IV. DISEASES OF FRUIT CROPS

A. POME FRUITS

APPLE

CROWN GALL (Agrobacterium tumefaciens). A number of seedlings planted near infected raspberry canes in York Co., N.B., were all visibly infected when lifted for transplanting (J.L. Howatt).

FIRE BLIGHT (Erwinia amylovora) was present in all varieties in the Kootenay district, B.C., especially Creston Valley, but caused significant damage only to Jonathon, Rob Roy and Wealthy. Infection was heaviest in blocks interplanted with pears (M.F. Welsh). Specimens were received from the Munro Nursery, Prince Albert, Sask., in which shoots of the root stock were attacked, but the more resistant grafted varieties remained healthy (T.C. Vanterpool). Blighted twigs of Baldwin were sent in from Wilton Grove, Middlesex Co., Ont. (G.C. Chamberlain). A specimen of twig blight was received from Haileybury (H.N. Racicot). No blight was observed in southwestern Que. (F. Godbout); but one commercial orchard at Deschambault, Portneuf Co., suffered very heavy damage (R. Desmarteau). A few trees in a garden at Kamouraska, Que., were seriously blighted (A. Payette). Specimens of infected Alexander were received from S.F. Clarkson from Jacquet River, Restigouche Co., and Tracadie, Gloucester Co., N.B.; and of McIntosh from White Settlement, Kent Co.; the organism was isolated in each instance (H.N. Racicot).

RUST (Gymnosporangium spp.). A trace of G. clavipes was found on McIntosh and Cortland in the Laboratory orchard, St. Catharines, Ont. (G.C. Chamberlain). G. sp. (pycnia only) was collected by Dr. J.D. MacLachlan at Trenton (H.N. Racicot).

ANTHRACNOSE (Neofabraea malicorticis) was common but caused slight damage to Yellow Transparent and other varieties in the lower mainland, B.C. (I.C. MacSwan).

PERENNIAL CANKER (Neofabraea perennans) has been increasing in the Okanagan Valley, B.C., since the wide use of the newer insecticides has caused the death of the predators of the woolly aphis. The aphids were very prevalent in 1949, which indicates a heavy spread of infection in the cankers in the spring of 1950 (H.R. McLarty).

FRUIT SPOT (Phoma Pomorum Thüm. (syn. P. Pomi Pass. = Mycosphaerella Pomi Lindau). A 10% infection of Jonathon was found at Cambridge, Kings Co., N.S., in October (J.F. Hockey).

BLACK ROT (Physalospora obtusa) appeared to be more common than usual in Ont. as a leaf spot, and several instances of fruit rot were seen (J.D. MacLachlan). Specimens of rotted Spy were received from Port Hope (G.C. Chamberlain).

CROWN ROT (Phytophthora Cactorum). Since the recent introduction of sprinkler systems in the Okanagan Valley, B.C., a close watch has been instituted in orchards affected by crown rot. To date, the use of sprinklers has not increased the amount of the disease (H.R. McLarty).

POWDERY MILDEW (Podosphaera leucotricha) was very light in the Okanagan Valley, B.C. In some orchards in which it was very severe in 1948 only a few blighted twigs could be found. The reason for the light infection is not known, but examination of buds in the spring indicated that few were infected and that the carry-over was accordingly light (H.R. McLarty). Mildew was very heavy at Kentville, N.S., on imported scab-resistant seedlings; it was light on locally grown seedlings started in the greenhouse (J.F. Hockey).

DAMPING OFF (Pellicularia filamentosa (Rhizoctonia Solani) caused 10% loss in flats of seedlings in the greenhouse, Kentville, N.S. (J.F. Hockey).

PINK ROT (Trichothecium roseum) caused 6% loss in a scabby lot of McIntosh in Queens Co., P.E.I. (R.R. Hurst).

SCAB (Venturia inaequalis) was comparatively severe in the Salmon Arm district, B.C., especially on McIntosh. Losses in some orchards were as high as 30% of the crop. Many orchards were sprayed with the new concentrate sprayers; on the whole results were comparable to those of the conventional machines, when carefully operated by the grower (H.R. McLarty). In the Kootenay district scab was lighter than usual, although it occurred on all varieties, especially McIntosh. In the West Kootenay area unsprayed trees had about 90% scabby fruit, but in Creston Valley the figure was only about 25%. Spraying by either the conventional or the concentrate sprayers was adequate to prevent infection under the conditions prevailing in Creston Valley (M.F. Welsh). A slight infection was seen in some trees at the Station, Beaverlodge, Alta. (T.R.D.).

Scab was very mild in Ont. and was not an economic problem in most sprayed orchards. It was perhaps most prevalent in southwestern Ont. where the season was not as dry as elsewhere. A general primary infection occurred at late bloom, just before the first cover spray, but subsequent dry weather was not conducive to spread. Late scab appeared in some orchards on terminal growth, but fruit infection was insignificant. Old leaves, collected near Brighton about 15 June, contained numerous perithecia from which no ascospores had been discharged. After 15 minutes soaking, spores were shot onto traps in profusion (J.D. MacLachlan). At the Laboratory orchard, St. Catharines, infection of unsprayed McIntosh was 19% on foliage and 28% on harvested fruit. On sprayed trees infection was tr.-8% on foliage and tr.-3% on fruit. Scab was generally unimportant,

but in one small orchard in the Niagara Peninsula, through lack of timely or thorough spraying it resulted in nearly complete loss of crop. This orchard was on heavy soil and the trees were slow to develop in the spring; consequently they were highly susceptible during the important infection periods of 19-20 and 22-23 May (G.C. Chamberlain).

