III. DISEASES OF VEGETABLES AND FIELD CROPS

BEAN

GREY MOLD (Botrytis cinerea). Pod infection was very heavy in Blue Lake pole beans after a rainy period in the Fraser River Valley, B. C. Loss was reported to be almost 100% of the crop; no protective fungicide had been used (H.N.W. Toms). A tr. occurred in a field of Tendergreen at Canaan, N.S. (K.A. Harrison).

ANTHRACNOSE (Colletotrichum lindemuthianum) had apparently been heavy in a field of Michelite in Elgin Co., Ont.; in the sample submitted for diagnosis seedless shrivelled pods accounted for nearly 40% of the crop (R.N. Wensley). Anthracnose was common and sev. in gardens along the Lower St. Lawrence in Que. (D. Leblond). Several gardens were visited in the same general area but damage appeared to be sl.-mod. Infection was quite variable, sev. damage being confined to the wetter, more humid portions of the plantings (L.J. Coulombe). The disease caused sev. damage in a planting of Soldier at Hampstead, N.B. (S.R. Colpitts). Only a tr. of anthracnose was observed at Kentville, N.S.; the dry season held the disease in check (K.A. Harrison). A few plants showed sev. infection in a late planting at York, Queens Co., P.E.I. (J.E. Campbell). Specimens revealed ascervuli to be numerous, mostly grouped along the veins although the numerous necrotic lesions, up to 5 mm. in diam., were larger than those usually observed (D.B.O. Savile). Several reports were received from all three counties in P.E.I. (R.R. Hurst). Infection was tr.-sev. on wax beans in gardens at Topsail and Manuels, Nfld. (G.C. Morgan).

ROOT ROT (Fusarium spp., Rhizoctonia solani) varied greatly in prevalence in the 10-15 fields visited in s.w. Ont. Some fields were almost free of infection while in others 70% of the plants were affected. The disease appeared worse in the drier sections and the lighter soils. In one field where the disease was sev. in 1948, it was again heavy this year (R.N. Wensley).

HALO BLIGHT (Pseudomonas phaseolicola) was for the second consecutive year unusually scarce in s. Alta.; tr.-sl. infection was noted in 2 fields (F.R. Harper). The disease was sev. in some gardens, but apparently not as destructive as in 1954 (W.P. Campbell). Halo blight caused sl.-mod. damage in the 6 gardens examined in south shore communities e. of Quebec City (L.J. Coulombe). Although halo blight has been very destructive in Annapolis and Kings counties, N.S., for several years only traces were observed this year on account of the dry season (K.A. Harrison).

DAMPING-OFF (Pythium, etc.). Cool wet weather delayed emergence of an experimental plot of Michelite and 14-B-An in Essex Co., Ont.; of the seedlings that did emerge, the stem of some 12% was affected by a soft rot caused by damping-off organisms (R.N. Wensley).

STEM CANKER (Rhizoctonia solani) caused about 50% damage in one small field of Tendergreen in Kings Co., N.S. (K.A. Harrison).

STEM ROT (Sclerotinia sclerotiorium) destroyed about 2% of the plants of Blue Lake in a 15-acre field at New Westminster, B.C. (N.S. Wright). The disease affected 60% of the plants in a field of the Kenearly strain of Yellow Eye in Annapolis Co., N.S. (K.A.H.).

RUST (Uromyces appendiculatus). The aecial state was quite heavy on leaves received from Chilliwack, B.C., on 23 Aug. (H.N.W. Toms). This is the first collection of the aecia to be received for deposit in the Herbarium from a Canadian locality (D.B.O. Savile). A sl. rust infection was observed in a planting in Queens Co., P.E.I. (R.R. Hurst).

COMMON BLIGHT (Xanthomonas phaseoli). What appeared to be this disease was affecting about 25% of the plants in a planting of Italian pole beans at Grand Forks, B.C., July 1954 (G.E. Woolliams). A tr. was seen in a market garden at Medicine Hat, Alta. (F.R. Harper). Common blight was heavy in 3 fields of Michelite inspected in Kent Co., Ont., on 15 Aug.; the disease was common in most areas in s.w. Ont. by this time (R.N. Wensley). A tr. was noted on Clipper inspected at Ottawa (R.L. Millar). Light infections were noted in Queens Co., P.E.I., but the disease was less prevalent than usual on account of the weather being dry (J.E. Campbell).

CURLY TOP (Beta virus 1) affected a tr.-10% of the plants in some plantings in the south part of the Okanagan Valley, B.C. In 1954 the disease was present in nearly every field, infection varying up to 70% of the plants in the Okanagan and Thompson Valleys (G.E. Woolliams).

COMMON MOSAIC (Phaseolus virus 1) was present in most fields in the B.C. Interior, but infection was usually only tr.-1%. In 1954, the disease was quite prevalent in the Okanagan and Thompson Valleys, infection being 10-90%. Both the green peach aphid, Myzus persicae, and the black bean aphid, Aphis rumicis, were very abundant and probably accounted for the widespread prevalence of mosaic (G.E. Woolliams). Common mosaic was found in only a few fields in s.w. Ont., but in one 15-acre field of Michelite in Huron Co. 50% of the plants were affected (R.N. Wensley). About 15% of the plants were affected in a 1/2-acre field at Charney, Que. (L.J. Coulombe). Mosaic increased very rapidly in 1954 in a planting of Yellow Eye at Kentville, N.S.; when the seed was planted in 1955, every plant was infected (K.A. Harrison).

YELLOW MOSAIC (Phaseolus virus 2). Infection was sev. on Michelite, but relatively light on 14-B-An in a plot in Essex Co., Ont. (R.N. Wensley). The disease was sev. in 5 gardens in Fredericton, N.B.; 12-22% of the plants infected (D.J. MacLeod). Mosaic affected 60% of the Blue Lake plants in a small garden at Kentville so sev. that they produced few pods and many died; gladiolus in the same garden showed sev. mosaic symptoms (K.A. Harrison).

BALD HEAD (mechanical injury) and SNAKE HEAD (seed corn maggot) caused 20% damage in a planting of Clipper in Kent Co., Ont. The seed harvested by combine thresher in 1954 and untreated was slow in germinating because of cool weather (R. N. Wensley).

COLD INJURY. Three large fields of snap beans at Wheatley, Ont., exhibited an unusual blotchy yellowing of the primary leaves on 7 June. During the preceding week air temperatures fell to about 35° F on three nights. The affected crops recovered and yielded well (C. D. McKeen).

LEAF MOTTLE (manganese deficiency) was quite striking in plantings of beans about Quebec, Que.; weather was very dry during June and July (D. Leblond).

SUN SCALD. About 15% of the plants were affected in a 3-acre field on Lulu Island, B. C. The mid-leaflet of the leaf that was of a certain maturity wilted and then dried up; damage nil. The condition was diagnosed as sun scald following a wet spell (H. N. W. Toms).

STEM NECROSIS (cause unknown) affected 75% of the Blue Lake plants in a 6-acre field at Rutland, B. C.; the injury was below the soil surface and in some respects resembled rhizoctonia injury (M. King).

WIND DAMAGE affected about 10% of the leaves in plantings at Canaan, N. S., on 5 July. The young leaves showed brown discolorations where two had rubbed together; the hot dry weather apparently intensified the injury (K. A. Harrison).

BEET

LEAF SPOT (Cercospora beticola) was general on the lower leaves of garden beets in the Montreal district, Que.; damage was negligible (E. Lavallee). A tr. was present on Flat Egyptian in the plots at Ste. Clothilde (R. L. Millar) and on Crimson Globe in a garden in Queens Co., P. E. I. (R. R. Hurst).

DAMPING-OFF (Rhizoctonia solani). Young seedlings in a 10-acre field at Chatham, Ont. were sev. affected, the stand being reduced by 50%. The field was sown in early August; the extremely hot weather during the next 3 weeks were favorable to the pathogen (C. D. McKeen).

SCAB (Streptomyces scabies). A sl. infection was noted on Detroit Dark Red in a market garden at Queens Co., P. E. I.; the warm dry summer favored scab development (J. E. Campbell). Scab was fairly heavy on beets about Conception Bay, Nfld., particularly in the Manuels-Kelligrews area (G. C. Morgan).

BORON DEFICIENCY. A case of boron deficiency was sent in from Grand Forks, B. C.; after the stecklings were set in the field, the roots failed to renew normal growth (G. E. Woolliams). Beets for canning were sev. affected by internal black spot on 3 farms in the Chatham area, Ont. Symptoms developed in late July following an excessively hot period of 4 weeks' duration. The beets were unfit for canning and the loss to one grower was $10,000. (C. D. McKeen).

BROCCOLI

2,4-D INJURY was sev. on 20 plants in a home garden nr. Ottawa, Ont. Injury varied from a proliferation of the parts to the formation of a large ball of proliferated tissue that transformed the entire plant. Tomato plants growing close by were sl. damaged (D. S. MacLachlan).

CABBAGE

GRAY MOLD (Botrytis cinerea) caused a sev. rot of cabbage stored in 3 outside cellars at Topsail, Nfld. (G. C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) causes considerable damage to cabbage and cauliflower in the Fraser Valley, B. C., where it has been common for many years, but it has now spread to a number of fields in the Chilliwack area (W. R. Foster). Club root was again general on Montreal and Jesus Islands, Que., but losses seemed less than usual (E. Lavallee). Diseased specimens received from Danville, Richmond Co., (H. N. Racicot). Every plant was infected in a 2-acre field of Penn State at Waterville, Kings Co., N. S. and caused about 20% damage; apparently the infection originated in the seed bed (K. A. Harrison). In a garden at Highfield, Queens Co., P. E. I., all the plants were affected but the damage was sl. The grower had experienced trouble previously with club root and tried Vancide 51 as a control. The fungicide was applied as a drench about the base of the newly set plants. The treatment appeared to have inhibited growth of the organism to some extent and permitted the crop to head up. On very hot days the plants showed sl. signs of wilting but always recovered again (J. E. Campbell). Infection was sev. this year in Bonavista, Trinity, and Conception Bays, Nfld.; many small gardeners lost most of their cabbage seedlings. Heavy infections were also noted in 12 commercial plantings. Many farmers are concerned over the increased infection in their fields in recent years (G. C. Morgan).

SCLEROTINIA ROT (S. sclerotiorum). A single rotting head of Penn State covered with sclerotia was seen in storage at Waterville, N. S. (K. A. Harrison).

BLACK ROT (Xanthomonas campestris) was observed and reported to occur in many crops in s. w. Ont. in 1955; usually the disease is quite rare (C. D. McKeen). A tr. was observed at Waterville, N. S. (J. F. Hockey).

HERBICIDE INJURY was observed in cabbage seedlings on Lulu Island, B. C. Stem above the cotyledon leaves were much swollen, somewhat twisted with greatly enlarged pith; base of stem rough and showing small cracks; leaves cupped inwards; petioles elongate and brittle; roots bushy but reduced in quantity. Offending herbicide could not be traced (H. N. W. Toms). Injury from 2,4-D was observed in 30,000 plants ready for transplanting to the field in Lincoln Co., Ont. Leaves were normal but there was severe hypertrophy of the crowns resulting in tumour-like swellings and rupture of the tissues in the area where the leaves were attached to the crown. Many plants were double the normal diameter. A similar condition was described by R. D. Wilson (Plant Dis. Reptr. 39:393. 1955) (J. K. Richardson).

BORON DEFIENCY had caused sev. damage to all heads of a lot of Danish Ball Head examined in storage in Queens Co., P. E. I., 7 Feb. 1955 (R. R. Hurst).

POTASH DEFICIENCY was observed in a 1/2-acre field of Penn State on a recently-purchased farm at Waterville, N. S. Lack of potash was confirmed by chemical analysis by the Kentville Farm staff. Part of the field on land formerly used as a garden was unaffected (K. A. Harrison).

CARROT

DAMPING-OFF (Alternaria dauci and Fusarium sp.) has been troublesome for the last two years in the Thedford marsh, Ont. A. dauci and a species of Fusarium have been repeatedly isolated, but only the Alternaria has proved pathogenic in greenhouse tests (N. J. Whitney).

GREY MOLD (Botrytis cinerea) was troublesome in many lots of carrots late in the storage period in Kings Co., N. S. Loss estimated at 10% of the crop (K. A. Harrison).

LEAF SPOT (Cercospora carotae) was relatively heavy on sample of diseased leaves received via the University from Oakbank, Man. The growers suspect that the leaf spotting is associated with small brown root discolorations, which have been objected to in the wholesale trade. The hypothesis has not been tested experimentally (W. A. F. Hagborg, D. B. O. Savile) See Root Russet (P. D. S. 34:62-63). (I. L. C.).

CROWN ROT (Erwinia carotovora) was observed in 2 fields about 1 1/2 mi. apart in Lincoln Co., Ont. In one 7-acre field, 5-10% of the carrots were affected. When examined on 6 July infection appeared to have occurred in early June; some seedlings had been completely rotted, while others, only sl. affected,

partially recovered. The surviving roots were more or less constricted at the ground line. The tops of the more sev. affected were easily broken off. This field had been in carrots in 1954 and there had been considerable rot in the mature roots at harvest. The other, 3-acre field had been in a variety of vegetables, which appeared normal when harvested. Most of the injury was confined to a low portion of the field, which was very wet for 7-10 days in early June (J. K. Richardson). Soft Rot affected 10% of the Chantenay roots in two poorly drained fields on a river bank at Lethbridge, Nfld. (G. C. Morgan).

ROOT KNOT (Meloidogyne ?hapla). Carrots 1/2-1/3 in. in diam. received from Mascouche, Terrebonne Co., Que. were sev. affected (H. N. Racicot). Root knot is becoming a problem of increasing importance on Ile Jesus, near Montreal (E. Lavallee).

VIOLET ROOT ROT (Rhizoctonia crocorum). Up to 10% of the carrots were sev. affected in the Thedford marsh, Ont. in 1955 (N. J. Whitney).

SCLEROTINIA ROT (S. sclerotiorum) caused the total loss of a lot of Nantes carrots in storage at Kentville, N. S.; the grower attempted to select out the sound carrots for sale immediately, but to no avail (K. A. Harrison). About 5% of a bushel lot of Nantes long in storage at Charlottetown, P. E. I., showed decay in January (J. E. Campbell). In a lot of Chantenay in Feb. 17% of the roots were affected (R. R. Hurst).

Laurence H. Purdy (Phytopathology 45:421-427. 1955) has proposed that the species Sclerotinia sclerotiorum, S. trifoliorum, S. trifoliorium var. fabae, S. intermedia, S. minor and S. sativa be united into a single species under S. sclerotiorum. It is true that the group of species typified by S. sclerotiorum, in which the apothecia arise from sclerotia and the conidial state is absent, are difficult to separate. However, it seems doubtful that the author has presented evidence to warrant the reduction of all these important plant pathogens to a single species. For instance, the history of the isolates of S. sativa and the conditions under which the organism is pathogenic do not suggest that the fungus is synonymous with S. sclerotiorum. As early as 1934 M. W. Cormack (Can. J. Research 11:474-480. 1934) in discussing the identity of the fungus which had been encountered in the roots of alfalfa and sweet clover reported that the species of Sclerotinia "has not been definitely identified, but Dr. H. H. Whetzel, who has examined it, has suggested that it may be an undescribed species related to S. minor." When F. L. Drayton and J. W. Groves (Mycologia 35:517-528) described S. sativa, they did so after a careful comparison with S. minor and S. intermedia. It may also be noted that the late Prof. Whetzel in his posthumous paper (Mycologia 36:648-714. 1945) recognized all these species as distinct. For the present, at least, they will continue to be reported separately in the Survey (I. L. C.).

