of a large number of samples of white clover were carried out in co-operation with the Agrostologist. Although an investigation which had been carried out previously for a complete season to investigate the variation (time of day and day-to-day variation) in the HCN content had shown that the variation was not great, an exception to this was noted during the past season. Samples collected one morning were found to be considerably higher in HCN than those collected during the afternoon of the same day or during the morning or afternoon of succeeding days. No explanation of this can be suggested, but the observation again emphasizes the necessity for an adequate number of controls, since the determination of the HCN in a casual sample of white clover might lead to serious error if any attempt were made to indicate type by HCN determination.

Feed-flavour Investigation.—The analysis of the herbage fed to cows in connection with the co-operative experiment carried out by the Dairy Research Institute and the Plant Research Station has been undertaken.

Mycological Section.

(By Dr. G. H. Cunningham.)

(1) *Brassica Diseases.*—(*a*) Dry-rot (*Phoma lingam*): Some seventy varieties and strains of swedes are under field test to determine their relative powers of resistance to this disease.

(*b*) Club-root (*Plasmodiophora brassicæ*): Field tests of over one hundred varieties and strains of swedes and rape are in progress, following up the results obtained during the previous season in regard to the fixation of the quality of resistance to this disease. The results to date show that in highly infected soil, with favourable conditions for attack, no strain has yet been found that remains free from the disease. However, some varieties and strains have proved much more resistant than others, and future work should involve hybridization of these on an extensive scale to evolve a type highly resistant and suitable to New Zealand conditions.

(*c*) Brown-heart (mottled-heart): This disease of swedes, the cause of which is as yet unknown, has become increasingly prevalent in all swede-growing countries including New Zealand. Elsewhere the use of small quantities of boron has given good control of the symptoms, and trials of the method are in progress in various parts of the Dominion.

(*d*) Turnip-mosaic: This virus disease has assumed epidemic proportions on the brassica crops of the Station, very seriously interfering with the experimental programme. Its effects are particularly destructive to turnips, but almost equally so to swedes, causing stunting and defoliation, followed by an offensive bacterial rot. It reduces the yield of rape by 25 per cent. The virus has been transmitted artificially to cauliflower and broccoli, causing mild mosaic symptoms. A survey is planned to determine the relative importance of this disease in the main turnip-growing districts.

(2) *Cereal Diseases.*—(*a*) Rusts: Investigations on the biotypes of cereal rusts in New Zealand have been continued in collaboration with specialists overseas.

(*b*) Seed-dressings: Extensive field trials on the effects of organic-mercury dusts on wheat, barley, and oat seed sown at weekly intervals have shown that, within limits, they are efficient controllants of such seed-borne diseases as the covered smuts and stripe, and result in an average increase of 10 per cent. in plant-establishment.

(3) *Potato diseases.*—(*a*) Virus diseases: It has been found that the variety "Aucklander Short Top" is a carrier of a masked virus causing severe losses when transmitted to other varieties, a discovery of great practical significance to growers of seed potatoes.

(*b*) Internal brown fleck: Experiments with various minerals for the control of this disease yielded negative results.

(4) *Diseases of Legumes.*—(*a*) Virus diseases: Investigations on the host range and methods of transmission of "pea-mosaic" have been carried out with a view to evolving measures for control. "Pea-streak," a disease which has troubled growers for some years past, has now proved to be of virus origin, and work is in progress to determine its host range and methods of transmission.