In 1949, ascospores in western Que. were mature early in the spring, but could not be discharged due to the lack of rain. A two-day rain on 22-23 May was the first one to permit ascospore discharge and infection. Primary scab was noticed on the foliage four weeks later, after the second cover spray, probably from the infection initiated on 23 May. This long period of incubation has been a common observation during the last few years. A few more rains occurred up to the end of June. Then the dry and very warm spell that followed during July and August completely destroyed the scab spots already established on the leaves and protected the fruit from infection, with the result that the crop was exceptionally free from scab (L. Cinq-Mars). In Missisquoi Co., calculation showed fruit infection on McIntosh to be about 1.5% in well-sprayed orchards on 22 Aug.; but considerable late infection occurred due to frequent rains in September (R. Desmarteau). At St. Denis, Kamouraska Co., severe infection of McIntosh caused killing of twigs; the pathogen was fruiting on the twigs in September (R.O. Lachance).

Widely scattered showers in May and June, followed by a hot, dry summer, greatly curbed scab development in N.B.; it was easily controlled in well-sprayed orchards. The first ascospore discharge occurred on 7 May and the first lesions were seen 13 June (J.L. Howatt). Numerous ascospores were developed by 4 May. A light to medium discharge occurred on 7 May during the pre-pink stage. From early pre-pink to the start of bloom the weather was quite dry and checked ascospore discharge. The heavy rains that occurred on 23-25 May during the bloom period made it necessary to apply a mid-bloom spray because of the heavy discharge of ascospores and favourable weather for infection. Primary infection was found on the leaves on 14 June. However, from 13 to 18 June the weather was extremely warm with maximum temperatures ranging from 90 to 97°F. The hot weather checked the growth of the apple scab fungus and, with the dry weather that prevailed during the summer, scab was controlled in the orchards. One or two apple growers suffered severe primary infection in their orchards through omitting the mid-bloom spray (S.F. Clarkson). In N.S., growth of perithecia began early in April and by 16 April collections from several orchards contained perithecia with a few mature ascospores. By the end of April spore discharges were recorded, but possible infection periods were comparatively short. Several heavy discharges occurred during May and June, but the infection periods were seldom sufficiently long to give more than a slight infection. The first primary infections were observed 1 June in unsprayed orchards. Sprayed orchards remained comparatively free from scab throughout the season, but in unsprayed orchards infection increased steadily. A young orchard, planted to winter rye in 1948, was not disked until the rye was in the firm dough stage. The unsprayed trees in this block carried less than 1% foliage scab by September. It is apparent that the spring growth of rye prevented the spores from reaching the apple foliage. The short infection periods during 1949 may have contributed to the light infection, but considerable scab occurred on trees

in a sod orchard adjoining the one planted to rye (J.F. Hockey). On McIntosh and other varieties in Queens Co., P.E.I., infection ranged from a trace to 80%; damage was often severe (R.R. Hurst).

BITTER PIT (non-parasitic). A few specimens were received from locations in Ont., particularly on Northern Spy, but less than in 1948 (J.D. MacLachlan). In the Laboratory orchard, St. Catharines, 3-5% of the fruit of Northern Spy and Cortland were affected (G.C. Chamberlain). In Kings Co., N.S., bitter pit was severe on Stark and 10-25% on Northern Spy and Baldwin. Storage pitting of Cox Orange ranged up to 60% a month after harvest (J.F. Hockey).

CHEMICAL INJURY (2,4,5-T spray). Following drifting of spray applied to the roadside at Steveston, B.C., in July, fruit of Yellow Transparent in a home garden remained on the tree until leaf-fall in October (N.S. Wright).

CROWN ROT (cause unknown). One tree each of Cortland and Delicious in a small, 15-year-old block in Niagara Twp., Lincoln Co., Ont., showed extensive crown injury and very poor growth. The location is poorly drained (G.C. Chamberlain).

DROUGHT SPOT, etc. (boron deficiency). Several affected Fameuse fruits were received from Dunham, Que. (H.N. Racicot). A lot of Wealthy from Queens Co., P.E.I., showed 2% affected fruit. The soil is very light and known to lack boron (R.R. Hurst).

ROSETTE (zinc deficiency) was detected in a limited number of orchards throughout the Okanagan Valley, B.C. Confirmatory evidence of the diagnosis was obtained (H.R. McLarty).

SCALD (physiological). Specimens of Talman Sweet were sent in from Orangeville, Ont. (G.C. Chamberlain).

PEAR

FIRE BLIGHT (Erwinia amylovora) was more serious in the Okanagan Valley, B.C., than for many years. Blossom infection was very heavy and an unusually mild fall favoured extensive late spread in the tree. Several hundred trees will have to be removed and many others heavily cut back (H.R. McLarty). Fire blight has re-appeared in many but not all the scattered pear-growing districts of the Kootenays. In Creston Valley it has been very serious for the third successive year. A contributing factor was the severe winter, which decreased the efficiency of winter pruning in many orchards (M.F. Welsh).

Fire blight was seen in an orchard in Wentworth Co., Ont., in July. A row of large Bartlett trees, alongside a block of Northern Spy apples, was affected. Damage varied from a few twig infections to almost complete death of the tree. Removal of the entire row was advised for

protection of a nearby young Bartlett orchard. The apples adjacent to the diseased pears showed blossom infection (J.D. MacLachlan). Specimens of Bartlett, with branches up to 1 in. diam. killed, were received from near Toronto. Two out of ten trees of Flemish Beauty in the Laboratory orchard, St. Catharines, were infected; one showed infection of a few large branches, and in the other infection had advanced into the trunk (G.C. Chamberlain).

EUROPEAN CANKER (Nectria galligena) caused slight damage to Bartlett in a commercial orchard at Sidney, B.C., apparently following scab infection (W. Jones).