BACTERIAL BLIGHT (Xanthomonas carotae) was present in all fields being grown for seed in the Grand Forks district, B. C., in July 1954, but in no field examined was there any significant injury as infection was confined

largely to the basal leaves and the occasional unbellet (G. W. Woolliams). A sl. infection was present on a few varieties in the University plots, Winnipeg, Man. (W. A. F. Hagborg).

YELLOWS (Callistephus virus 1). Tr.-sl. infections were recorded in all 4 fields examined at Taber and Medicine Hat, Alta. (F. R. Harper). Although yellows was common and caused sl. damage, it was less abundant on carrots in 1955 than in any of the last 2 or 3 years. It also caused less damage to ornamental plants such as china aster, petunia and godetia than in 1954 (R. J. Ledingham). Carrot roots from Texas were found to be excessively hairy on examination in Winnipeg; the condition was attributed to yellows (J. E. Machacek). A mod. infection was noted on carrots in the University garden, Winnipeg, Man. (W. E. Sackston). A trace of aster yellows was found in most of the carrot fields in the Thedford marsh, Ont. (N. J. Whitney). The variety test conducted at Harrow in 1954 (P. D. S. 34:62) was repeated with the same 20 varieties in 1955, except the test consisted of 6 replicates instead of 2. Dr. N. J. Whitney kindly supplied his data on the rate of infection in each variety for each year. The average percentage infection of aster yellows was 6.1% in 1954 and 5.4% in 1955. Greater randomization in 1955 resulted in the level of infection in each variety to be nearer the mean value for the plot than in 1954. Moreover, there appeared to be little correlation between variety infection levels in the two years. Thus it appears that carrot varieties do not differ greatly in their resistance to aster yellows nor exert any measurable influence on the feeding habits of the leaf-hopper vectors (I. L. Conners). Yellows was common in commercial fields in York and Sunbury counties, N. B.; in the 9 fields examined, infection was 7-48% (D. J. MacLeod). A 5% infection was observed in one field in Kings Co., N. S., in September; yellows was not as sev. this year as usual (K. A. Harrison). Yellows (0.5% infection) was recorded in one planting in Queens Co., P. E. I. (R. R. Hurst). Sl. infections were noted in 3 commercial plantings in Conception Bay, Nfld. (G. C. Morgan).

CAULIFLOWER

YELLOWS (Fusarium oxysporum f. conglutinans). About 10% of the plants were infected in a planting at Middlechurch, Man.; infection occurred in the flats before the transplants were set in the field (J. E. Machacek).

CLUB ROOT (Plasmodiophora brassicae) was general on Ile Jesus, near Montreal, Que. Because cauliflower is more susceptible than other crucifers, losses are most pronounced in that crop (E. Lavallee). Club root caused sev. damage to a planting containing several 100 plants of Snowball in Queens Co., P. E. I. The plants showed sev. symptoms shortly after transplanting and the infection was traced to the compost in which the plants were started (J. E. Campbell).

BLACK ROT (Xanthomonas campestris) affected about 10% of the crop in a 2-acre field at Burlington, Ont.; infection started in leaves injured during tying operations. A sev. general infection was also noted in early September in a planting in Lincoln Co., Ont. The disease appeared following heavy rain and very high winds. Further spread was later checked by drier weather (J. K. Richardson).

CELERY

ROOT ROT (Paratylenchus macrophallus (de Man, 1880,) Goodey, 1934) was general on Epicure and Utah celery in the Thedford marsh, Ont. It is, however, much less severe in newly broken fields, where the populations of the pin nematode have not yet built up to the extent they have in the older fields (N. J. Whitney, W. B. Mountain). The nematode is not a Pratylenchus, as erroneously reported in P. D. S. 34:63 (I. L. C.).

VIOLET ROOT ROT (Rhizoctonia crocorum) was sev. on a few plants in one or two fields of Epicure in the Thedford marsh, Ont. (N. J. Whitney).

LATE BLIGHT (Septoria apii-graveolentis) was very sev. in a 2-acre field of the early spring crop at Leamington, Ont.; the infection originated in the plant beds and lack of thoroughness in applying the sprays permitted a sev. outbreak to develop (C. D. McKeen). On account of the dry weather, late blight was much less sev. than usual in the Montreal district, Que. (E. Lavallee).

YELLOWS (Callistephus virus 1, California strain). A sl. infection was noted at Burlington, Ont., on 20 July (J. K. Richardson). There was some increase of the disease as the season progressed, but on none of the three farms where counts were made was the infection more than 0.5%. This figure was much less than in 1954, when several growers estimated the loss to be 5% of the crop. This reduction in infection appears in no way correlated with leaf hopper populations because one of the vector species was extremely abundant (J. A. George). Only a trace was observed on celery in 1955 in the Ottawa district. In 1953 and 1954 it appeared that the disease would soon become of economic importance. Although leaf hoppers were abundant and yellows was prevalent on wild hosts, the incidence in celery was markedly less than in 1954 (D. S. MacLachlan).

DAMPING-OFF (? Pythium sp.) caused the loss of about 10% of the seedlings in a greenhouse at Oromocto, N. B. (S. R. Colpitts).

CUCUMBER

LEAF SPOT (Alternaria sp.) was observed in two greenhouse crops in the Harrow area, Ont. (C. D. McKeen).

GREY MOLD (Botrytis cinerea) was much less prevalent in greenhouse crops in Essex Co., Ont., than in any year in the last seven. Freedom from disease is attributed to the small amount of cloudy weather in April and May (C.D. McK.).

SCAB (Cladosporium cucumerinum). A sev. outbreak has occurred for 2 successive years in a backyard garden at Ottawa, Ont. (K.M. Graham). The disease was seen in a few fields about St. Martin and Ste. Dorothee, Que.; much less sev. than last year (E. Lavallee). Scab affected about 25% of the fruits at Ste. Anne de la Pocatiere; it was present on most varieties in the Farm plots (L.J. Coulombe). Some infection was present in all plantings examined in N.B. but early plots were less sev. infected than late fields. A 70% infection recorded at Hampstead (S.R. Colpitts). Scab was sev. in several garden patches at Kentville, N.S.; fields planted with the resistant varieties of pickling cucumbers were free of disease (K.A. Harrison). In a market garden in Queens Co., P.E.I., on 22 Aug. an early planting of Straight Eight was sev. infected whereas a later planting of the resistant variety Highmoor was clean (J.E. Campbell).

ANTHRACNOSE (Colletotrichum lagenarium) sev. affected a small field planting at Leamington, Ont.; a light infection was also noted in 3 greenhouse crops in the area (C.D. McKeen).

BACTERIAL WILT (Erwinia tracheiphila) was observed in a garden in Edmonton, Alta. (L.E. Tyner). A sl. infection was noted on 2 varieties in the plots, Ste. Anne de la Pocatiere and a trace at L'Islet, Que. (L.J. Coulombe). A few infected plants were seen at Kentville, N.S. (K.A. Harrison).

POWDERY MILDEW (Erysiphe cichoracearum) was prevalent in most greenhouse crops in Essex Co., Ont., sometime during the cropping season. It was effectively controlled with Karathane in spray, dust and smoke form. Greenhouse studies revealed that the older the mildew mycelium, the more resistant it is to the eradicant action of Karathane smoke (C.D. McKeen). Powdery mildew mod. infected Straight Eight at Ste. Foy, Que. on 13 Sept. (D. Leblond).

WILT (Fusarium sp.) wiped out nearly all plants in a garden at Lethbridge, Alta., and killed a few plants in a commercial planting at Cassils (F.R. Harper). Affected plants were sent in from Esterhazy, Sask.; it was reported to have also been prevalent in 1954 (T.C. Vanterpool).

STEM CANKER (Phomopsis sp. and Mycosphaerella melonis (Pass.) Chiu & Walker). Both organisms have been isolated from plants showing stem canker, but the two fungi have never been detected in the same greenhouse. Although they both cause a destructive stem canker, the fungi are morphologically quite distinct (C.D. McKeen).

ANGULAR LEAF SPOT (Pseudomonas lachrymans) caused mod. damage in the Westbank and Osoyoos districts, B. C. (W.R.F.) A mod. infection was noted in a commercial planting at Medicine Hat, Alta., in late July, but no further spread was found when the field was re-examined a month later. Tr. leaf infections were observed in 2 other fields in s. Alta.; no fruit rotting was found (F.R. Harper). The disease affected a few plants in one greenhouse at Leamington, Ont. (C.D. McKeen).

DOWNY MILDEW (Pseudoperonospora cubensis). A light infection was observed in a greenhouse in s.w. Ont. early in November. Application of zineb as a spray checked the disease and no loss occurred (C.D. McKeen).

FOLIAGE ROT (Trichothecium roseum) caused light injury in a few greenhouses at Leamington, Ont. (C.D. McK.).

MOSAIC (virus) was reported by the district horticulturalist to have affected a large proportion of the plants growing about Westbank, B.C.; the disease was diagnosed from specimens received with the report (G.E. Woolliams). A sev. leaf infection was observed at Normandin, Que., on 16 Aug. (D. Leblond). Varieties in an extensive test at the Farm, Kentville, N.S., were sev. affected and in many of the plots every plant showed mosaic before the end of the season. Mosaic was also seen in 2 garden plots. The disease is rarely present in N.S. (K.A. Harrison).

RING SPOT (virus, unidentified strain). As in the last 3 years, the virus affected a few plants in several greenhouse crops in s.w. Ont. Additional evidence that the virus is seed-borne was obtained this year (C.D. McKeen).

COOL WEATHER INJURY. Affected fruits, shaped like an hour-glass, were reported from Milner, B.C., in late September; the affected fruit were unmarketable (H.N. Toms).

COLD POX. The disorder reported last year in Ont. as Cracking and Gummosis (P.D.S. 34:65) appears to be identical with Cold Pox as described and illustrated by R.S. Cox (Plant Dis. Reptr. 39:478-479. 1955). In Florida there was apparently more chlorotic blotching of the fruit than in Ont., but otherwise his description of the symptoms fit well the disorder observed by me (C.D. McKeen).

EGGPLANT

EARLY BLIGHT (Alternaria solani) caused sev. defoliation of eggplant in 3 fields at Harrow, Ont.; sev. outbreaks have not been observed previously on this crop (C.D. McKeen).

WILT (Verticillium albo-atrum) affected most plants being grown for home use on a vegetable farm at Kelowna, B.C., in 1954 (G.E. Woolliams).

HOP

BLACK ROT (?Phytophthora cactorum var. applanata) affected 35% of the plants in a 40-acre area in 108-acre field at Lillooet, B.C. The rot was first noticed in April as the plants were starting to renew growth. Most of the plants seemed to recover during the growing season and produce a crop, but in late fall the symptoms began to develop again and some plants were killed. The pathogen, which was isolated has not previously been observed affecting hops in the B.C. Interior (G.E. Woolliams).

WILT (Verticillium dahliae). Typical symptoms were observed on the occasional plant in the field noticed above at Lillooet (G.E.W.)

LETTUCE

GREY MOLD (Botrytis cinerea) developed in a greenhouse on seedlings to be used for early setting at Harrow, Ont.; as a result 80% of the affected plants failed to develop further in the field (C.D. McKeen). Grey mold was general in the lettuce crop in the Annapolis Valley, N.S., and caused a loss of 3-20% of the crop in individual plantings (K.A. Harrison). A few heads were sev. rotted in 2 gardens in St. John's, Nfld. (G.C. Morgan).

DOWNY MILDEW (Bremia lactucae) mod. affected the lower leaves of seed plants of New York N-12 at the Farm, Agassiz, B.C., in August. A sl. infection was also noted in the Univ. plots, Vancouver (H.N.W. Toms).

SOFT ROT (Erwinia carotovora). A tr. was found in 2 out of 4 crops being grown for seed inspected at Grand Forks, B.C. (G.E. Woolliams).

BACTERIAL ROT (Pseudomonas viridilivida (N. A. Brown) Holland) affected about 10% of the plants in a commercial planting of head lettuce at Oliver, B.C. The rot showed up as the plants started to head (G.E.W.). This pathogen appears not to have been previously reported to the Survey.

DROP (Sclerotinia sclerotorium) affected a tr. to 1% of the plants in 4 seed-crop fields inspected at Grand Forks, B.C.; the plants were beginning to bolt (G.E. Woolliams). A few plants were destroyed in the University garden, Winnipeg, Man. (W.E. Sackston). Drop caused about 5% damage to hotbed lettuce at Ste. Dorothee, nr. Montreal, Que. Traces were observed in several small plantings in Annapolis and Kings counties, N.S. (K.A. Harrison).

YELLOWS (Callistephus virus 1). Sev. affected heads were received from Oliver, B. C., on 26 July 1954. The heads were puffy and when taken apart showed a curling of the inner leaves and blisters on the petioles. Interior of the head eventually breaks down. The symptoms corresponded to the description given for aster yellows by M. B. Linn (Cornell Agr. Exp. Sta. Bull. 742. 1940) (K. M. Graham). Yellows caused sev. damage in a commercial field of head lettuce at Maugerville, N. B.; 40% of the plants were unfit for use (D. J. MacLeod). A grower at Grande Pre, N. S., estimated a 40% loss in his fall crop of lettuce; a few affected heads were seen in the spring crops in Kings Co. (K. A. Harrison).

MELON

SCAB (Cladosporium cucumerinum) affected about 5% of the fruit in a local garden at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe).

ANTHRACNOSE (Colletotrichum lagenarium) caused sev. spotting of fruits, stems and leaves in one field at Harrow, Ont. (C. D. McKeen).

POWDERY MILDEW (Erysiphe cichoracearum) was less sev. than usual in the Harrow-Leamington area, Ont. (C. D. McKeen).

MOSAIC (cucumber mosaic virus). Soon after a heavy infestation of the melon aphid, Aphis gossypii, many crops in the Harrow area, Ont., developed mosaic. Zucca melon was also affected. Infection by the virus seriously reduces the crop when infection occurs early in the cropping season (C. D. McK.). Mosaic symptoms were observed on a few plants near sev. infected cucumber plots at Kentville, N. S. (K. A. Harrison).

MUSHROOM

COBWEB (Dactylium ?dendroides Fr.) was observed at Surrey, B. C., in early November. Some patches were present on casing soil and on an occasional mushroom. The grower was careless about sanitation but was able to continue picking from the infested beds (H. N. W. Toms, J. W. Groves). This disease does not appear to have been recorded previously in Canada.

