## The Weather and Its Influence on Plant Diseases.

In British Columbia the season was in general dry, especially during August, the interior valleys, particularly the Okanagan and parts of the Kootenay, being drier than usual. However, in the latter half of October it was very wet on the coast and considerable snow and rain fell in the interior. The temperature was below normal during the early half of the season, but the weather was unusually warm during July and August.

On Vancouver island the dry warm weather in April checked the spread of tulip blight, which caused severe damage in 1932. Although conditions were favourable in May, very little infection occurred, due to the destruction of the inoculum in the preceding dry month.

In the Fraser valley on account of the lower precipitation and an increase in the number of hours of sunshine, downy mildew on hop was not severe and the disease was easily kept in check by spraying.

In the Okanagan valley the effect of the weather was chiefly of a direct nature. A few rain showers falling when the fruit was ready to pick caused the cherries to split, resulting in considerable loss. Hail accompanied in some places by a gale reduced the quality of applesin several orchards to the lowest grade on account of skin cuts and bruises. An early frost with snow caused the fruit to fall from the trees in some districts and the weight of the snow broke many trees. Rainy weather at the time when the onion crop was ready to harvest favoured an outbreak of neck rot, which caused enormous losses.

Although the crop season began in Alberta with normal temperature and rainfall, in each succeeding month it became progressively hotter and drier, especially in the southern part of the grain-growing area. Northeast, east and south from Calgary the season was unusually dry. In consequence there was a general crop failure, except where the land was irrigated. Similar conditions although less severe, occurred east of a line from Calgary, Stettler and Hardesty to Wainwright. On account of the drought, this area was not surveyed. West and northwest of this line moisture became progressively more abundant. A good crop was harvested from Didsbury northward, north of the line from Edmonton to Lloydminister, and in the Peace River area. In the latter district, the crop which matured about two weeks later than that in central Alberta, suffered considerably from frost. In general, August was a dry month, the crop matured early, foliage-borne diseases were reduced and foot rots were checked. In 1933 the

survey was confined chiefly to the area adjacent to Edmonton.

In Saskatchewan the spring was early except in the north and northeast, with fair moisture conditions prevailing throughout the province. Good rains fell in the latter part of May, except in the west central portion. Cool weather preceded these rains and no soil drifting occurred. The first fortnight of June was comparatively cool and crop growth was good. From then on, dry hot weather set in and continued until well into August in all parts of Saskatchewan, except the east central, northeast and northwest districts, which were favoured with good rains. As a result, there was almost a crop failure through the greater part of Saskatchewan, except in those districts where rain fell as indicated above. During the last few days of August and the beginning of September, the long drought was broken by general rains.

Here again as in Alberta, the weather had much more direct influence on the crop on account of the serious shortage of moisture and high temperatures prevailing than it had indirectly by favouring parasitic fungi. Drought appears to have little affect on the prevalence of Helminthosporium-Fusarium foot rot, as the disease was widespread in the dry areas, where its symptoms, however, were not easily distinguished from those of drought injury.

Browning root rot, on the other hand, seems to be greatly influenced by the sequence of moisture and temperature conditions, at least in the expression of its symptoms, if the observations made in Saskatchewan this year are any clue. It would appear that moisture must be abundant and a fairly high air temperature be reached before the disease makes its appearance. Where abundant moisture is present, new roots are put out and the plants recover. Where it is lacking, drought symptoms replace those of browning root rot. The importance of this disease may be underestimated on account of the shortness of the period, during which the symptoms are visible, but even where it only retards the crop for a brief period it delays the maturity of the crop and lengthens the period during which other fungi or unfavourable weather may act.

In Manitoba, conditions were dry again in the southwest, moist in the northwest and north and in the vicinity of Winnipeg a damp spring was followed by a dry summer. In the Winnipeg area several diseases such as powdery mildews, plum pocket and certain rusts started early and were abundant, but were subsequently largely checked by the dry weather. The aecia of rusts on cultivated plants such as gooseberry, lettuce and rhubarb were more abundant than usual. Wheat stem rust occurred only in traces and caused no appreciable damage. In fact, wheat has not been so free of stem rust in any previous year during the past decade

Scarcity of inoculum during the early part of the season and dry weather later, which caused the crop to ripen early and was unfavourable for rust development, probably accounted for its scarcity. Stem rust was correspondingly rare on the other cereals.

In the north the damp weather allowed an unusual development of downy mildews of wild plants. Plasmopora Geranii and P. pygmaea were found for the first time and also the hosts Geum and Veronica were first found infected by downy mildews previously known. These records are all from Berens River and Swan River. It might be pointed out that downy mildews are rarely injurious to cultivated plants in Manitoba.

The past season was considerably warmer and drier than usual in most parts of Ontario. In Lincoln county the warm dry weather in the early part of the season tended to keep early varieties of peaches, which are usually affected, relatively free of brown rot. However, the low rainfall of July was followed by considerable excess in August, the weather becoming very favourable for the disease and for the rapid maturing of the fruit. Consequently, brown rot became epidemic, especially in mid-season varieties. It was the worst epidemic of brown rot in 12 years and was considered by some growers to be the worst ever experienced. Blossom-end rot of tomato was widespread and prevalent in many districts in Western Ontario. Weather conditions undoubtedly favoured the development of the disease. Tobacco suffered from wind and hail, and frost, to some extent, while black root rot was almost absent on account of the dry weather. Raspberry mosaic was masked during the hot months.

In Quebec the rainfall and temperature were about normal in the Montreal district, but over the rest of the province, the weather was unusually dry and warm, until the end of August or later. In the eastern part the crops suffered from lack of moisture up to the middle of September. In the apple orchards in western Quebec slight delays in the application of the pink and calyx sprays due to rain caused considerable scab infection on the fruit. The dry weather, nevertheless, prevented secondary spread, but cool weather and rain at the end of August and beginning of September favoured late infection. Fire blight on apple and anthracnose on raspberry was similarly checked by the dry weather. Freezing and thawing of the ground during January and February caused some injury to apple orchards in eastern Quebec.

In the Maritime provinces the growing season was generally warm and dry. There was very little rain either in July or the

first three weeks of August in Prince Edward Island or parts of Nova Scotia. However, in September rain fell in excess of normal and October was also wet. Early blight caused severe damage to potatoes in the Annapolis valley and was apparently favoured by the drought. On the other hand, this was one of the worst late blight years on record in Prince Edward Island, the plentiful rains late in the season being favourable for its development. Strong northwest gales caused immense damage to orchards in the Annapolis valley on October 8, while considerable loss resulted in November in these provinces on account of vegetable and root crops being frozen in the ground.