FRUIT ROT (Phytophthora Cactorum). Since the introduction of sprinklers in the Okanagan Valley, B.C., many specimens of rotten fruit of several varieties have been sent in for examination. The fruit is found rotting on the tree. The rot was found to be due to P. Cactorum. It is not considered to be a serious disease and is confined to fruit on the lower branches (H.R. McLarty).

SCAB (Venturia pirina) caused considerable damage in a low-lying orchard with poor air drainage at Sidney, B.C. On 9 March pustules with spores were quite abundant on 1948 twigs; spores left overnight in a moist chamber showed 50% germination. Foliage and fruit became badly scabbed despite use of recommended sprays (W. Jones). Scab was general on the lower mainland (I.C. MacSwan). In spite of the dry climate pear scab persists on Flemish Beauty, where apple scab cannot, in the southern Okanagan Valley. This ability is evidently due to its habit of infecting the twigs. Such infections sporulate during blossom time and thus cause fruit infection. The disease is confined to low-lying orchards (H.R. McLarty).

Scab was severe on fruit in a small orchard at Windsor, Ont. (J.D. MacLachlan). Scab was conspicuous on the fruit of Flemish Beauty in Lincoln Co., but foliage infection was much less than usual. Overwintering twig lesions were common (G.C. Chamberlain). In a small unsprayed orchard at Ste. Anne de la Pocatière, Que., the crop was a total loss. In sprayed orchards most varieties were almost free from infection (R.O. Lachance). A very light infection occurred at Canard, N.S. (R.G. Ross). Flemish Beauty was very severely damaged in a home garden at Charlottetown, P.E.I. (R.R. Hurst).

STONY PIT (virus) affected a few trees of d'Anjou in the Laboratory orchard, St. Catharines, Ont. (G.C. Chamberlain).

BITTER PIT (cause unknown). A pitting of pears was severe in the Okanagan Valley, B.C., in 1949. The trouble is believed to be similar to bitter pit in apple. In some orchards in the Kelowna area the disease was very severe and the crop was not picked from many trees. D'Anjou was the most severely affected variety (H.R. McLarty).

BLACK END (cause unknown). This disorder again caused considerable loss in several varieties in the Okanagan Valley, B.C. Its severity fluctuates from year to year; that of 1949 was about average (H.R. McLarty).

QUINCE

RUST (Gymnosporangium clavipes) was moderately heavy on quince at Brighton, Ont. (H.N. Racicot, J.A. Parmelee). It was moderately heavy at the Experimental Station, Kentville, N.S. (C.O. Gourley).

BLACK ROT (Physalospora obtusa). A few infected fruits were seen at Clarence, Annapolis Co., N.S. (J.F. Hockey).

B. STONE FRUITS

APRICOT

CORYNEUM BLIGHT (Clasterosporium carpophilum). Spotted fruits were received from Lillooet and leaves from a garden at North Vancouver, B.C. (H.N.W. Toms). Coryneum blight caused slight damage in the Okanagan Valley compared with 1948. In many orchards it caused no damage and in most others damage was slight. The weather was dry from swelling of the buds until after fruit-set (H.R. McLarty). In the Kootenays infection was moderate on unsprayed trees; but most growers have adopted the recommended spray programme, which controls the disease (M.F. Welsh).

FRUIT ROT and TWIG BLIGHT (Phytophthora Cactorum). One orchard in the Okanagan Valley, B.C., in which sprinklers were used, suffered severely from fruit rot and twig and branch blight. This orchard is on a steep slope. Water from the sprinklers drenched the entire trees. P. Cactorum was isolated and proved by inoculation to be the pathogen (H.R. McLarty).

CHERRY

SCAB (Cladosporium carpophilum) was general on a few sweet cherry trees at Brentwood, B.C. (E.R. Hall, W. Jones).

BLACK KNOT (Dibotryon morbosum). A specimen was received from Hollyrood, Ont. (J.D. MacLachlan). A large branch of, probably, choke cherry was received from Mayo, near Buckingham, Que., bearing many large knots and with almost all twig tips swollen from recent infection (H.N. Racicot). Black knot was severe at Souris, Kings Co., P.E.I., with three enquiries received (D. Robinson), and heavily infected specimens were brought in from Queens Co. (R.R. Hurst).

SHOT HOLE (Higginsia hiemalis) was severe and defoliation moderate on young cherry trees in several nurseries in the lower mainland, B.C. Infection in mature orchards was negligible in comparison with 1948 (I.C. MacSwan). Infection was very light, and confined to leaves, on all varieties in the Kootenays (M.F. Welsh). Shot hole was of no importance in 1949 in the Niagara Peninsula, Ont. A moderate development late in the season in the Fonthill district caused premature defoliation (G.C. Chamberlain).

POWDERY MILDEW (Podosphaera Oxyacanthae). A specimen was received from Thornberry, Ont., and heavy infection of a wild cherry was seen near Guelph (J.D. MacLachlan).

BROWN ROT (Sclerotinia fructicola and S. laxa) was severe on all varieties in the West Kootenay district, B.C., where partial or complete loss of crop resulted from failure to apply the cover sprays, but was light in Creston Valley (M.F. Welsh). A trace only of blossom blight (S. fructicola) occurred in the Niagara Peninsula, Ont. The bloom period was short, with fair weather and high temperature (G.C. Chamberlain). At the Experimental Station, Kentville, N.S., S. fructicola caused severe killing back of new growth of sour cherries, especially Morello and Montmorency (C.O. Gourley).

WITCHES' BROOM (Taphrina Cerasi) affected the leaves of a single sweet cherry twig in the University orchard, Point Grey, B.C. (R.E. Fitzpatrick). A specimen showing leaf curl, but no witches' broom, was collected 16 May at Penticton by R.P. Murray on sweet cherry. The specimen was identified by Dr. Anna E. Jenkins, following A.J. Mix's recent monograph of the genus (Univ. Kans. Sci. Bull. 33, pt. 1, 167 pp. 1949) in which T. Cerasi and T. minor are combined (I.L.C.).