ONION

BLACK MOLD (Aspergillus niger). A high percentage of the crop was affected from one farm in the Erieau marsh, Ont., one month after the onions were placed in storage. The same grower reported a high incidence in a few other crops in the area (C. D. McKeen).

NECK ROT (Botrytis allii). The rot developed on the sides of young developing Sweet Spanish bulbs from plants imported from Walla Walla, Wash., into the Kelowna district, B.C. The rot usually affected only the two outer scales, but the injury was sufficient to cause lopsided bulbs. The disease was more prevalent in some sections of the field than others. The imported plants were from fall-sown seed and were grown by different growers. It appears that the plants produced by some growers were much healthier on arrival than those produced by others (G. E. Woolliams). A more extensive survey of fields at Vernon and Kelowna revealed some damage in most fields and 10% loss of crop would occur in several (M. King). In 1954, out of a total crop of about 7,000 tons produced in the Kelowna, Vernon, Kamloops and Grand Forks areas, about 3,000 tons was lost by the end of December from neck rot, probably the highest loss ever experienced in the B.C. Interior. The loss was undoubtedly due to humid, rainy, cool weather that prevailed during harvest that prevented proper curing of the bulbs. Onions that were kept in cold storage and appeared sound when removed for shipment, developed a high percentage of rot in transit (G. E. Wooliams). Neck rot was present on 5% of the bulbs in a lot of locally grown onions in storage at Kentville, N.S., in March (K. A. Harrison). Neck rot was observed on onions both locally grown and imported from the United States at Charlottetown, P. E. I. (R. R. Hurst, J. E. Campbell).

BULB ROT (Fusarium oxysporum f. cepae) mod. infected a planting at Carberry, Man. (J. E. Machacek). Basal rot was present in Spanish onions at harvest in 2 areas in a 2-acre field in Jeanettes Creek marsh, Ont. (C. D. McKeen).

DOWNY MILDEW (Peronospora destructor) heavily infected White Creole, White Portugal and Australian White in small plots at the Farm, Agassiz, B.C.; foliage was killed and bulbs only fit for home use (H. N. W. Toms). Owing to climatic conditions during the growing season little downy mildew was present in the Okanagan Valley or in the Grand Forks district; only an occasional field showed some damage. In 1954, downy mildew was quite prevalent in some fields of Sweet Spanish onions at Kelowna, but its development came too late to affect yields noticeably. However, in crops of Yellow Globe Danvers, the disease began to develop in late July and caused a 10-25% loss. Onion seed crops both at Kelowna and Grand Forks were reduced 75% by the disease (G. E. Woolliams). The most sev. epidemic of downy mildew in recent years was observed in a 10-acre field of Spanish onions at Leamington, Ont.; the usual sprays containing zineb had been applied (C. D. McKeen). A tr. was observed on Mountain Danvers at St. Clothilde, Que. (R. L. Millar). Downy mildew was epidemic on several varieties on the Farm plots, Kentville, N.S.; the disease has not been reported in this area since its occurrence in 1925 (K. A. Harrison).

PINK ROOT (Pyrenochaeta terrestris, etc.) was much less serious in the onion growing marshes of Essex and Kent counties, Ont. than it was a few years ago. Why there has been this reduction in the disease is unknown, but it

has coincided with changes in cultural practices including heavier applications of commercial fertilizers and more extensive use of fungicide sprays (C. D. McKeen). Pink root (?Fusarium solani) mod. infected fields of Sweet Spanish onions at Kelowna, B. C. (M. King).

ROOT ROT (Pythium irregulare). Some root rot was present in 20% of Spanish onion seedlings in one greenhouse at Leamington, Ont. (C. D. McKeen).

SMUT (Urocystis cepulae) has so far been found in the Okanagan Valley, B. C. in only one isolated area on two farms located on opposite sides of the road. The disease was first observed in 1947 (P. D. S. 47:52-53). In one field the disease has been gradually increasing each year since then until in 1955 it affected about 50% of the plants in the seedling stage. Smut could also be found occasionally on mother bulbs late in the season. Treatment of the seed with Arasan was recommended, but because of improper application, practically no control was obtained. This field has been planted to onions almost continuously for over 40 years. (G. E. Woolliams).

YELLOW DWARF (virus) was quite prevalent in onion seed crops of Ebenezer at Grand Forks, B. C., in 1955; 10-20% of the plants were infected. In 1954, up to 90% of the plants were affected in some fields of this variety being grown for seed, whereas yellow dwarf was almost entirely absent in seed crop fields of other varieties of onions (G. E. Woolliams).

GAS INJURY. Gas completely wiped out a commercial planting of onion sets at Medicine Hat, Alta. An underground leak from a natural gas well a few hundred feet from the plot allows gas to seep to the surface. Growth of the roots was inhibited followed by collapse of the top growth. Peppers growing close by were also affected (R. R. Harper).

PARSNIP

SCURFY CROWN (?non-parasitic) resulted in the rejection of 2-5% of crop from East Delta, B. C., at the local marketing board. The roots show a scurfy condition of the shoulders of the roots (H. N. W. Toms).

YELLOWS (Callistephus virus 1) sev. affected 1% of the plants in a garden at Fredericton, N. B. (D. J. MacLeod).

PARSLEY

YELLOWS (Callistephus virus 1). A mod. infection was noted on parsley throughout the summer in the University garden, Winnipeg, Man. (W. E. Sackston).

PEA

Dr. V.R. Wallen has prepared a special report entitled, "Pea Disease Survey, 1955".

During last summer a number of pea fields in Ont.; Que., N.B. and N.S. were surveyed for disease.

At Ottawa, Ont., traces of Leaf and Pod Spot (Ascochyta pisi), Rust (Uromyces fabae) and Mosaic (virus) were present in 2 fields of Chancellor and one of Arthur field peas. A few plants of Laxton's Progress were infected by Root Rot (Fusarium sp.) and a trace of rust was noted in a field of Alton; no diseases were observed in the other 3 fields of garden peas examined.

At Smithfield, in a field of Director peas, Enation Pea Mosaic (virus) was found in trace amounts, as well as a few plants infected with Common Mosaic and Pea Streak (virus).

In the Peterborough area 13 fields of canning peas, comprising the varieties Alton, Wisconsin Early Sweet, Wyola, Canner King and Perfection, were examined. For the first time in several years this area was free of Leaf and Pod Spot infection. A tr. of Powdery Mildew (Erysiphe polygoni) was found in a field of Wisconsin Early Sweet.

In the Georgian Bay area, 17 fields of canning peas were examined; 6 (of Perfection or Alton) showed tr.-mod. infection of Leaf and Pod Spot. The original seed used for planting these 6 fields was found in every case to be infected with Ascochyta pisi. Records of the health condition of the seed sown in the other 11 fields showed that in every instance the seed had been free of Ascochyta. No other diseases appeared to be prevalent in the area.

In Que., the experimental plots at Ste. Anne de la Pocatiere were examined; only a trace of mosaic was observed.

In the Annapolis Valley, N.S., Ascochyta Blight (Mycosphaerella pinodes) was found in tr. amounts in 8/35 fields examined. Leaf and Pod Spot was found in one field at Berwick and few plants were infected by Pea Streak in another.

In the Northumberland Strait area the pea crop had been sown late and at the end of July no diseases had yet developed.

Near Tidnish, N.B., in 2 fields of field peas examined, no disease was observed.

Other Observations

LEAF AND POD SPOT (Ascochyta pisi) occurred in all but one field being grown for seed inspected on the Creston Flats, B.C.; infection varied from a tr. to 90% of the plants, mostly 10-25%. The disease was mostly on the lower leaves and sometimes on the basal part of the stem. In 1954, a small amount of leaf infection only was found in a couple of seed crop fields (G.E. Woolliams). Sev. damage was reported in garden peas by a grower at Liberty, Sask. (R.J. Ledingham). A mod. infection on leaves and pods was present on plants from a field at Ste. Anne de la Pocatiere, Que. (L.J. Coulombe). A tr. was observed in one field at Nictaux, Annapolis Co., N.S.;

the disease appeared to be scarce this year (K.A. Harrison). Infection was heavy in a 15-acre block of canning peas at Bedeque, P.E.I. (J.E. Campbell); it was also heavy on peas in a garden at Charlottetown (R.R. Hurst).

POWDERY MILDEW (Erysiphe polygoni). Infection was mod. in several gardens in s. Alta. (M.W. Cormack); tr. in a garden at Kentville, N.S. (K.A. Harrison).

FUSARIUM WILT (?F. orthoceras var. pisi) was so sev. at Ladner, B.C., in a 4-acre field of canning peas that the crop was abandoned. The condition was similar to that in another field in the area observed in 1950. From the latter field a Fusarium sp. was isolated. Aphanomyces has not yet been recorded on peas in coastal B.C. (N.S. Wright, H.N.W. Toms). A foot rot and wilt (Fusarium sp.) was mod. on peas at the Farm, Normandin, Que. (D. Leblond). Root rot and wilt affected about 10% of plants in several fields in Kings Co., N.S., the disease was less sev. than usual, probably because the spring was dry (K.A. Harrison).

DOWNY MILDEW (Peronospora pisi) occurred in all fields examined in the Creston Flats, B.C., but the infection was not severe. The disease appeared to be somewhat heavier in 1954, but it did not cause much damage (G.E. Woolliams).

BACTERIAL BLIGHT (Pseudomonas pisi). A mod. pod infection was seen in 1 field of canning peas in s. Alta. (F.R. Harper).

DAMPING-OFF (Pythium spp.) caused sev. damage in several fields at Taber, Alta., during a long period of cold wet weather in the spring (M.W. Cormack).

ROOT ROT (Rhizoctonia solani) killed or caused sev. stunting and unthriftiness of pea plants in 1 field at Creston, B.C. In the affected patches, about 10% of the area, all the plants were diseased (G.E. Woolliams).

LEAF BLOTCH (Septoria pisi) caused sev. infection of the lower leaves of several varieties in the plots at Lethbridge, Alta. (M.W. Cormack) and in a planting at Altona, Man. (J.E. Machacek). It was heavy on the leaves in a field of Perfection at Nictaux, N.S. (K.A. Harrison).

RUST (Uromyces fabae). A trace was seen in a garden patch of Fenland Wonder at Kentville, N.S., after most of the crop had been harvested (K.A.H.). Rust was heavy on a planting of Laxton's Progress in Queens Co., P.E.I. The crop had been planted early and was nearly through bearing; no rust had yet developed on later plantings (J.E. Campbell).

MOSAIC (virus). Common pea mosaic affected about 25% of the plants in a home garden at Richmond, B.C. The virus was transmitted by rubbing from pea to pea and pean to bean (N.S. Wright). A trace of mosaic was found

in one seed crop field examined on the Creston Flats, B.C. in 1954 (G.E. Woolliams). Traces of mosaic was seen in several fields in the Annapolis Valley, N.S., after heavy aphid infestation (K.A. Harrison).

ROOT ROT (cause undetermined) was found in peas growing on the Creston Flats, B.C., in 1954. The fields are on dyked reclaimed land, where the water table was high. The diseased plants were growing in quite damp soil. In most fields only an occasional plant was affected but in one 230-acre block of Perfection, 70-90% of the plants were diseased in several sections which totaled about 50 acres (G.E. Woolliams).

APICAL TUFT (cold wet weather) affected peas on the Farm, Agassiz, B.C. Leaves and flower buds at the top of the terminal shoot had only partially unfolded giving a definite tufted appearance to the shoot. After a time the plants recovered and then grew normally (H.N.W. Toms).

PEPPER

DAMPING-OFF (?Pythium spp.) was sev. in 4 transplanting beds at Ste. Dorothee, Que. (E. Lavallee).

WILT (Verticillium albo-atrum) infected 50% of the plants in a planting at Lillooet, B.C. (G.E. Woolliams).

BACTERIAL SPOT (Xanthomonas vesicatoria). The organism was isolated from diseased fruit sent in from Cawston, B.C., by the District Horticulturist (G.E.W.). The disease affected fruits and leaves in one 3-acre field at Harrow, Ont.; damage was mod. (C.D. McKeen).

MOSAIC (virus). Pepper crops in Essex Co., Ont., suffered more heavily from virus infection this year than in any season since the 1949-50 epidemic. The green peach aphid, Myzus persicae, invaded the crops in late June and introduced the virus or viruses; some crops were a total loss (C.D. McKeen).

BLOSSOM-END ROT (non-parasitic) caused about 10% damage in 1 field at Ste. Dorothee, Que. (E. Lavallee).

POTATO

The data in Tables 4-7 on Seed Potato Certification were supplied by the Plant Protection Division, Science Service.

Both the acreage entered for certification and the acreage that passed inspection declined slightly from the 1954 figures. Bacterial ring rot was an important cause of rejection in N.B. and Que. and for the first time it was recorded during field inspection in P.E.I., although the disease has been

reported in that province as a result of special surveys. Sebago, mostly grown in P.E.I., is the leading variety being certified, while Netted Gem has moved into fourth position ahead of Green Mountain.

Table 4. Seed Potato Certification: Fields and Acres Inspected and Passed, 1955

Province	Number of Fields Inspected	Number of Fields Passed	Fields Passed %	Number of Acres Inspected	Number of Acres Passed	Acres Passed %
P.E.I.	6,249	5,428	86.9	26,749	23,453	87.7
N.S.	271	244	90.0	522	439	84.1
N.B.	2,635	2,188	83.0	15,052	10,512	69.8
Que.	1,102	781	70.9	3,514	2,499	71.1
Ont.	677	634	93.6	1,928	1,716	89.0
Man.	125	121	96.8	538	533	99.1
Sask.	48	43	89.6	114	96	84.2
Alta.	228	214	93.9	1,004	965	96.1
B.C.	668	586	87.7	2,206	1,960	88.8
Total	12,003	10,239	85.3	51,627	42,173	81.7
			Previous Yearly Totals			
1954	13,783	11,959	86.8	59,360	50,686	85.4
1953	14,411	11,875	82.4	60,173	47,706	79.3
1952	12,169	10,985	90.3	45,988	41,315	89.8
1951	12,093	10,580	87.5	46,176	40,402	87.5

Acres Entered		Acres Passed	
1955	51,627	1955	42,173
1954	59,360	1954	50,686
Decrease of 7,733 or 13.0%		Decrease of 8,513 or 16.8%	

EARLY BLIGHT (Alternaria solani). Infection was 197-sl. 28-mod. 5-sev./668 fields inspected in B.C.; in most fields in s.e. B.C. and the Okanagan, where its presence seems to hasten the maturity of early varieties; sev. in the Cariboo in one field which had been planted to potatoes for several successive years (N. Mayers). Found in 14 (16%) of the fields inspected in s. Alta., all in the Calgary and Brooks areas (R.P. Stogryn). Recorded in 32 (23%) of the fields inspected in central and n. Alta.; most prevalent in the early varieties (J.W. Marritt). Some fields of early varieties affected in Sask., but less prevalent than usual (A. Charlebois). Occurred in negligible amounts in Man. and n.w. Ont. (D.J. Petty). Sl. infection in fields of Irish Cobbler and Sebago about Scotland and Waterford in s.w. Ont. (F.J. Hudson). Some damage reported in fields of Canso table stock in district 2 (W.L.S. Kemp).