LITTLE CHERRY (virus). None was found in the survey of 45,000 cherry trees in the Okanagan Valley, B.C., conducted by the Provincial Dept. of Agriculture (T.B. Lott). In the Kootenays it is becoming increasingly obvious that the symptoms of little cherry vary significantly from district to district. There are now only a few orchards in the extreme western limits of the Kootenays in which the disease has not appeared (M.F. Welsh).

NECROTIC RING SPOT (virus) was found in 9 of the 21 sour cherry orchards inspected in the Niagara Peninsula, Ont. Total infection was 1.6% of trees. In the affected orchards infection ranged from 0.2 to 12.0%, av. 3.2%. Of the 1.6% visibly diseased trees, 0.9% showed necrotic spotting, 0.5% necrotic spotting and shock symptoms, and 0.2% etch symptoms. Shock symptoms were found in 5 orchards, in 3 of which 5% of the trees showed this symptom, indicating active spread of the virus (G.C. Chamberlain).

RUGOSE MOSAIC (?virus). The disease affecting 6 trees of Lambert at Erickson, B.C., previously ascribed to a form of rasp leaf (P.D.S. 27:89. 1948, and 28:79. 1949) is considered by Dr. L.C. Cochran, U.S.D.A., as more closely allied to rugose mosaic. The trouble is still confined to 6 trees and spread within the individual trees is slow (M.F. Welsh).

SMALL BITTER CHERRY (virus) continues to spread slowly in Bing and Lambert sweet cherries in the southern Okanagan Valley, B.C. A tree inoculated in 1941 finally showed the disease in 1949, providing some confirmation of the virus nature of the disease (T.B. Lott).

TATTER LEAF (virus) was present in 19 of 22 sweet cherry orchards surveyed in the Niagara Peninsula, Ont., and affected 5.7% of the trees. Infection ranged from 1 to 31%, av. 7.5%, in affected orchards. Most commercial varieties were affected. Symptoms were usually confined to a few branches (G.C. Chamberlain).

YELLOWS (virus) was present in all 21 orchards, comprising 4929 trees, of sour cherry surveyed in the Niagara Peninsula, Ont. Infection ranged from 2 to 53%, av. 17%. Leaf fall and yellowing were less severe than usual, and the period of symptom expression was both late and short. Temperatures were high during the early bloom period. Trees that showed green ring patterns suffered heavier defoliation than those that did not (G.C. Chamberlain).

CRINKLE (bud sport) was present in 18 of 22 sweet cherry orchards surveyed in the Niagara Peninsula, Ont., affecting 3.2% of the 2849 trees. Infection ranged from 1 to 17% in affected orchards, av. 4.7%. Black Eagle is frequently affected. Affected trees are unproductive (G.C. Chamberlain).

MOTTLE (cause unknown) was present in 21 of 22 sweet cherry orchards surveyed in the Niagara Peninsula, Ont., ranging from 3 to 52%, av. 21%, in affected orchards. Various types and degrees of mottling, sometimes with definite ring or blotch patterns, were seen, but the cause or causes are not known (G.C. Chamberlain).

NECROTIC SPOTTING (cause unknown) was seen in 17 of 22 sweet cherry orchards surveyed in the Niagara Peninsula, Ont., ranging from 1 to 9%, av. 1.9% (G.C. Chamberlain).

PEACH

SCAB (Cladosporium carpophilum). A specimen was received from Toronto, Ont. (J.D. MacLachlan).

CORYNEUM BLIGHT (Clasterosporium carpophilum) was moderately heavy, causing slight damage, on all varieties, especially Rochester, in unsprayed orchards in the Kootenays, B.C. In most of the seriously affected orchards the disease is now satisfactorily controlled by the recommended spray programme (M.F. Welsh).

LEAK (Rhizopus nigricans). Light to moderate infections were seen on local and Ontario peaches on the market at Kentville, N.S. (J.F. Hockey).

BROWN ROT (Sclerotinia fructicola). In contrast with 1948, brown rot caused no loss in the Okanagan Valley, B.C., in 1949, and not a single case of its occurrence was reported. The normal, dry summer weather does not permit development of the pathogen (H.R. McLarty). Specimens were received from Brantford, Ont. Less reported than in most years (J.D. MacLachlan). Brown rot was of minor importance in the Niagara Peninsula. Fair weather during bloom curbed blossom blight and prolonged dry weather through the summer and harvest period prevented fruit infection. Some loss occurred late in the season where fruit was held beyond the firm-ripe stage (G.C. Chamberlain).

LEAF CURL (Taphrina deformans) was general in the lower Fraser Valley and Vancouver areas, B.C. Some unsprayed trees were severely affected (R.E. Fitzpatrick, I.C. MacSwan). Little leaf curl developed in the Okanagan Valley. In some experimental plots infection in the checks was insufficient to allow evaluation of fungicides (H.R. McLarty). Infection was moderate in the West Kootenays and light in Creston Valley (M.F. Welsh). Specimens were received from Iona Station, Wallaceburg, Port Elgin, and Clinton, Ont. (J.D. MacLachlan). A trace occurred on one tree in the orchard at the Experimental Station, Kentville, N.S., and a few specimens were brought in from the district (C.O. Gourley).

CANKER (Valsa spp.). Cankers developed at many points along the smaller branches of trees in several orchards in Essex Co., Ont. V. ?leucostoma was isolated from several lesions (C.D. McKeen). Every tree in a 4-year-old block of 50 Red Hanen in Lincoln Co. showed one to several extensive crotch or trunk cankers in March. The variety seems to be very susceptible. One- and two-year-old trees in a nursery in Lincoln Co. bore trunk cankers in May, resulting from the removal of laterals and also, perhaps, from imperfect ripening in the fall of 1948 (G.C. Chamberlain).

WESTERN X DISEASE (virus) continues to spread slowly in the orchards that were first mapped in 1940 in the Okanagan Valley, B.C. Six new infections were found in 2278 trees in the southern districts. Symptoms were evident in 51 trees that had shown them at some previous time, and were lacking in 28 that had previously shown them (T.B. Lott).

X DISEASE (virus). Scattered infected trees of Fischer and Elberta were found in one area of Niagara Twp., Lincoln Co., Ont. Choke-cherries were found within a mile of the infected trees (G.C. Chamberlain).

FERTILIZER INJURY (excess nitrogen) caused leaf yellowing and marginal burning of 6-year-old Elberta and Vedette in Lincoln Co., Ont. The yellowed leaves fell prematurely. Cyanamid was applied in the spring at 2-3 lb. per tree (G.C. Chamberlain).

SPRAY INJURY. Two and a half rows of trees in a large block of Elberta in Lincoln Co., Ont., showed leaf spotting and defoliation due to residue of Bordeaux mixture being left in the tank after grapes were sprayed. Similar injury was seen in a second orchard in which the sprayer had previously been used to apply Bordeaux mixture to pears (G.C. Chamberlain).

PLUM

SCAB (Cladosporium carpophilum) was severe on fruit received from Pointe aux Trembles, Laval Co., Que. (H.N. Racicot).

CORYNEUM BLIGHT (Clasterosporium carpophilum) caused severe defoliation of Italian prune in several scattered orchards in the Kootenays, B.C. (M.F. Welsh).

BLACK KNOT (Dibotryon morbosum). Infection was light in a neglected orchard at North Saanich, B.C. Specimens of Damson plum were sent in from Duncan (W. Jones). Specimens were received from home gardens at Toronto, Plattsville, Walkerton and Mono Road, Ont. (J.D. MacLachlan). Infection was moderate and damage slight at the Experimental Station, Kentville, N.S. (C.O. Gourley). Black knot severely damaged several trees in a neglected orchard in Queens Co., P.E.I. (R.R. Hurst).

BROWN ROT (Sclerotinia fructicola) was common on plum and prune fruit at harvest in the lower mainland, B.C., but the loss was slight (I.C. MacSwan). Specimens were received from Essex, Point Edward, and Tilbury, Ont. (J.D. MacLachlan). A trace was seen on Victoria in Queens Co., P.E.I. (R.R. Hurst).

PLUM POCKET (Taphrina communis). Specimens were received from Carnarvon and Devlin, Ont. (J.D. MacLachlan). Damage was severe in a planting in Kings Co., P.E.I., and a trace was recorded on a single tree of Victoria in Queens Co. (R.R. Hurst).

WILT (Verticillium sp.) attacked 10/200 3-year-old trees of Early Golden and Reine Claude at Port Dalhousie, Ont., causing partial defoliation (G.C. Chamberlain).

SHOT HOLE (?Xanthomonas pruni) caused heavy defoliation of oriental plums at the Station, Kentville, N.S. The disease, which appears to be bacterial, is under investigation (C.O. Gourley).

SHIRO LINE-PATTERN MOSAIC (virus). Symptoms appeared on Mammoth oriental plum at the Station, Kentville, N.S., about 10 June, but were completely masked by the end of July (C.O. Gourley).

DIE BACK (boron deficiency) was again present in some orchards in the Okanagan Valley, B.C. Some of the affected orchards had received ample boric acid, but the symptoms were typical of boron deficiency. The matter is being investigated (H.R. McLarty).

HEAT SPOT (physiological) was prevalent in orchards of Italian Prune on heavy soil in Lincoln Co., Ont., after high temperatures in July. Water-soaked spots developed on the fruit, which later dropped (G.C. Chamberlain).

SCORCH (potash deficiency). Trees of Reine Claude in a low area of an orchard at Port Dalhousie, Ont., showed extensive marginal scorch. The trees had received a heavy application of nitrogen (G.C. Chamberlain).

SHOT HOLE (cause unknown). Severely affected leaves were received from Marieville, Que., but as all the lesions had abscissed the caused remained uncertain (H.N. Racicot).

WILT (cause unknown) was severe in a tree in Queens Co., P.E.I. The pathogen had evidently entered through a wound on the trunk and had blackened the conductive tissue (R.R. Hurst).

C. RIBES FRUITS

CURRANT

WHITE PINE BLISTER RUST (Cronartium ribicola) was heavy and caused slight defoliation of black currant in the University plots, Point Grey, B.C. (H.N.W. Toms). It was common about Guelph, Ont., in late summer, often causing complete defoliation of susceptible varieties of black currant before the end of September. A specimen was received from Freeman (J.D. MacLachlan). It was commonly found in black currant nursery plantings at Fenwick, Smithville, Port Burwell and Hamilton. It was also troublesome in commercial plantings especially of Boskoop Giant and Black Giant (G.C. Chamberlain). A trace occurred on Black Naples at the Station, Ste. Anne de la Pocatière, Que. (A. Payette). Rust was trace to heavy, av. 75% of leaves infected, on black currants in Queens Co., P.E.I. Red currant was also infected (R.R. Hurst).

ANTHRACNOSE (Drepanopeziza Ribis) was moderately heavy and caused some defoliation of red currant at the Station, Kentville, N.S. (C.O. Gourley).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was moderately heavy at the Station, Kentville, N.S., and caused some defoliation (C.O. Gourley).

DOWNY MILDEW (Plasmopara ribicola) was moderately heavy on swamp black currant, Ribes triste, in a shady situation at Moose Factory, Ont., at the south end of James Bay. The only previous record of the fungus in Canada is from Beeton, Ont., on cultivated gooseberry (R.D.S. 25:96. 1946). (D.B.O. Savile).