Table 5. Seed Potato Certification: Acreage Passed by Varieties, 1955

Variety	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.-Alta.	B.C.	Total
Sebago	16,792	30	455	34	153		3	17,467
Katahdin	1,346	53	6,235	272	765	6	22	8,699
Irish Cobbler	3,074	73	421	143	141	60	5	3,917
Netted Gem	55	42	559		1	913	1,507	3,077
Green Mountain	1,011	29	234	1,557	64	10	47	2,952
Kennebec	398	64	1,026	351	4	46	26	1,915
Pontiac	88	2	489			55	30	664
Keswick	184	22	111	67	149	6	1	540
Canso	305	12	92	41	65	1		516
Russet Rural	31		373	1	26			431
Warba	104	27	3	9	17	112	101	373
Bliss Triumph	8	46	274			21	1	350
Red Pontiac			205			76		281
Chippewa	13	8	17		207			245
White Rose							129	129
Ontario	3		12		111			126
Columbia Russet					2	114	4	120
Cherokee	15	19	5		4			43
Others (20)	26	12	1	24	7	174	84	328
Total	23,453	439	10,512	2,499	1,716	1,594	1,960	42,173

Despite hot dry weather in district 3, little early blight developed; most prevalent on Keswick and Irish Cobbler, particularly in the Cochrane and Temiskaming areas (H.W. Whiteside). Infection 18-sl. 2-mod./41 fields inspected in e. Ont.; one field of Irish Cobbler on gravelly soil yielded a poor crop on account of drought and early blight (E.H. Peters). Infection 292-sl. 84-mod. 7-sev./1102 fields inspected in Que.; most prevalent in n.e. Que. and sev. infections noted on Kennebec and on Teton, the latter in two fields on light soil (B. Baribeau). Commoner than usual in unsprayed fields about Quebec City (D. Leblond). Sl. infection reported in only a few fields in N.B.; less prevalent than last year (C.H. Godwin). Despite a hot dry season, only sl.-mod. infections occurred in a few scattered fields in N.S. As most growers are now spraying with nabam and maneb it is possible the use of these fungicides has reduced the prevalence of early blight (R.C. Layton). Only sl. infections noted in P.E.I. (H.L. McLaren). Tr. of Alternaria tuber rot seen on Irish Cobbler in a bin examined 8 April in Queens Co. (R.R. Hurst). Early blight found in many fields in e. Nfld., but it caused little damage (G.C. Morgan).

GREY MOLD (Botrytis cinerea) lightly affected about 20% of the plants in a plot of blight resistant seedlings at the Farm, Agassiz, B.C.; at first glance the symptoms resembled a light infection of late blight (H.N.W. Toms). A sl. infection was seen on very rank tender growth in a field of Keswick at

Table 6. Seed Potato Certification: Fields Rejected on Field Inspection, 1955

Province	Leaf Roll	Mosaic	Ring Rot in field	Ring Rot on farm	Black Leg	Wilts	Adjacent Diseased Fields	Foreign Var.	Misc.	Total
P.E.I.	19	117	13	14	119	28	36	308	167	821
N.S.	-	5	1	-	4	2	6	9	-	27
N.B.	5	13	192	97	9	-	10	105	16	447
Que.	18	7	156	20	21	-	34	56	9	321
Ont.	3	-	6	12	6	9	1	3	3	43
Man.	1	-	-	-	1	-	-	-	2	4
Sask.	-	-	1	-	4	-	-	-	-	5
Alta.	-	-	1	4	9	-	-	-	-	14
B.C.	16	8	-	-	10	-	12	2	34	82
Total	62	150	370	147	183	39	99	483	231	1,764
Rejection as a percentage of fields:										
Inspected	0.5	1.3	3.1	1.2	1.5	0.3	0.8	4.1	1.9	14.7
Rejected	3.5	8.5	21.0	8.3	10.4	2.2	5.6	27.4	13.1	100%

Table 7. Seed Potato Certification: Average Percentage of Disease found in Fields, 1955

Average Percentage disease found in	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
Fields entered (first inspection)									
Black Leg	.25	.05	.08	.10	.05	.08	.56	.23	.07
Leaf Roll	.06	.04	.02	.05	.02	.01	.08	.12	.08
Mosaic	.12	.13	.05	.03	-	-	.04	.01	.05
Fields passed (final inspection)									
Black Leg	.15	.02	.07	.08	.01	-	.08	.12	.04
Leaf Roll	.02	.04	.01	.02	.02	.01	.03	.01	.04
Mosaic	.03	.08	.03	.02	-	-	.01	.01	.02

Mavillette, N.S. (K.A. Harrison). A sl. infection was reported in a field of Sebago from Summerside from which specimens were received (J.E. Campbell). A tr. of grey mold was present on greenhouse plants at Charlottetown in February (R.R. Hurst).

BLACK DOT (Colletotrichum atramentarium) In many fields about Ste. Anne de la Pocatiere, Que., the plants died down prematurely apparently on account of the drought, but the bases of the stem frequently showed symptoms of black dot. The disease also mod. affected McIntyre Blue in a local garden; the organism was isolated from the tubers as well as the base of the stems. (H. Genereux). A heavy infection was noted late in the season in a field of

Irish Cobbler in Queens Co., P.E.I.; damage nil (R.R. Hurst).

BACTERIAL RING ROT (Corynebacterium sepedonicum) was reported in one lot of Warba at Grand Forks in the spring of 1955. Measures were taken to prevent the planting of the seed and to disinfect the premises. The disease was not seen again in field or on bin inspection in the area (N. Mayers). Ring rot was detected in sl. amounts in 12 crops, four grown in 1954 and eight in 1955 (W.R. Foster).

Ring rot was found in s. Alta. in a seed grower's plot on a farm where the disease was found in 1953; fresh seed was planted in 1954, but the disease was not detected in the crop during field or bin inspection. A 10% infection was found in a planting of Early Gem, U.S. Certified Seed from Minnesota; it is highly probable that this seed was infected when imported (R.P. Stogryn). Ring rot was found in table stock fields only, in central and n. Alta. (J.W. Marritt). The annual provincial survey for ring rot was carried out in Alta. under excellent conditions. The survey revealed that the percentage of farms on which ring rot was found was about the same as in 1952 and 1953, but the acreage affected was less. The figures for 1955 were slightly higher than 1954, but the 1954 crop was very late and in some fields the disease probably escaped detection. It is anticipated that the thorough inspection which the fields received this year will result in a reduction of ring rot in 1956. Probably most significant is the fact that in over 95% of the fields inspected only one or two diseased plants were found in each. Undoubtedly the annual survey has resulted in a steady improvement in the health condition of the potato stocks produced (W. Lobay).

Ring rot was found in a field of Pontiac entered for certification near Saskatoon, Sask. (A. Charlebois) and diseased specimens were received from Weyburn (R.J. Ledingham). The disease was not observed during field or bin inspections in Man. or n.w. Ont. (D.J. Petty), in the London district (F.J. Hudson) or in e. Ont. (E.H. Peters). In district 2, ring rot was detected in the crop from 5 fields, in one crop at digging and in crops of two other growers on bin inspection. The disease apparently was introduced into these seed crops by growers loaning their machinery to neighbors, who had the disease in fields of table stock and then using this machinery again without properly disinfecting it (W.L.S. Kemp). In district 3, ring rot was detected in 6 fields. It may be noted that in one instance potatoes known to have been infected in 1954, were planted in 1955 and over 50% of the resulting plants were infected. The loss at digging time was surprisingly small, being about one barrel per 100 barrels graded. However, about 6 weeks later some of these potatoes were put under detention by Fruit and Vegetable Inspectors because about 15% of the tubers were showing rot (H.W. Whiteside). As a result of the 13th annual provincial survey for ring rot in Ont., 219 cases of ring rot were reported in table stock fields in Ont. This figure represents a decrease from the 1954 figure of 232 and from the 12-year average of 323 cases. In most fields, infection was only a trace (D.S. MacLachlan).

Ring rot caused the rejection of 156 (14.1%) of the fields inspected in Que., an appreciable increase over last year. The disease was particularly prevalent in the St. John district. The late blight epidemic last year caused the premature destruction of the foliage and made the detection of ring rot virtually

impossible. Undoubtedly the disease escaped detection in some crops. This year growing conditions were ideal for symptom expression. Volunteer plants were also responsible for the rejection of a few fields (B. Baribeau). A 10% infection was recorded in a field of Green Mountain at Charny (L. J. Coulombe).

Bacterial ring rot caused the rejection of 192 fields upon inspection in N. B. and of an additional 97 fields because the disease was present in table stock fields on the same farm. As pointed out last year severe late blight infection made detection of ring rot almost impossible especially in Victoria Co., where symptoms may not be visible until late August or early September. Also last year unusually high table stock prices in April tempted some growers into disposing of seed stock at prevailing prices and planting potatoes of inferior quality. As a result ring rot was more prevalent than usual in the seed crop in N. B. (C. H. Godwin). Ring rot caused the rejection of one field entered for certification in N. S.; the seed had been imported from P. E. I. A survey by the provincial department uncovered 5 cases of ring rot, scattered in Colchester, Pictou and Hants counties; no cases were found in Cumberland or Halifax counties. The source of infection could not be determined but none had been planted with seed certified in N. S. in 1954 (R. C. Layton). Bacterial ring rot caused the rejection of a few fields on second inspection in P. E. I. and of several crops at harvest (see table 6) (H. L. McLaren). By 30 Nov., 56 cases of ring rot had been found in the 1955 crop, compared to 30 cases in 1954. This increase is probably of no significance except that this past season appeared to favor symptom expression and it was easier to detect the disease (J. E. Campbell). Two 3-acre fields of Arran Victory at Torbay, Nfld., were found sl. infected. In the West Coast survey; of 20 suspected cases, 17 proved to be positive on examination at Ottawa (G. C. Morgan). These fields were located at Jeffreys, the same district where ring rot was found in 1953 (D. S. MacLachlan).

BLACK LEG (Erwinia atroseptica) was found in 108 (16.1%) of the fields inspected in B. C. and caused the rejection of 10; it was slightly more prevalent in the Cariboo and Kootenays probably because of weather conditions favorable for the disease (N. Mayers). In s. Alta. black leg was found in 46 (53%) of the fields inspected and one of Irish Cobbler was rejected. The marked decrease in its prevalence in this irrigated area is attributed to the use of captan and to a lesser extent to that of whole seed (R. P. Stogryn). In central and n. Alta., black leg was present in 72 (51%) of the fields inspected and 8 were rejected. Use of whole seed appeared to be the best precautionary measure (J. W. Marritt). Mod. infection was noted in 2 gardens in Edmonton (W. P. C.). Black leg was recorded in nearly 40% of the fields inspected in Sask. and caused 4 rejections (A. Charlebois). It was quite prevalent in many parts of Sask. in 1955; cool weather and wet soils in the early season favored the disease (R. J. Ledingham). Tubers examined 5 Aug. from Muenster showed sev. injury from black leg infection; weather in the area had been cool and very wet (D. S. MacLachlan). In Man. 10% of the fields inspected showed a trace and one with a 10% infection was rejected (D. J. Petty). Mod. infection was seen in a field at Carmen (J. E. Machacek).

In the Thedford marsh, Ont., traces of black leg were found in many fields and a 1% infection in one of Sebago (N. J. Whitney). Black leg was recorded in fields in several parts of the London district; it appeared to be most prevalent in Sebago fields planted with eastern seed (F. J. Hudson). A few diseased plants were observed in several fields, mostly of Sebago, in district 2; the overall incidence of the disease has declined in seed crops because few fields are now entered from Waterloo Co., where it is a common practice to plant potatoes beside fields of corn (W. L. S. Kemp). Black leg caused the rejection of 6 fields in district 3; Sebago and Russet Rural appeared most susceptible (H.W. Whiteside). The disease was recorded in 10/41 fields in e. Ont. (E.H. Peters).

Black leg was present in 539 (49%) of the fields examined in Que. and caused the rejection of 21, a much smaller percentage than in recent years (B. Baribeau). The disease was observed in fields of the more susceptible varieties this year in N. B.; but only 9 fields were rejected compared to 40 in 1954 (C.H. Godwin). Black leg was recorded in 41/271 fields inspected in N. S. and caused rejection of 4, one of which showed 5% infection; it was most sev. in Sebago, Irish Cobbler and Cherokee (R. C. Layton). The disease caused the rejection of 119 fields in P. E. I. in 1955 compared to 214 in 1954 (H. L. McLaren). Black leg appears to be increasing in importance in Nfld.; this year sl.-mod. infections were found in 75% of the fields visited (G. C. Morgan).

SOFT ROT (?Erwinia carotovora). Some soft rot was observed in district 3, Ont., in various crops the first week after harvest; it was invariably associated with damaged tubers (H. W. Whiteside). The disease was sev. in a lot of Sebago brought in for examination from Queens Co., P. E. I. (R. R. Hurst).

In 1954, frequent heavy rains during the growing season caused super-saturated conditions in many soils in N. B. In consequence spring planting was considerably delayed, and in many fields the soil remained very wet throughout the summer. As a result the crop developed poorly and in many instances the tubers were characterized by enlarged lenticels, lack of maturity and "off-flavor" quality. In addition, many tubers were enveloped by a mantle of clay when placed in storage. Such tubers kept poorly and usually in time became affected by a bacterial soft rot.

Examination revealed that infection of the tubers was usually through the enlarged lenticels. In some cases development of cork layers about the lenticels effectively walled-off the infection but in many instances the infection broke down the natural barriers. In such cases the tubers tended to rot rapidly when taken out of storage, particularly if they were washed before marketing. The causal pathogen appeared to be principally E. carotovora (J. L. Howatt).

POWDERY MILDEW (?Erysiphe cichoracearum) was troublesome on breeding stock at Fredericton, N. B.; it tends to defoliate the plants (J. E. Howatt).

WILT (Fusarium oxysporum, Verticillium albo-atrum) was recorded in only 2/668 fields inspected in B. C. (N. Mayers). Wilt was present in 25 (29%) of the fields inspected in s. Alta.; up to 30% of plants were infected at first inspection in fields planted with eyes of Pontiac and Warba from Man. (R. P. Stogryn).

Wilt, usually only a tr., was recorded in 6 (5%) of the fields inspected in n. Alta. (J.W. Marritt). Sl. infections were observed in 6% of the fields inspected in Sask. (A. Charlebois) and in a field at Arden, Man. (J.E. Machacek). Tr.-sl. amounts were noted in 11% of the fields inspected in Man. and in 1/7 in n.e. Ont. (D.J. Petty).

Wilt was found to some extent in most fields inspected in the London district, Ont.; it was more prevalent in Canso and Red Pontiac than other varieties (F. J. Hudson). In district 2, one field was rejected for wilt and the disease was present in a few other fields (W.L.S. Kemp). Wilt was recorded in many fields in district 3, particularly in Chippewa and Sebago in the Cochrane area; 3 fields were rejected (H.W. Whiteside). The disease was found in 5/41 fields inspected in e. Ont. (E.H. Peters). Wilt was reported in several fields in N.B. and 2 (in Irish Cobbler and Cherokee) were rejected (C.H. Godwin). Wilt was about as prevalent as usual in P.E.I.; 28 fields were rejected (H.L. McLaren). Fusarium wilt has caused some trouble in the greenhouse in soils containing too much peat moss (J.L. Howatt).