POWDERY MILDEW (Sphaerotheca mors-uvae). Infection was about 50% on the rust-resistant black currants at Agassiz, B.C. (H.N.W. Toms). Infection was heavy on black currants at the Station, Beaverlodge, Alta., and light in garden plantings at Edmonton (T.R.D.). Mildew was moderately heavy on Crusader and Coronet rust-resistant black currants at Ste. Anne de la Pocatière, Que. (A. Payette).

GOOSEBERRY

WHITE PINE BLISTER RUST (Cronartium ribicola) was light on gooseberries at Charlottetown, P.E.I. (R.R. Hurst).

ANTHRACNOSE (Drepanopeziza Ribis) was moderately heavy on gooseberries and caused some defoliation at the Station, Kentville, N.S. (C.O. Gourley).

SEPTORIA LEAF SPOT (Mycosphaerella Grossulariae) was moderately heavy and caused some defoliation at the Station, Kentville, N.S. (C.O. Gourley). Infection varied from trace to moderately heavy in Queens Co., P.E.I. (R.R. Hurst).

D. RUBUS FRUITS

BLACKBERRY

ORANGE RUST (Gymnoconia Peckiana). A specimen was received from Port Dover, Ont., in June (J.D. MacLachlan).

CROWN GALL (Agrobacterium rubi (Hildebrand) Starr & Weiss). Considerable increase in gall growth occurred on second-year growth of R. procerus at Keating, B.C., infected with A. rubi, reported in P.D.S. 28:86 as A. tumefaciens (W. Jones). It has been the practice to report all crown gall in the Survey under A. tumefaciens pending clarification of host relationships. This policy will be continued except when definite evidence has been provided that A. rubi is involved (D.B.O.S.).

BOYSENBERRY

CROWN GALL (Agrobacterium tumefaciens) was present on two plants in the University plots, Point Grey, B.C. (H.N.W. Toms).

LOGANBERRY

CANE BLIGHT (Leptosphaeria Coniothyrium) caused considerable damage to fruiting canes of R. macropetalus X R. loganobaccus in a commercial planting at Duncan, B.C. (W. Jones).

SEPTORIA LEAF SPOT (Mycosphaerella Rubi) was general on foliage and canes in the Saanich Peninsula, B.C., but lighter than in 1948 (W. Jones).

RASPBERRY

CROWN GALL (Agrobacterium tumefaciens) was found in nursery plantings of Latham in Middlesex and Welland Co., Ont., during roguing. Failure of newly planted Latham canes to become established at Wallaceburg was also attributed to crown gall (G.C. Chamberlain). In a plantation at McDonalds Corner, N.B., all plants of 12 varieties showed trace to heavy infection (W.A. Hodgson, H. Lawrence). Crown gall caused severe injury to 5% of the canes in a Viking plantation in Queens Co., P.E.I., and enquiries were received from four other sources (R.R. Hurst).

SPUR BLIGHT (Didymella applanata). A trace was seen in plantings at Edmonton, Alta. (T.R.D.). Spur blight was trace to very heavy, av. 7%, in plantings of Latham and Viking throughout P.E.I. (R.R. Hurst).

ANTHRACNOSE (Elsinoe veneta) was generally of minor importance in commercial plantings in Ont. In a varietal test at Vineland the percentage of infected canes on 7 July was as follows: Chief 2, Cuthbert 0, Gatineau 16, Herbert 15, Latham 0, Lloyd George 24, Madawaska 21, *Marci 65, Milton 10, Newburg 0, Ottawa 1, *Rideau 80, Taylor 36, *Trent 81, Viking 3, *Washington 68. The varieties marked with an asterisk bore relatively few lesions per cane and the figures accordingly do not truly indicate the degree of infection. In specimens of Trent sent in from Barrie anthracnose had caused death of the cane tips (G.C. Chamberlain). In a planting of Cuthbert at Alma, Prince Co., P.E.I., infection was 100% and damage moderate on 10 July (D. Robinson). Elsewhere, on Viking, it was trace to severe but generally trace (R.R. Hurst).

YELLOW RUST (Phragmidium Rubi-idaei) was light on Washington at Duncan, B.C. (W. Jones). In the lower Fraser Valley and Vancouver areas infection on Cuthbert and Washington was light. At Point Grey basidia were seen on 11 April, aecia on 5 May and uredinia on 21 June (H.N.W. Toms).

LATE YELLOW RUST (Pucciniastrum americanum) caused moderate scorch and leaf fall of Viking in a nursery planting at Fenwick, Ont. (G.C. Chamberlain).

POWDERY MILDEW (Sphaerotheca Humuli). Infection was light in plantings at Lacombe and Beaverlodge, Alta. (T.R.D.). It was commonly seen on Latham and occasionally on other varieties in Ont. In a young planting of Bristol in Wentworth Co. infection was general on 8 July; the cane tips were infected and of little use for layering (G.C. Chamberlain).

WILT (Verticillium albo-atrum). Specimens of Chief were received from Moose Range, Sask., and of Viking from Woodstock, Ont. (G.C. Chamberlain).

LEAF CURL (virus). Severely stunted specimens of Golden Queen yellow raspberry were received from Moose Range, Sask. Infection was 1% in a young planting of a Newburg X Cuthbert seedling at St. Catharines, Ont., and it was also seen on a few plants of Viking (G.C. Chamberlain). Specimens were received from Kenogami, Chicoutimi Co., and St. Troy, Quebec Co., Que. (H.N. Racicot). A single infected plant of Viking was seen in Queens Co., P.E.I. (R.R. Hurst).