DRY ROT (Fusarium spp.). Several Katahdin tubers showing small dark depressed areas, 1/16-1 1/2 in. in diam., were received from Middlesex Co., Ont. Isolations consistently yielded Fusarium sp. (J.K. Richardson). A Fusarium sp. was isolated from sl. affected Irish Cobbler tubers from Belleville, Ont. Small sunken discolored areas around many of the lenticels were present on Katahdin tubers from Penetang; a Fusarium was isolated (D.S. MacLachlan). From 2 to 4% of the tubers were affected by dry rot in a few 1954 lots of Keswick examined in the spring in Que.; a sl. infection was also noted in some lots of Green Mountain (B. Baribeau). The 1954 crop in N.B. did not store well because of adverse growing and harvesting conditions; Fusarium dry rot was observed along with other types of breakdown in many bins during last winter and spring (C.H. Godwin). Typical dry rot was observed in numerous samples of tubers from N.S. and also of seed potatoes from outside the province; infection was 1-5% (K.A. Harrison). Tuber decay caused by F. sambucinum f. 6 and F. coeruleum was generally sl. in P.E.I. in 1954-55. One lot of Keswick was affected by both species (G.W. Ayers). Losses from dry rot observed in Nfld. were in Sebago; 2 lots (1200 bags) showed 2% infection (G.C. Morgan).

RHIZOCTONIA (Pellicularia filamentosa (R. solani). Infection was 436-sl. 122-mod. 30-sev./668 fields inspected in B.C. In general scurf development was heavier than usual. On Vancouver Island the loss was estimated at 100 tons worth $5,000, less 50 tons of sound culls worth $750, a net loss of $4,250 or 2-3% of the crop (N. Mayers). Sl. infections were recorded in 147/288 fields inspected in Alta. Killing frosts were early. In s. Alta. digging was early and scurf infection was very sl. but elsewhere digging was delayed by wet weather and tuber infection was more than usual (R.P. Stogryn, J.W. Marritt). Despite the dry season the perfect state of the fungus was found in tr. amounts in gardens at Saskatoon and on 3 hills in a field in Asquith, Sask. Little scurf developed on tubers about Saskatoon (T.C. Vanterpool). Sl. infections occurred in most fields in Man. and n.w. Ont. (D.J. Petty), in the London district (F.H. Hudson) and in 16/41 fields in e. Ont. (E.H. Peters). In district 2, most

affected fields were on the light porous soils in York, Ontario and Durham counties; also reported to have been heavy on a crop grown on land which had not been in potatoes for over 25 years (W.L.S. Kemp). Little plant infection occurred in district 3, but tuber infection was more prevalent than usual in several districts, where harvesting was delayed (H.W. Whiteside). Rhizoctonia was noted in 91 (8.2%) of the fields inspected mostly in n.w. Que. Tuber infection was generally sl., but scurf development was sev. in 3 cases (B. Baribeau). Sl. infections were noted in a few fields in N.B. and scurf development was also very sl. (C.H. Godwin). Only sl. infections were noted in fields inspected in N.S. Scurf development was somewhat higher, the infection being high in some lots; in one lot 40% infection occurred (R.C. Layton). Sprouts were sev. attacked and the stand very poor in a field at Canning, N.S., 10 June (K.A. Harrison). Rhizoctonia infection was mod. in P.E.I. (H.L. McLaren). Scurf development was very heavy on one lot of Irish Cobbler tubers brought in from Queens Co. for examination (R.R. Hurst). The disease was widespread in the field and scurf development was sev. on the tubers in e. Nfld.; cool moist weather prevailed during the summer (G.C. Morgan).

PINK ROT (Phytophthora erythroseptica). In a sample of 20 tubers from Woodstock, N.B., 8 showed symptoms of pink rot; the organism was isolated (D.S. MacLachlan).

LATE BLIGHT (Phytophthora infestans) was mostly confined in B.C. to the Lower Fraser Valley and Vancouver Island. In the Lower Fraser Valley it was first observed on 18 July in a field of White Rose. For the first time in many years it caused considerable damage to early potatoes, especially Early Epicure and Warba, and also second earlies, but losses in the main crop were negligible. On Vancouver I., late blight developed early and spread rapidly. Many crops were partially defoliated by early August and mechanical damage by spraying and dusting machinery was considerable. As a result of early defoliation much of the crop consisted of undersize tubers. The estimated loss was $17,500 or 10-15% of the normal crop. The weather was fine later in the season with the result that little tuber rot developed (N. Mayers).

Late blight was recorded in 3 (2%) of the fields inspected in central and n. Alta. On a farm at Spruce Grove a field of Warba was completely defoliated and some tubers were infected. Lesser infections were seen in Netted Gem. Diagnosis was confirmed by microscopic examination. Despite these outbreaks little spread occurred. As it is probable that many infected tubers were used for seed in and about Edmonton, it is remarkable that so few diseased fields were found (J.W. Marritt, A.W. Henry). An infected specimen was received from Galahad on 18 July (W.P. Skoropad).

Late blight was recorded in potatoes at Indian Head, Broadview and Wishart, Sask.; dry weather in July and August evidently kept the disease in check. (R.J. Ledingham). Late blight was rather destructive to a field of Netted Gem, sev. injured by hail in late August at Norquay. Sl. infections were also noted about Kamsack, Calder and Yorkton in late August (A. Charlebois). Late blight was first found on 6 Aug. near Gonor, Man., near Winnipeg and then at Portage la Prairie (J.E. Machacek). By late August, sl.-sev. infections

could be found in most areas of Man. Very little tuber rot occurred chiefly because of excellent weather before and during harvest (D. J. Petty).

Little late blight was observed in district 2, Ont., on account of the hot dry summer. An occasional affected tuber was seen in about 20 lots at bin inspection, but in one lot each of Katahdin and Rural New Yorker 10-15% of the tubers were affected (W. L. S. Kemp). Late blight was not observed in the field in district 3; a few affected tubers were found in a lot of Katahdin in the Sudbury district (H. W. Whiteside). Although a late blight warning service was maintained in Ont. in 1955, late blight was first recorded on potatoes in Dufferin Co. on 10 Sept. in the low parts of a field. A survey on 12 Sept. revealed additional fields infected; it probably caused some tuber rot in fields where little or no fungicide had been used (C. B. Kelly).

Late blight was first reported in Que. in Compton Co. on 27 July in a field of Kennebec. Because of hot dry weather during the summer, the disease spread very slowly. From mid-August onward the disease was observed in a few scattered fields, chiefly of Green Mountain. Conditions in late August and early September were more favorable for its spread but soon cool spells and frosts checked its further dissemination. At harvest, traces of tuber rot were found in about 15% of the bins inspected (B. Baribeau, H. Genereux).

Late blight was first found in N. B. on a cull pile in Victoria Co. on 19 July and in a potato field in York Co. on 2 Aug. The disease developed slowly until late August when it could be found in half the fields in some areas. Infection was generally light and only a few fields which were not properly sprayed were completely killed. Rot in the harvested crop was not serious, although some early shipments of table stock were turned down at destination because of breakdown by blight in transit.

Late blight was first found in N. S. on 28 July in the Scotts Bay area. Scattered outbreaks of late blight began to be observed from 11 Aug. on. It became fairly sev. in Yarmouth and Digby counties on all varieties except Keswick. Dry weather held blight in check in most parts of the province but by mid-September it was present in most unsprayed fields. It was easily controlled by spraying and there was little loss from tuber rot in commercial areas. Late blight resistant varieties have not stood up as well this year as previously, but little tuber rot developed except in Kennebec. The exact cause of this rot is not known, but some pathologists have attributed the rot to bacteria following infection by Verticillium (R. C. Layton, K. A. Harrison).

Late blight was first reported in P. E. I. on 1 Aug., when it was discovered by an inspector in an early unsprayed planting of Irish Cobbler at Argyle Shore, Queens Co. When the area was surveyed on 3 Aug. the crop had been lifted, but some spread had occurred. Traces were found in a field of Sebago, about 200 yards to the n. w. As the lesions were few but evenly spaced, it appeared that the infection was from spores that had drifted there from the Irish Cobbler field. Only one other infection was found - a single lesion in a field of Irish Cobbler 600 yards to the s. of the original field. The appearance of late blight on 1 Aug. was 10 days later than normal, and its delayed appearance was probably due to the comparatively dry weather through July.

Cumulative rainfall, although an admirable index for the forecasting of late blight in certain regions, is not an accurate criterion in P.E.I. The mean rainfall from July-September in P.E.I. is slightly over 10 in., yet in 1954 and 1955 when the rainfall was 8.85 and 8.78 in. respectively, late blight was extremely sev. The cumulative rainfall from 1 July to Aug. 18 was only 2.94 in., or much below normal, yet the disease was developing and spreading rapidly by mid-August. In the next two weeks the cumulative rainfall had risen to 5.30 in. but was still below that for the same period in 1954. At the same time, relative humidities which had previously shown weekly means in the low seventies rose for the weeks ending 18 Aug., 25 Aug. and 1 Sept. to 85.5, 83.5, and 83.6. During these 3 weeks there occurred several long periods when the relative humidity was in the high nineties. Dews were frequent, and because of extremely humid conditions foliage remained wet until noon or later on many days. When these conditions set in, the development and spread of late blight was forecast and growers were advised. Those who maintained their spray programs as suggested were able to protect their crops, fields that were not sprayed died in a few days and fields that were sprayed in a haphazard fashion were sev. defoliated (L.C. Callbeck). Although late blight appeared a month later than in 1954, it caused considerable damage to potato foliage in the eastern half of P.E.I. (H. L. McLaren).

Table 8. Distribution by Provinces of Physiologic Races of Phytophthora infestans in Canada in 1955

Physiologic Race	Provinces							
	P.E.I.	N.B.	N.S.	Que.	Man.	Sask.	B.C.	Total
0			2					2
1	1	1						2
2			2					2
3	19	13	6	4			8	50
4	59	50	12	14	3	1	8	147
1.2		2						2
1.3		7	1	2				10
1.4		21	5	1			1	28
2.4	2	1						3
3.4	13	22	3	3				41
1.3.4			12	5				17
Total	94	117	43	29	3	1	17	304

Late blight did not appear on the foliage in Nfld. until much later than last year. Losses in the early crop were much lighter than last year. In the late crops, infection in the tubers was fairly heavy, about 10% in Green Mountain and Katahdin, but early destruction of the vines by frost prevented heavier losses (G.C. Morgan).

For a second year a survey was carried out at Fredericton, N.B., to determine the races of Phytophthora infestans occurring on potato and tomato crops in Canada. Because of less favorable weather conditions, late blight was

less prevalent than last year. However, 194 collections were secured from potato foliage and tubers and tomato fruits from seven provinces; some 17 varieties of potatoes were sampled in contrast to 31 in 1954.

The races present were determined by inoculating detached leaves of the genotypes. In many instances, difficulty was encountered in determining the specific race present. In these cases, the collection was assigned to what appeared the most likely race. In many cases the reaction of race 0 and other simple races may have been masked by that of the complex races. The results in the survey shown in accompanying table must be considered provisional in the light of these circumstances. Possibly these results might be considerably modified if monosporous isolations had been attempted with this material.

Inspection of Table 8 reveals that race 4 was the most prevalent one found in Canada. It is interesting to note that race (1.3.4) was encountered frequently in Nova Scotia this year and that this, in part, accounts for the susceptibility of the Keswick, Cherokee, and Kennebec varieties in that province.

The prevalence of race 0 has not been enumerated mainly because of the difficulty in determining this race in the presence of other races. There is reason to believe, however, that race 0 is being supplanted by race 4.

A feature of the survey was the prevalence of an apparent race 3. This race was found frequently on tomatoes in the extreme East and West (J.L. Howatt, P.N. Grainger).

LEAK (Pythium ultimum) appeared to be more prevalent than usual in the early crops on Vancouver Island, B.C.; the estimated loss was about 30 tons valued at $1,200. Traces were noticed in several fields of early crops in the Lower Fraser Valley and considerable breakdown occurred in one crop of Warba dug on a hot day and placed in a field root pit. About 1% of the tubers were also affected in early crops in s.e. B.C. (N. Mayers). From 5 to 10% of the tubers were affected in 3 separate plantings at Ste. Anne de la Pocatiere and St. Roch des Aulnaies, Que. (H. Genereux).

VIOLET ROOT ROT (Rhizoctonia crocorum) sev. affected up to 5% of the potatoes in the Thedford marsh, Ont.; the outbreak this year was the worst so far observed (N.J. Whitney).

SILVER SCURF (Spondylocladium atrovirens) was reported to be prevalent in the spring in district 3, Ont., especially on tubers that had been bagged for a long time (H.W. Whiteside). This defect was found in Que. in 6 lots of Green Mountain at bin inspection; infection was usually sl. (B. Baribeau). Only a sl. infection was noted in a few lots in N.S. (R.C. Layton). In the spring a 15-20% infection was noted on Kennebec and other white-skinned varieties in Kings Co.; damage was nil (K.A. Harrison). Sl. amounts were recorded on several varieties in March in P.E.I. (R.R. Hurst).

POWDERY SCAB (Spongospora subterranea). Although rarely recorded on Vancouver Island, B.C., powdery scab was observed in 2 White Rose crops grown on low-lying organic soil (N. Mayers). Sl. infections were recorded in 8 lots at bin inspection in Que. (B. Baribeau). A 1% infection was reported in

one Sebago lot in the Scotts Bay area, N.S.; this area is about the only one where we observed the disease (R.C. Layton). A mod. infection was found in 5 fields in Conception Bay, Nfld. (G.C. Morgan).

Root nodules caused by S. subterranea were observed on a few potted plants of U.S.D.A. seedling 41956 in the laboratory greenhouse, Vancouver, B.C. (N.S. Wright, W. Jones).