MOSAIC (virus). Infection was moderate in some varieties at the Station, Beaverlodge, Alta., and a trace at Lacombe (T.R.D.). A trace to 8% occurred in 15/100 propagative plantings examined in southern Ont. It was found in Cuthbert, Latham, Taylor and Viking, mainly in Middlesex, Elgin, Norfolk and Wentworth Counties. Four per cent occurred in Newburgh X Cuthbert seedlings at St. Catharines (G.C. Chamberlain). Infection was nearly 100% in a garden planting of Viking at Truro, N.S. (R.G. Ross). At Charlottetown, P.E.I., infection was Viking trace, Cuthbert 15%, and Latham, Lloyd George and Newburg 25%. Fruit from infected canes was small, dry and tasteless (R.R. Hurst).

CHEMICAL INJURY (2,4,5-T spray). Following drift from roadside spraying at Steveston, B.C., in July, raspberry fruits coloured but remained hard and did not ripen (N.S. Wright).

WINTER INJURY caused 15% loss in a Viking plantation in Queens Co., P.E.I. The planting received a heavy fertilizer application late in the summer of 1948 and the canes continued to grow late into the fall (R.R. Hurst).

E. OTHER FRUITS

BLUEBERRY

CANKER (Godronia Cassandrae) caused slight damage in a garden at Brentwood, B.C. (W. Jones), and was general in the Surrey and Lulu Island districts on high bush blueberry (R.E. Fitzpatrick).

GRAPE

DEAD ARM (Fusicoccum viticola) was serious in a large Concord vineyard in Lincoln Co., Ont. A close check in one part showed 11.2% of vines affected and 13% removed prematurely because of the disease. Dead arm is widespread in the Niagara Peninsula (G.C. Chamberlain).

DOWNY MILDEW (Plasmopara viticola) was unimportant in 1949 in the Niagara Peninsula, Ont. Scattered infections were seen on Agawam and Delaware foliage. Only a trace was seen on unsprayed vines of the highly susceptible Fredonia (G.C. Chamberlain). A specimen was received from Aylmer, Que. (H.N. Racicot).

POWDERY MILDEW (Uncinula necator) was light in a garden at Sumas, B.C. (W. Jones). Foliage infection was common on Concord in Lincoln Co., Ont., following fall rains, but developed too late to cause appreciable damage (G.C. Chamberlain).

CHEMICAL INJURY (2,4-D spray). Small, malformed foliage was found scattered throughout a Concord vineyard in Welland Co., Ont., following roadside spraying with an ester of 2,4-D. In one area there was a marked delay in maturing of fruit and a lack of terminal growth (G.C. Chamberlain).

CHLOROSIS (?iron and manganese deficiency). Many vineyards of Concord and Worden in the Niagara Peninsula, Ont., showed marked yellowing following prolonged drought and heat. Affected vines made weak growth and yielded poorly. A mild chlorosis of Concord, suggested by Dr. du Plessis of Stellenboch, South Africa, as perhaps due to manganese deficiency, was also seen (G.C. Chamberlain).

FROST INJURY. Up to 90% of new growth of Concord was killed in localized areas of the eastern Niagara Peninsula, Ont., by frost on the night of 9 May. The overall damage in the area was about 10% (G.C. Chamberlain).

LEAF SCORCH (potash deficiency). Unthrifty growth and abundant leaf scorch of Fredonia and Concord in Lincoln Co., Ont., was attributed to lack of potash (G.C. Chamberlain).

STRAWBERRY

GREY MOULD (Botrytis cinerea) affected 1% of Senator Dunlap at Alberton, P.E.I. (D. Robinson).

LEAF BLIGHT (Dendrophoma obscurans) became prevalent in Ont. after the crop was harvested, and its incidence increased towards autumn. Some plots of Senator Dunlap in the Ottawa district were severely affected. Premier was also severely attacked, no plot being found free from disease in the districts surveyed (see under scorch). The pycnidia of the fungus are seen as dark dots on the light brown lesions. The fungus was also found on Fragaria vesca and F. virginiana near Ottawa (Joan E. Fall).

LEAF SCORCH (Diplocarpon Earliana). Varietal resistance to scorch was evident from surveys in the Ottawa, Vineland, St. Catharines, Oakville and Waterford districts, Ont., during the seasons of 1948 and 1949. Catskill, Crimson Glow, Culver, Dresden, King, Premier, and Tupper showed very high resistance to the disease. A few scorch lesions were found on Borden, July Morn, Mackenzie, Massey, Maytime, and Senator Dunlap. Louise, Robinson, Sparkle, Temple and Valentine showed a moderate amount of disease. Heavy infection occurred on Fairpeake and Redwing. Scorch became prevalent in early summer and increased in severity during the warmer months (Joan E. Fall). At Charlottetown, P.E.I., scorch incidence was as follows: none -- Borden, Crimson Glow, Dresden, Herman, King, Maytime, Premier, and Valentine; trace -- Catskill, Culver, Mackenzie, Massey, Senator Dunlap and Tupper; moderate -- July Morn, and Louise; severe -- Redwing (R.R. Hurst, V. Clark).

LEAF BLOTCH (Gnomonia Fragariae Kleb. var. fructicola Arn. (Zythia Fragariae Laibach). The pathogen was isolated from leaves thought to be affected with Dendrophorna obscurans. The pycnidia of the Zythia, however, are much lighter in colour than those of the blight fungus. The perfect or Gnomonia stage was found on overwintered strawberry leaves collected near Ottawa. The fungus seems to occur in association with D. obscurans. The degree of its pathogenicity and the economic importance of the disease are under investigation. The name 'Leaf Blotch' was proposed by H. Wormald (Gardeners' Chronicle 28 Oct. 1944) for what appears to be this disease. Alexopoulos and Cation (Phytopath. 38: 698-706. 1948) report a fungus causing a stem-end rot of strawberry fruit which they consider to be the perfect stage of D. obscurans. Their fungus, however, resembles closely Gnomonia Fragariae. Their account seems to be the only previous reference to it in North America (Joan E. Fall).