COMMON SCAB (Streptomyces scabies) was general in several districts in B.C. on white-skinned varieties, but no sev. affected fields were reported (N. Mayers). Scab was of little importance this year in s. Alta. but one field of Pontiac nr. Calgary was sev. affected (R.P. Stogryn). Elsewhere in Alta. scab was more prevalent than usual and in the Lacombe district, a sl. infection was seen on Netted Gem, which is normally free of scab (J.W. Marritt). Affected tubers were received from a garden at S. Battleford, Sask.; although the garden is located in the Black Soil Zone, the soil had been heavily manured in 1954 (T.C. Vanterpool). Scab was slightly more prevalent than usual in Man. and n.w. Ont., but loss was negligible (D.J. Petty). Scab was rarely observed in the London district, and only a few sev. infected tubers were seen (F.J. Hudson). Because of hot, dry weather, 50-75% of the crop grown in Dufferin and Wellington counties in district 2 were too scabby for seed grade; ordinarily about 25% of the crop has to be called out. On account of scab and off-type tubers, no lots of Irish Cobbler were suitable for seed (W.L.S. Kemp). As a result of the extreme heat and drought scab was more prevalent than usual in district 3; even the resistant varieties Ontario and Cherokee showed some infection. In a field trial where the varieties were read for scab by L.K. Richardson, the scab count on Chippewa and Irish Cobbler was over 20 and on Ontario 1.6 and Cherokee 6.8 (H.W. Whiteside). Scab was also more prevalent in e. Ont. than usual (E.H. Peters). Scab was about twice as prevalent this year as last in Que.; infection was 312-sl. 31-mod. 3-sev. In general the infection was sl. and occurred mostly along the lower St. Lawrence and in n.w. Que. (B. Baribeau). In a scab trial at Peribonka the least affected seedling (F4792) had 70% of the tubers scabby and 7% of the surface scabbed, compared to 100% of tubers and 85% of the surface in Green Mountain (H. Genereux). Scab was somewhat more prevalent than in recent years in N.B., but only one or two crops had to be rejected on account of the disease. Cherokee continues to show high resistance to scab infection (C.H. Godwin). Common scab was sev. in the scab trial plots at the Farm, Fredericton; 884 seedlings were tested this year and a considerable number had a tr. to 10% of the surface area scabbed compared to Green Mountain controls with 40% on the average. Seedling F4775 has proved to be highly resistant to scab in repeated tests (C.H. Lawrence). Scab was somewhat more prevalent than usual in N.S. (R.C. Layton). Many reports were received during the winter 1955 from Kings Co. of scab on potatoes grown on land formerly in orchard (K.A. Harrison). Scab infection was sl. in P.E.I. this year (H.L. McLaren). However, one sev. infected crop of Irish Cobbler was found in Queens Co. (R.R. Hurst). Scab was very prevalent in Nfld., particularly in the Clarkes Beach area; in many fields over 50% of the tubers were very scabby. It appears that since lime was subsidized, many farmers are applying heavy dressings of lime to the land without, in most cases, first having their soil tested. (G.C. Morgan).

WART (Synchytrium endobioticum). Losses from wart were the heaviest since 1949, particularly in the Conception Bay, Trinity Bay, and Bonavista Bay areas. Arran Victory showed the highest infection, followed by Green Mountain and Arran Comrade. Sebago was highly resistant and is becoming quite popular with growers in the Conception Bay and other areas where wart and late blight are the major cause of losses in the crop. Out of 213 crops of potato examined during a survey of the West Coast, wart was found in 3 fields. It may be noted that reports and diseased specimens were received from all parts of Nfld. except the West Coast. (G.C. Morgan).

WILT (Verticillium albo-atrum) affected 1-10% of the plants in different fields examined at Lillooet, Cache Creek and Ashcroft, B.C., in 1954 (G.E. Woolliams). Wilt was found in 66 (6%) of the fields examined in Que. and caused one to be rejected; it was most prevalent in Kennebec (B. Baribeau). Wilt was observed in 39/271 fields inspected in N.S. and 2 (of Kennebec) were rejected for wilt. Verticillium wilt was reported to have sev. affected some fields of table stock, but in the seed producing areas, where growers carefully treated their seed before planting, the disease was not sev. (R.C. Layton). Sl.-mod. infections were noted in Sebago, Irish Cobbler and Kennebec during a survey in P.E.I. (G.E. Ayers).

LEAF ROLL (virus) was reported in 150 (22.4%) of the fields inspected in B.C. and caused 16 to be rejected. There was a sharp reduction of its prevalence at Grand Forks over 1954; this improvement is attributed to better insect control, more careful roguing and use of recommended disease-free seed. On the other hand, it was more prevalent than usual in the Okanagan (N. Mayers). Leaf roll was found in 42 (18%) of the fields inspected in Alta., but in most instances only traces were present. The disease continues to be most prevalent in garden allotments about Edmonton. Tuber indexing along with careful seed plot selection is helping to eliminate the last traces from some of the best seed stocks of Netted Gem (R.P. Stogryn, J.W. Marritt). Leaf roll was recorded as a tr. to 0.5% in 14% of the fields in Man. and in 1/7 in n.w. Ont. (D.J. Petty). Plants affected by leaf roll were found occasionally in most varieties throughout the London district (F.J. Hudson). Little or no leaf roll was found in district 2 (W.L.S. Kemp). Although leaf roll was slightly less prevalent than in 1954 in district 3, its incidence on Green Mountain and Keswick was higher than usual; 2 fields were rejected (H.W. Whiteside). Only single plants were observed in 2/41 fields inspected in e. Ont. (E.H. Peters). Leaf roll was recorded in 314 (28.5%) of the fields inspected in Que. and caused 18 to be rejected (B. Baribeau). Only 5 fields were rejected on account of leaf roll in N.B. (C.H. Godwin). Leaf roll was reported in 70/271 fields inspected in N.S.; none were rejected (R.C. Layton). Leaf roll was less prevalent in P.E.I. than last year; 19 fields were rejected (H.L. McLaren). In table stock fields of Irish Cobbler and Green Mountain examined, leaf roll infection was usually only a trace (R.R. Hurst). From the severity of the reaction on Physalis floridana, a good indicator plant for leaf roll, two distinct strains of the virus were recognized; 92 collections of leaf roll were used from 19 different potato seedlings and 9 named varieties obtained from various parts of the Maritime Provinces (J.P. MacKinnon).

MOSAIC (virus) was recorded in 50 (7.4%) of the fields inspected in B.C. and caused 8 to be rejected. One field of White Rose in the Cariboo showed 12% infection (N. Mayers). Traces were recorded in 4/228 fields inspected in Alta. (R.P. Stogryn, J.W. Marritt). Small amounts of mosaic were recorded in 2% of the fields in Man. and in 3/7 in n.w. Ont. (D.J.Petty). A few plants in a field of Irish Cobbler at Clinton, Ont., were affected (F.J. Hudson). Only an odd plant was seen affected in district 2 (W.L.S.Kemp). Very little mosaic was observed in district 3, but it was probably masked by hot weather (H.W. Whiteside). Mild mosaic was recorded in only 2 fields in e. Ont. and traces of rugose mosaic was seen in 2 (E.H. Peters). Long periods of hot dry weather in e. Ont. and w. Que. caused a masking of symptoms of virus X infections (D.S. MacLachlan). Mosaic was recorded in 248 (22.5%) of the fields inspected in Que.; 7 were rejected compared to 65 in 1954 (B. Baribeau). Mosaic caused the rejection of 13 fields in N.B.; the disease continues to be prevalent in Green Mountain fields in Madawaska Co. (C.H. Godwin).

An examination of some 60 fields in non-seedgrowing areas in York and Charlotte counties has revealed that strains of potato virus X are still commonly causing severe mosaic in Green Mountain. The cause of the disease is usually attributed to potato virus Y, because it has been assumed that intensive roguing of seed stocks of the variety over the past 30 years would have eliminated the severe strains of virus X from the province (J. Munro).

Four plants in a commercial field in York Co. showed a mild form of mosaic caused by a strain of potato virus Y; potato virus X was not found in these plants. Also 15% of the plants in a commercial field of Keswick showed a severe form of mosaic; it proved also to be caused by virus Y (D.J. MacLeod).

Mosaic was reported in 109/271 fields in N.S. and caused 5 to be rejected. Symptoms of mild mosaic seemed to be on the increase (R.C.Layton). Mosaic was slightly less prevalent in P.E.I. than in 1954; 117 fields were rejected (H.L. McLaren). Mosaic and leaf roll are widely distributed in Nfld. and causing concern particularly among growers of Arran Victory. Mosaic infection in this variety was 25-75% compared to 10% in Green Mountain and Sebago (G.C. Morgan).

PURPLE or BUNCH TOP (virus). A tr. to 1% infection was noted in several fields of Katahdin and Netted Gem in 1954 at Salmon Arm, Kamloops, Oliver and Osoyoos, B.C. (G.E. Woolliams). Purple top occurred in tr. amounts in 9 (10%) of the fields inspected in s. Alta.; all varieties were affected (R.P. Stogryn). Infections up to 1% were observed in 31 (22%) of the fields in n. Alta., particularly in Netted Gem (J.W. Marritt). Infection in the gardens about Saskatoon, Sask., was sl. compared to 1954 (T.C. Vanterpool). Most fields in Man. and n.w. Ont. contained tr.-1% infection (D.J. Petty). Mere traces were noted in n. part of district 3, Ont. (H.W. Whiteside). Sl. amounts of purple top were reported in Que. in most varieties, especially in Keswick, Katahdin and Irish Cobbler (B. Baribeau). Small percentages of the disease were observed in a few fields in N.B. but the infection was not so widespread as in previous years (C.H. Godwin).

Bunch or purple top was found in fields in York Co. as follows: Kennebec, Bliss Triumph and Chippewa tr.; Irish Cobbler and Katahdin 1/2%; Green Mountain 1%; Sebago 1 1/2%; 2 seedlings 2 and 3%; also seedling 927-3, which is resistant to leaf roll, tr. Also late leaf roll was found in York and Sunbury counties in commercial fields as follows: Sebago 65%, Epicure 60%, Pontiac 50%, Bliss Triumph 47%, Ontario 27%, Irish Cobbler 24%, Warba 21%, Kennebec 8%, Sequoia 1 1/2%; it was also found in U.S.D.A. Seedling 41956 (12%) in a test plot. When scions from infected plants were grafted to tomato and Katahdin potato symptoms resembling those of bunch top (purple top) were produced (D.J. MacLeod).

Rarely more than a tr. of purple top was observed in fields in N.S. this year (R.C. Layton). A tr. to 15% infection was found in several table stock fields in P.E.I. (R.R. Hurst). The disease was of no importance in the seed crop (H.L. McLaren). Spongy, flabby tubers were found associated with purple top in Sebago at Upton (J.E. Campbell).

HAYWIRE (virus) was present in traces in 5 fields inspected in s. Alta. (R.P. Stogryn). Also tr. occurred in 10 (7%) of the fields, mostly of Netted Gem, in n. Alta. (J.W. Marritt).

SPINDLE TUBER (virus). One or two plants were seen in 3 different fields inspected in Man. (D.J. Petty). Spindle tuber was found in small amounts in Sebago, Canso and Katahdin in the London district, Ont. (F.J. Hudson). Examination of tubers at harvest indicated that some spindle tuber was present in district 3, but it was difficult to detect its presence because misshapen tubers were common this year on account of the dry season (H.W. Whiteside). A 2% infection was seen in Kennebec near Tweed; tubers from infected hills were small and spindle-shaped (D.S. MacLachlan). Spindle tuber was observed in Que. in a few fields of Kennebec during field inspection; it was also noted in 27/533 bins inspected in Green Mountain (1/2-1%) and Kennebec (1-2%) (B. Baribeau). Small amounts of spindle tuber were recorded in a few fields widely scattered in N.B.; in one field of Katahdin a 3% infection resulted in its rejection (C.H. Godwin). Spindle tuber appeared to have increased in N.S. particularly in Irish Cobbler, Sebago, Kennebec and Katahdin. Usually infection was a tr. but 1% infection was noted in a field of Sebago and 1/2% in one of Irish Cobbler (R.C. Layton). Spindle tuber continues to increase in P.E.I.; 30 fields were rejected (H.L. McLaren). A tr.-1% was recorded in several table stock fields of Irish Cobbler examined in P.E.I. (R.R. Hurst).

WITCHES' BROOM (virus) was found in 29 (4.3%) of the fields inspected in B.C. and caused 2 fields to be rejected. The disease is encountered most frequently in crops grown from tubers produced in the Cariboo. (N. Mayers). Witches' broom was recorded in 6 (4%) of the fields inspected in n. Alta.; it occurred in sl. amounts in Netted Gem only (J.W. Marritt). Two plants found infected in a field of Irish Cobbler in Kings Co., P.E.I. (R.R. Hurst).

YELLOW DWARF (virus). A tr. was found in Keswick and Columbia Russet at Melbourne, Ont. Tubers were small and showed necrosis of the phloem and considerable external cracking. Tubers planted in the greenhouse produced

sprouts and plants that were weak (D.S. MacLachlan). Small amounts were observed elsewhere on Sebago and Katahdin in the London district (F.J.Hudson) and on Sebago and Keswick in district 3 (H.W. Whiteside).

LATENT DISEASE (virus S). A latent virus was detected in plants of Epicure and U.S.D.A. Seedling 41956 by serological means by the writer in collaboration with Dr. R.H.E. Bradley, Entomology Laboratory, Fredericton, N.B. The virus was shown to be serologically identical with potato virus S (P.D.S. 34:88) described in Holland. Virus S antiserum and plants of the Dutch varieties Industrie and Profijt infected by the virus were obtained from Dr. R.H. Larson of the University of Wisconsin.

Subsequent tests revealed that potato virus S is widespread in American and Canadian potato varieties. Some plants at least of the following varieties have been shown to harbor the virus: Bliss Triumph, Cayuga, Cherokee, Chippewa, Chisago, Desota, Earlaine, Empire, Fillmore, Green Mountain, Irish Cobbler, Kasota, Ketahdin, Kennebec, Keswick, Ladoda, Netted Gem, Norkota, Pawnee, Pontiac, Red Warba, Russet Burbank and Teton.

Stocks of the following varieties, free from virus S, have been located: Canoga, Canso, Early Rose, Keswick, Saco and Sebago.

Virus S has been shown to be sap-transmissible from potato to potato seedlings, although no symptoms became apparent in the latter. Inoculation with infective potato sap of plants of Nicotiana repanda held at 20°C resulted after 14 to 21 days in an interveinal mottle followed by veinclearing of the middle leaves of the plant. Systemic infection of the host by virus S was demonstrated serologically and by successive transfers of the virus. Inoculation of the legume, guar (Cyamopsis tetragonalobus) resulted in localized necrotic lesions in 4-6 days; the symptoms are most distinct in plants held at 20° C (H. Bagnall).

BLACK HEART (nonparasitic). Affected specimens were received in late spring from North Battleford and Beechy, Sask. (T.C. Vanterpool). A tr. occurred in a lot of Green Mountain in Queens Co., P.E.I. in April (R.R.Hurst).

ENLARGED LENTICELS All the tubers in a lot of Sebago in damp storage in Queens Co., P.E.I., were mod. affected in April (R.R. Hurst).

FROST. Most bins showed sl. frost necrosis in the Pemberton district, B.C. Because of delay in harvesting a few late fields also suffered some injury in the Grand Forks area (N. Mayers). Frost injury to the tubers was practically absent in n. Alta.; early destruction of the vines by frost cut yields in a few fields (J.W. Marritt). Frost necrosis affected 10% of tubers in a lot of Warba from Holland, Man.; tubers indexed and found free of leaf roll (D.S. MacLachlan). Little frost injury occurred in e. Ont. (E.H. Peters). Some frost injury occurred in Que. mostly along the lower St. Lawrence and in the Lake St. John district (B. Baribeau). Many fields suffered 5-10% injury in Conception Bay, Nfld. (G.C. Morgan).