ROOT KNOT (Heterodera marioni). A patchy infection occurred in old plants in a neglected bed at Point Grey, Vancouver, B.C. (H.N.W. Toms).

LEAF SPOT (Mycosphaerella Fragariae) was common in the Guelph district, Ont. A ¼-acre field at Bayfield showed slight damage on 16 July (J.D. MacLachlan). Surveys of the Ottawa, St. Catharines, Vineland, Oakville, and Waterford districts, Ont., during the seasons of 1948 and 1949 indicated a striking range in the incidence of leaf spot on strawberry varieties. Catskill, July Morn, Maytime and Premier showed very high field resistance. Resistance was also shown by the following varieties, although leaves bearing a few spots could be found: Borden, British Sovereign, Culver, Dresden, Fairfax, Massey, Redwing and Temple. The varieties King, Mackenzie, Senator Dunlap and Valentine were considerably spotted. In some cases Senator Dunlap plants were very severely attacked. Louise was found to be severely spotted in each district during the entire growing season. On the whole the disease incidence varied seasonally, spots being most abundant in the spring and in the late summer and fall (Joan E. Fall). A survey at the Station, Charlottetown, P.E.I., gave the following incidence of leaf spot: none -- Catskill, Dresden, July Morn, Mackenzie, Massey, Maytime, Premier, Redwing, and Valentine; trace -- Borden, Culver, King, and Senator Dunlap; moderate -- Herman; severe -- Louise (R.R. Hurst). It is interesting to note that although Valentine, Mackenzie, King and Senator Dunlap were considerably spotted in Ontario, these varieties were free or almost free from disease in P.E.I. (Joan E. Fall). It is to be hoped that detailed data of the incidence of each of the foliage diseases of strawberry will in future be recorded in varietal test plots in other regions. Miss Fall's success in clearing up the confusion between the several diseases involved with greatly simplify the collection of such records. The accumulation of data from all parts of Canada will help to indicate whether biologic specialization exists in any of the pathogens, and will make it possible for breeders to tackle the problem of disease resistance in a more rational manner (D.B.O.S.). Examination of phanerogamic specimens collected in 1949 yielded Mycosphaerella Fragariae, or Ramularia Tulasnei, on Fragaria glauca from the neighbourhood of Dawson, Mayo, Watson Lake and Whitehorse, Yukon; and on F. virginiana from Moose Factory, Ont., and Stephenville, Nfld. It is conceivable that the F. virginiana records represent introductions of the parasite, but it seems clear that it must be endemic in Yukon on F. glauca (Joan E. Fall, D.B.O. Savile).

RED STELE (Phytophthora Fragariae) was found, for the first time in N.B., near Memramcook on 10 June. A few specimens were received from Kings, Colchester and Yarmouth Co., N.S. (J.F. Hockey).

POWDERY MILDEW (Sphaerotheca Humuli) was general on some hybrids at the Station, Saanichton, B.C., causing considerable damage. It was slight on British Sovereign (W. Jones). Powdery mildew was general in the lower Fraser Valley; it caused blotching of British Sovereign foliage, but the damage was generally negligible (R.E. Fitzpatrick). It caused slight injury in the Ottawa district, Ont. (Joan E. Fall). Infection was less than 5% on Senator Dunlap and damage slight at Charlottetown, P.E.I. (D. Robinson).

MILD MOSAIC (virus) was found in 3 plantations of Senator Dunlap in Sunbury Co., N.B. Infection was trace to 3% (D.J. MacLeod).

YELLOWS (virus). All plantings of Marshall in the lower mainland, B.C., seem to be affected; the damage is severe (R.E. Fitzpatrick). Yellows was severe on Marshall in a laboratory plot at Fredericton, N.B., and was found in Catskill and 5 seedlings at the Substation, McDonald's Corner (D.J. MacLeod).

JUNE YELLOWS (genetic breakdown). A specimen was received from Owen Sound, Ont., on 4 June (J.D. MacLachlan). June yellows was quite common in the Niagara Peninsula. It caused yellowing and stunting in scattered areas of several second year plantings of Premier examined on 9 May in Louth Twp., Lincoln Co.; none was seen in adjacent rows of Valentine and Fairfax (G.C. Chamberlain).

ROOT ROT (cause unknown). Failure of plantings examined at Weyburn (1 June), Saskatoon (10 June) and Broomhead (13 July), Sask., was apparently due to a combination of root rot and winter injury (T.C. Vanterpool). Specimens affected with root rot were received from Little Currant, Grand Valley, Paris, Thorndale, Woodstock, Cooksville and Wallenstein, Ont. (J.D. MacLachlan). In a 3-year-old planting of Premier in Lincoln Co. about half the plants were stunted and dying; they had been mulched with sawdust. Root rot was serious in a new planting of Premier at Port Dalhousie; 10-15% of the plants were dead or dying in some areas in July (G.C. Chamberlain). Root rot was prevalent in the Ottawa district. A crown rot and lesions at the base of the petioles were associated in most cases with the blackened roots. In one plot it was noted that first the parent plant died, and then all its runner plants died even though they had become established. All three symptoms were present. Attempts to find a pathogen yielded no conclusive evidence (Joan E. Fall). Infection was moderate to severe in nearly all variety plots at the Station, Ste. Anne de la Pocatière, Que. (R.O. Lachance). In a severely affected planting of Senator Dunlap at Milton, P.E.I., examined in May, many soil organisms were isolated from rotted areas of the roots. In a slightly damaged planting of the same variety at Charlottetown, examined 7 June, additional symptoms included severely affected plants that were taller than normal and had red-coloured crowns. Organisms isolated included Mucor, Sclerotinia, Fusarium and two undetermined Phycomycetes (D. Robinson).