GIANT HILL occurred in sl. amounts in s.e. B.C. (N. Mayers). Trace amounts occurred in nearly 20% of the fields inspected in s. Alta. (R.P. Stogryn).

GROWTH CRACKS. About 20% of the tubers were affected in a field of Kennebec at Flat River, Kings Co., P.E.I. Lengthwise growth cracks occurred about the eye end of oversized tubers probably the result of fluctuations in growing conditions last summer (J.E. Campbell).

HEAT NECROSIS was observed in several fields on light soil in district 3, Ont.; Ontario was rather sev. affected. In some cases the whole tuber broke down (H. W. Whiteside). Tubers showing typical heat necrosis were received from the Renfrew area (H.N. Racicot). Seven samples of Kennebec were received this fall affected by heat necrosis. Rust-colored necrotic areas are found scattered through the interior of the tuber, which externally appears perfectly sound. One grower in the Eastern Townships reported that 35% of a 40,000 bushel crop was affected (B. Baribeau).

HOLLOW HEART. A slight amount occurred in some fields about Grand Forks, B.C. (N. Mayers). It also affected 1% of the tubers in 1954 in a lot of Irish Cobbler in Queens Co., P.E.I. (R.R. Hurst).

HOPPER BURN was both widespread and sev. in s. Man., particularly in early varieties; plantings dusted with DDT were practically free from injury (J.E. Machacek).

LOW TEMPERATURE INJURY was found in sl. amounts in lots of Sebago and Green Mountain after long storage at chilling temperatures in Queens Co., P.E.I. (R.R. Hurst).

MAGNESIUM DEFICIENCY caused considerable damage to a field of Irish Cobbler on light soil lacking in humus at South Granville, Prince Co., P.E.I. (R.R. Hurst).

MEASLES was first noticed in 1952 in the Grand Forks area, B.C.; this year it was found in nearly every crop in a small percentage of tubers (N. Mayers).

STEM-END BROWNING. A sl. amount was present in most lots grown in s.e. B.C. following early destruction of tops by frost (N. Mayers). It was rather sev. about Saskatoon, Sask. (R.J. Ledingham). Stem-end browning was rather prevalent in Canso grown in the s. part of district 3, Ont. (H. W. Whiteside). This trouble was observed in Que. in sl. amounts in a few lots of Green Mountain (B. Baribeau).

SUNBURN affected a few tubers of Sebago in a field at Graham's Road, Queens Co., P.E.I. (J.E. Campbell). Sunburn caused considerable injury to Sebago, Katahdin and Kennebec, particularly when grown in the shallow soils at Manuels, Kelligrews and Bay Roberts, Nfld. (G.C. Morgan).

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) developed late in the season throughout the Okanagan Valley, B.C.; it caused no injury (G. E. Woolliams).

LEAF SPOT (Septoria cucurbitacearum) caused sl. damage to plants at Kentville, N.S. (D. W. Creelman).

RADISH

SCAB (Streptomyces scabies) was heavy on one lot of radishes grown in Queens Co., P.E.I. (R. R. Hurst).

RHUBARB

CROWN GALL (Agrobacterium tumefaciens). Roots of a plant in a home garden at Summerland, B.C., were found in April 1954 with numerous large galls (G. E. Woolliams).

SOFT ROT (Erwinia carotovora). About 50% of the plants were sev. rotted in a 1/2-acre patch planted this spring in Lincoln Co., Ont.; the field was in carrots in 1954 (J.K. Richardson).

RED LEAF (cause unknown) was found in several plantings in s. Alta. (J. T. Slykhuis). Red leaf was again sev. in the variety plots at the Farm, Melfort, Sask.; the disease was also observed several times in the Saskatoon area (R. J. Ledingham).

SQUASH

ANTHRACNOSE (Colletotrichum lagenarium). The organism was isolated from lesions on sl. affected squash leaves from Kentville, N.S. (D. W. Creelman).

STORAGE ROT (Mycosphaerella melonis). A single Buttercup squash from a small garden at Kentville, N.S., developed this rot in storage (K. A. Harrison).

LEAF SPOT (Septoria cucurbitacearum) caused mod.-sev. damage to squash at Kentville, N.S. (D. W. Creelman).

SWEET CORN

SMUT (Ustilago maydis). About 1% of the ears were affected in a planting of Bantam at Montmagny, Que. (L. J. Coulombe). A tr. was also observed in a field at Rougemont (R. Crete). Diseased ears were received from St. Lambert and St. Henri (D. Leblond). Three growers in Kings Co., N. S., brought in affected ears (K. A. Harrison).

FERTILIZER INJURY. Fertilizer applied too closely to developing seedlings caused mod. injury in a 1/4 acre planting at Charlottetown, P. E. I. (J. E. Campbell).

TOBACCO

A special report on tobacco diseases in Ontario and Quebec in 1955 was prepared by Drs. Z. A. Patrick and L. W. Koch.

Seedbed Diseases

BLUE MOLD OR DOWNY MILDEW (Peronospora tabacina). The appearance of blue mold in the Old and New Tobacco Belts of Ont. is becoming less and less frequent and loss of tobacco seedlings from the disease has been negligible in the last few years. There were this year only a few mold outbreaks in the Cedar Springs area of Ont., which occurred late in the season around 20-25 May. As yet, this disease has not appeared in Que. However, the growers are still advised to follow a regular spray program for blue mold control as it is well known that the disease can assume epidemic proportions almost overnight if no preventative practices are followed. The recommended program for blue mold control (P. D. S. 34:95) has also been found to aid considerably in the control of damping-off organisms.

YELLOW PATCH (excessive nutrients) was a very common seedbed trouble in 1955, especially in the burley tobacco area where the growers very often tend to over-fertilize their seedbeds.

COLD INJURY was very common this year in ground seedbeds of burley tobacco.

DAMPING-OFF (Pythium spp. and Rhizoctonia solani) was very common this year causing mod. to heavy damage especially during the cold wet weather. Most sev. damage was caused where plants in the seedbed were too crowded and where water was applied in excess.

MUSHROOMS caused mild damage throughout the burley and dark tobacco areas of Kent county where outside seedbeds are used.

SLIME MOLDS were present in a few groundbeds in Kent county. The affected plants were enveloped entirely with a slimy incrustation varying in color,

but most often grey or yellow. The damage was not severe, however, and the mold disappeared under direct sunlight and as a result of adequate ventilation and drying-out of the bed surface.

CHEMICAL INJURY. Only a few cases of 2, 4-D injury were noted. It appeared to be due to spray drift from weed control operations rather than from the use of improperly cleaned sprayers.

A few cases of creosote toxicity were noted in new greenhouses where this wood preservative had been used.

Field Diseases

BLUE MOLD (Peronospora tabacina). No cases of blue mold in the field were observed in the tobacco areas of Ont. and Que. this year.

BROWN ROOT ROT (nematodes) is one of the most serious diseases of burley and flue varieties. The disease was widespread occurring in all the tobacco growing areas. It was most severe in light sandy soils following a rye rotation where it caused much stunting and reduction of yield and in most of the fields visited some brown root rot damage was noted. In all instances where damage was observed large populations of the root-lesion nematodes, Pratylenchus spp., were present in the soil.

BLACK ROOT ROT (Thielaviopsis basicola). Very few instances of black root rot damage was noted. Its low incidence is due to the widespread planting of resistant burley and flue varieties.

FRENCHING (?soil toxins). A few fields of tobacco were sl.-mod. damaged by frenching.

SOFT ROT (Pythium spp.) was found in a few fields soon after setting.

SORE SHIN (Rhizoctonia spp.), along with Pythium Soft Rot, caused mod. losses in the new transplants.

BACTERIAL BLACK STALK, a rather rare disease, was found in a number of tobacco fields in the Chatham area where up to 5% of the plants in 3 fields were affected. Only mature plants appear to be affected. These plants turn bright yellow and the lower leaves, many of which have decayed midveins, are wilted. The bark is blackened, commencing at the ground line and the stalk may be completely girdled. The pith is not decayed, but in the region of the older affected area it may appear grayish and often separates into grayish discs. The roots are not affected. Bacteria were isolated from the diseased tissue.

HOLLOW STALK (Erwinia carotovora and E. atroseptica). A few cases of stalk soft rot and hollow stalk were observed. Most of these were as a result of topping damage and the use of suckering oils.

NONPARASITIC LEAF SPOT (cause undetermined) was widespread in 1955 and sev. throughout most of the flue tobacco growing areas of Ont. The very hot dry weather during the summer contributed considerably to the seriousness of this condition resulting in mod.-sev. loss in yield.

MOSAIC (virus). Injury from TMV was widespread throughout the burley, dark and flue-cured tobacco growing areas of Ont. and Que.

ETCH (virus) caused sev. damage to burley tobacco in the Leamington-Harrow areas of Ont. Most of the fields were 100% infected. It was not observed on flue-cured tobacco.

OTHER VIRUS DISEASES. Several other viruses were present on tobacco plants in the field. However, very few plants were affected in each field and the losses were negligible. The viruses included the ring spot virus, streak virus, veing banding virus and several of the cucumber mosaic viruses.

Other Observations

In breeding tobacco for resistance to tobacco mosaic virus Nicotiana glutinosa has been used to impart resistance to commercial varieties of Nicotiana tabacum. It has been found that plants from such breeding, while resistant to TMV are extremely susceptible to crooked top or streak virus. Work in the Tobacco Division, Experimental Farms Service, during the last 3 years has shown that the wild tobacco species, N. ambalema, from South America, may be used to impart resistance to both mosaic virus and to crooked top or red streak virus. Attempts to combine resistance to both viruses are showing some progress; several strains at Ottawa show segregation for resistance to both virus diseases (F.H. White).

TOMATO

EARLY BLIGHT (Alternaria solani) was quite general in most commercial plantings in the North Okanagan and Thompson Valleys, B.C., in 1954. In general, leaf infection was not sev., but some fruits were affected (G.E. Woolliams). The worst epidemic of early blight observed in the decade occurred in canning crops in s.w. Ont. in 1955. In a few fields 75% of the crop was lost although some received the regular protective sprays. The hot summer hastened maturity and along with ideal infection conditions in late August favored the disease. In one field at Leamington 20% of the plants were destroyed by the collar rot phase; the plants had become infected while still in the plant beds (C.D. McKeen). Early blight was more sev. than usual in the Niagara Peninsula; it was present in most fields and extremely sev. in fields not regularly sprayed. In the laboratory plot at St. Catharines 500 staked plants suffered sev. infection on leaves and some of the fruits developed lesions at the calyx end (J.K. Richardson). A heavy infection developed in a block of vigorously growing tomatoes near Ottawa by 12 July; it caused sev. damage (K.M. Graham). Leaves and fruit of a few scattered plants were affected in an

acre field of Bounty at Charny, Que. (L. J. Coulombe). Early blight was general in tomato fields about Oromocto, N. B. Few fruit were affected but loss of foliage was considerable (S. R. Colpitts). Early blight was first seen in N. S. on an irrigated plot at Berwick on 28 June; regular applications of maneb kept the disease in check. Early blight occurred on many fields but it dit not cause serious defoliation this year (K. A. Harrison).

NAIL-HEAD SPOT (Alternaria tomato) affected fruit received in August 1944 from Hope, B. C. (G. E. Woolliams).

GREY MOLD (Botrytis cinerea) caused a stem canker of a number of plants in a greenhouse at Ridgeville, Ont. (J. K. Richardson). It affected a few tomatoes which had been left to ripen in a humid cellar at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). Several lots of ripe or nearly ripe imported tomatoes affected by this rot were received from fruit firms in Fredericton and St. John; tight packaging, careless handling and unsanitary conditions at local premises probably favored development of the rot (J. L. Howatt). Grey mold destroyed about 10% of the crop, more than that by any other disease, in the spray plots at Kentville, N. S., growth was very heavy. It was also troublesome in a spring greenhouse crop at Falmouth (K. A. Harrison).

LEAF MOLD (Cladosporium fulvum) was sev. in several greenhouses in June about Kelowna, B. C. (M. King). Because most growers in the Leamington area, Ont., now grow leaf-mold resistant varieties in the fall crop, the incidence of the disease was quite low. Vagabond and several unnamed selections originated by the Ont. Horticulture Station, Vineland, showed high resistance (C. D. McKeen). A few plants in a crop of Bay State showed traces of infection in a greenhouse in Kingston, N. S.; the grower had saved his own seed and it appeared that these plants had lost the factor or factors for resistance (K. A. Harrison).

ANTHRACNOSE (Colletotrichum phomoides) was prevalent in many crops in Essex and Kent counties, Ont.; the incidence was highest in crops grown on sandy soil (C. D. McKeen). Some anthracnose was present in canning tomatoes in Northumberland Co. (R. Wilcox). Anthracnose developed on a few crops left to mature in a cellar at Ste. Anne de la Pocatiere, Que. (L. J. Coulombe). Many spots developed on fruits from a field where anthracnose had occurred previously when they were held in storage at Kentville, N. S. The disease was even more sev. on fruits from a garden where anthracnose has occurred several times when held a week in storage (K. A. Harrison).

BACTERIAL CANKER (Corynebacterium michiganense). Infection was a tr. in a field at Ashcroft and sl. in one at Vernon, B. C., in 1954. Diseased plants were also received from Cawston (G. E. Woolliams). Two plants out of 50 were affected at Charney, Que.; 2 diseased plants were also seen at L'Islet. The identification was checked by smear preparations (L. J. Coulombe).

WILT (Fusarium lycopersici) was general about Oromocto and Hamstead, N.B.; in one field 80% of the plants were affected with loss of most of the crop (S. R. Colpitts). Some wilt also occurred in the canning crop in Northumberland Co., Ont. (R. Wilcox).

ROOT KNOT (Meloidogyne sp.) was so sev. in Japanese grower's greenhouse near Haney, B.C., that maturity of the crop was hastened and the grower had to abandon the crop (H.N.W. Toms). Root knot was sev. in a greenhouse crop at Mastai, Que. and cut the crop in half (D. Leblond).

PHOMA ROT (Phoma destructiva). A few diseased fruits were brought in from Ste. Anne de la Pocatiere, Que. (L.J. Coulombe). Although the disease was found late in the season about Quebec City, it was much less prevalent than last year (D. Leblond).

LATE BLIGHT (Phytophthora infestans) was observed in late August in the test plots at the University, Vancouver, B.C., and by the end of September was causing widespread infection (H.N.W. Toms). Late blight caused sev. damage in a planting at Indian Head, Sask. (J.E. Machacek). It was not recorded elsewhere in Sask. in 1955 (R.J. Ledingham). A number of fruits touching the ground were found infected in a small garden in Lincoln Co., Ont.; on 16 June (J.K. Richardson). This record was the first of late blight in 1955 (I.L.C.). Late blight affected a few fruits in the plots at St. Pacome, Que., but it was somewhat more prevalent on stored fruits (L.J. Coulombe). A 75% infection developed in the untreated plots at Kentville, N.S., but dry weather checked late blight development and losses were less than last year. Commercial growers sprayed their crops and no reports of loss were received. Maneb is replacing Bordeaux mixture for the control of blight on tomatoes (K.A. Harrison). Late blight was very destructive in many plantings of tomato in Queens Co., P.E.I. (R.R. Hurst).

DAMPING-OFF (Pythium sp.) was very prevalent in seedling beds and in the first transplanting in a greenhouse at Hampstead, N.B.; 15% of the crop was lost (S. R. Colpitts).

STEM ROT (Sclerotinia sclerotiorum) was prevalent in several greenhouses at Vernon, B.C., and caused 10% loss (M. King). Every plant was affected in a weedy part of a field at Nictaux, N.S., whereas only 5% were affected elsewhere. In October, many of the fruits were rotted and apothecia were found under the heavy foliage. Only a trace of stem rot was seen in the plots at Kentville (K.A. Harrison).

LEAF SPOT (Septoria lycopersici) was rather heavy on 18,000 plants of Stokesdale 4 before the plants were removed from the greenhouse at Kelowna, B.C. However, after they were set in the field the disease soon disappeared (G.E. Woolliams). Leaf spot was about as prevalent as usual in canning and early field crops in Essex county, Ont.; it caused sev. damage in a few greenhouse crops (C.D. McKeen).

LEAF SPOT (Stemphylium solani Weber). In 2 fields in s.w. Ont. a mixed infection of S. solani and Alternaria solani was found. This is the first time that I have encountered this fungus on tomato crops in s.w. Ont. (C.D. McKeen).

WILT (Verticillium albo-atrum) was prevalent in the Similkameen, Okanagan, Thompson and Upper Fraser Valleys in 1955; usually 10-35% of the plants were infected, but depending on the field and location infection ranged from a tr. to nearly 100%. In 1954 the infection was 75-100% at several points in the B.C. Interior, but on account of the unusually cool season, the plants suffered little from the disease (G.E. Woolliams). Wilt caused considerable damage to several plants in a greenhouse at Medicine Hat, Alta. (F.R. Harper). A light general infection occurred in 3 greenhouses at Kingston, N.S. (K.A. Harrison).

MOSAIC (virus) was present in most greenhouses and fields of tomatoes in the B.C. Interior; infection varied from a trace to 25% in a few cases. In 1954, 90% of the plants were sev. affected in a 10-acre field at Kamloops; the plants were grown from seed by Chinese growers, who smoked continuously while handling the plants. In other fields in the district, infection was about 1-5% (G.E. Woolliams). A few early field and canning crops were sev. affected by cucumber mosaic, tobacco etch, etc. in the Harrow-Leamington area, Ont. High virus incidence coincided with heavy aphid infestations (C.D. McKeen). As reported last year (P.D.S. 34:102), a milk spray is now being used to reduce virus infection in greenhouse tomatoes in N.S. The growers feel that the milk spray has helped to reduce the spread of mosaic, but there is a tendency for molds to grow on the milk residue and turn it black. Fruit so discolored has to be wiped. For this reason growers now discontinue spraying as the first truss is set. The subsequent spread of mosaic causes some damage (K.A. Harrison).

STREAK (double virus) was observed in 1954 affecting a few plants at Cawston, B.C. (G.E. Woolliams). About 0.5% of the Vulcan plants in a greenhouse at Edmonton, Alta., showed symptoms characteristic of double virus streak (A.W. Henry). Streak was found on two plants in a garden near a planting of potatoes at Saskatoon, Sask. Streak is rarely seen in Western Canada (T.C. Vanterpool). A sev. outbreak developed late in the fall in the spray plots at Kentville, N.S.; potatoes were being grown in an adjacent plot and mosaic was present on the tomatoes. Streak was not seen in commercial plantings (K.A. Harrison).

YELLOWS (Beta virus 1) only affected an occasional plant in the Okanagan Valley, B.C. It was more prevalent in 1954 when up to 10% of the plants were affected in some fields (G.E. Woolliams).

PURPLE TOP (virus). A disease of the yellows type was found affecting 3% of the milkweed plants examined along a highway leading to Fredericton, N.B. The virus was transmitted by means of dodder (Cuscuta gronovii) to tomato

and Green Mountain potato. The symptoms on these hosts resembled those of the bunch top (purple top) virus. All 27 plants of Datura tatula in an experimental plot at Fredericton showed symptoms of a disease of the yellows type. The virus was transmitted by grafting to tomato in which it produced typical symptoms of the bunch top virus (D. J. MacLeod).

BLOSSOM ABSCISSION. In a small garden patch of about 50 Beefsteak plants in Lincoln Co., Ont., less than a dozen fruits were developing. Soil analysis revealed that the soil was low in potash and high in nitrogen. Application of required fertilizer resulted in some improvement (J.K. Richardson).

BLOSSOM-END ROT (nonparasitic) was quite general in 1954 in the Okanagan and Thompson Valleys, B.C. The disorder appeared to be more prevalent than usual, particularly on fruit in the first trusses (G.E. Woolliams). In s.w. Ont. blossom-end rot took its usual toll of fruits that ripened early in the harvest period when transpiration was high and soil moisture low (C.D. McKeen). The disorder was apparently more general and more sev. than usual in the Niagara Peninsula, particularly in crops on heavy soils low in organic matter (J.K. Richardson). Blossom-end rot and sun scald was quite prevalent in the canning crop in early September in Northumberland and Prince Edward counties (R. Wilcox, J.E. Armand). Blossom-end rot was general in the Montreal district, Que., losses averaged about 5% (E. Lavallee). About 15% of the fruit were injured in a field at Rougemont (L. Cinq-Mars). The disorder was common about Quebec City when the first tomatoes were harvested, but it soon disappeared (D. Leblond). A few affected fruits were also noted at Ste. Anne de la Pocatiere (L.J. Coulombe). Blossom-end rot caused sl. damage in Queens Co., N.B., on account of extreme drought this year (S.R. Colpitts). The disorder was prevalent in fields in Kings Co., N.S., where the water holding capacity of the soil was low. Normal rainfall in August checked its development on the later crop (K.A. Harrison). Blossom-end rot was heavy in a local garden in Queens Co., P.E.I. (R.R. Hurst).

BLOTCHY RIPENING (nonparasitic) affected about 50% of the fruit on the first truss in a 2-acre field at Berwick, N.S., that was being irrigated frequently with nutrients added to the irrigation water; later trusses were normal (K.A. Harrison).

CHEMICAL INJURY. Less damage was noted about Saskatoon, Sask., on tomatoes and other sensitive plants than in any year since 2,4-D came into general use. Factors contributing to this improvement appeared to be (1) fewer grain fields sprayed in the area, (2) more chemicals of lower volatility being used, and (3) more careful handling of spray materials by city gardeners (R.J. Ledingham). Mod. injury noted at Hazelridge, Man. (J.E. Machacek). A few crops were injured in Essex Co., Ont., because of drift from roadside and fence-row spraying. Apart from visible fruit, leaf and stem distortion, the crop of plants mildly affected is reduced and harvesting is delayed by 2-3 weeks (C.D. McKeen).

Tomato seedlings, 600-800 per flat were sev. damaged in a greenhouse in Essex Co., Ont., when the plants were sprayed with Manzate, 1-1 1/2 lb. per 100 gal. The cortical cylinder of the hypocotyl was destroyed at the soil line and the seedling collapsed. As the vascular strands remained intact and uninjured, the seedlings survived, although stunted and deformed. Subsequent tests proved the toxicity of maneb preparations to tomato seedlings in the greenhouse (C.D. McKeen).

FRUIT CRACK (nonparasitic) caused sl. damage in Queens Co., N.B. (S.R. Colpitts). Fruit crack was also prevalent about Ottawa, Ont., if one may judge by tomatoes on the local market (I.L.C.).

NUTRIENT DEFICIENCY. Some 10,000 plants in shallow flats were left for 2 weeds under trees in an orchard at Pereau N.S., where they were exposed to heavy rains. The plants were pale and when exposed to the sun developed necrotic lesions that resembled spots caused by Septoria but no organism was found. An application of fertilizer corrected the condition, but the plants had received a severe check (K.A. Harrison).

SUN SCALD caused sl. damage in a planting at Hazelridge, Man. (J.E. Machacek).

TURNIP

CROWN GALL (Agrobacterium tumefaciens). Affected specimens were received from Milestone, Sask. (T.C. Vanterpool).

SOFT ROT (Erwinia carotovora) caused heavy losses to 1500 bags stored at Harbour Grace and St. John's, Nfld. (G.C. Morgan).

CLUB ROOT (Plasmodiophora brassicae) was found for the first time in the Terrace district, B.C. (W.R. Foster). Diseased swede turnips were received from Deschambault, Frampton and Thedford Mines, Que. (D. Leblond). Most farmers in Kent Co., N.S., are able to keep club root in control in swede turnips by following a 7-year rotation. Each year, however, 2 or 3 growers bring in samples of sev. infected plants (K.A. Harrison). Club root of swedes has been prevalent in the Pawnal, Hazelbrook, Vernon River and Brackley districts, Queens Co., P.E.I.; sev. infestations have been noted in these districts over the past several years (G.W. Ayers). Infection was heavy in garden plots in Conception and Trinity Bays, Nfld., and mod.-heavy in 5 commercial plantings at Conception Bay and 3 farms at Lethbridge, Bonavista Bay. One of the latter fields had only been cleared in 1954 (G.C. Morgan).

BLACK ROT (Xanthomonas campestris). About 1% of the plants were affected in a field of Laurentian at Guernsey Cove, Kings Co., P.E.I.,; the disease, in small amounts, appears to be scattered throughout the province (G.W. Ayers, J.E. Campbell).

STERILITY (virus). About 2% of the plants were affected in a seed plot of swede turnips in York Co., N.B. (D.J. MacLeod).

LATENT VIRUS. A latent virus was detected in stecklings of Laurentian swede grown in the field in York Co., N.B. in 1954. Although it produces no symptoms on infected swedes, it was transmitted by aphids and by grafting. When Physalis floridana plants are infected by the virus, the plants show a striking yellowing of the veins, which eventually forms a yellow net pattern on the leaves (J.P. MacKinnon).

BROWN HEART (boron deficiency) was detected in a shipment of swedes examined by a fruit and vegetable inspector at Glace Bay, N.S. in May. Two growers in Kings Co. brought in affected roots in October (K.A. Harrison). Brown heart affected 5% of the Laurentian turnips in 2 commercial fields at Lethbridge, Nfld. (G.C. Morgan).

CHEMICAL INJURY (2,4-D spray drift). Two cases of injury, received from Pictou and Truro, N.S., were traced back to application of weed killers in nearby grain fields; estimated damage was 25% (K.A. Harrison).

Survey of the Vegetable Market Gardens in the Lower Fraser Valley for Disease

H. N. W. Toms

The Lower Fraser Valley from Chilliwack to the islands of the Fraser River delta is the most concentrated vegetable growing area in B.C. and grows approximately one third of the produce required to supply the wholesale market of the Greater Vancouver area throughout the year. Although there is some overlapping, the local produce is replaced in spring and winter by comparatively low-priced imports from California, Texas and Mexico and in the spring by earlier crops from adjacent Washington and Oregon. The detailed figures will not be given here. For the individual crops, the percentages produced in the Lower Fraser Valley or elsewhere in B.C. reaching the Vancouver market naturally vary considerably but for the principal crops they are 20-40% of the total. The Vancouver market also receives substantial quantities of cucumbers, field onions, potatoes and tomatoes from elsewhere in B.C. The remainder are imported. These figures do not include canning crops.

The market gardens are almost entirely on flat terrain adjacent to the present channels of the river or in old channels long since silted up. Soils in use are predominantly clays (Monroe and Ladner types) or peat (muck soils of partially decomposed sphagnum moss) with an occasional garden extending up loam slopes. Since the war there has been a noticeable decrease in local vegetable production owing both to the high cost of land and to the conversion of farm lands to residential and industrial use. Such vegetables as beans and peas for canning, beets, corn, potatoes and turnips, are usually grown as rotation crops on mixed farms rather than in market gardens.

The three main growing areas are the Chilliwack, the Surrey-Cloverdale, and the Fraser River Delta, comprising some 75 market gardens which are all, with one exception, cultivated by Chinese tenant farmers, employing Chinese labor. A few of the younger growers, born in Canada, have bought their own gardens. The most noticeable feature is their intensive cultivation, crops being interplanted, and, as one crop reaches maturity and is harvested, the other is already well established.

The growers seem well-informed about application of fertilizers, probably because of frequent visits by trusted salesmen from agricultural chemical companies, but, in general, and mainly because of the language problem, the Chinese grower is not conversant with diseases and pests and their control.

Some 30 gardens were visited in 2 days during the last week of August in company with an agricultural chemicals salesman whose knowledge of the areas and the growers was very helpful.

Major Crops

Of the major crops examined, no disease was seen on carrots, green onions, radish or rhubarb.

Bean

Grey Mold (Botrytis cinerea) slightly affected pods of pole beans in a few gardens.

Cabbage

Club Root (Plasmodiophora brassicae) was present in a few fields but is controlled by proper rotation. However, it was heavy in owners' gardens, near houses, on cabbage, Chinese cabbage, a Chinese chard-like crucifer and light on a Chinese white turnip.

Head Splitting was seen in several gardens as a result of excess moisture following a dry period.

Cauliflower

Club Root (Plasmodiophora brassicae) was seen occasionally but the affected plants were heading up normally.

Root Rot (?Erwinia carotovora). About 3% of the plants were girdled following attack by maggots in one garden.

Whiptail (molybdenum deficiency). What appeared to be this disease was seen in one 5-acre field. There were several patches of depauperate plants with elongated striate leaves in low spots where the water table had remained high long after transplanting.

Celery

Late Blight (Septoria apii-graveolentis). Tr. infection was seen in one garden and the crop a total loss in another in which there seemed to have been no attempt to control the disease.

Cucumber

Leaf Spot (Alternaria sp. associated) was present in 3 gardens; the pathogen apparently was only weakly parasitic.

Chemical Injury. Burn from ammonium sulphate fertilizer was sev. in one garden.

Lettuce

Molds. Outer leaves of some plants were disfigured by saprophytic molds and Botrytis cinerea. There were some misses, the cause of which was undetermined.

Potato

Late Blight (Phytophthora infestans) was present in all gardens that were growing potatoes. Although most of the crop had been lifted, foliage of the unharvested crop was 100% infected; apparently no spraying was done.

Tomato

Late Blight (Phytophthora infestans). Foliage infection was general but not sev. whereas in some cases 50% of the fruit was infected. Only determinate, staked varieties are grown.

Stem-end Cracking was common as a result of recent rains.

Minor Crops

No disease was seen on broccoli, brussels sprouts, kale, spinach, Swiss chard and sweet corn.

Misses were observed in one small patch of beets which probably resulted from damping-off of plants in the seedling stage. Beets are only grown for harvesting as baby beets. Onions are not grown at the Coast in any quantity for bulbs. Saprophytic molds were fairly common on damaged and mature lower leaves. Fruits of sweet pepper were filling poorly owing to the cold wet weather of early summer but no diseases were seen.

Uncommon Crops

Uncommon crops are endive, kohlrobi, vegetable marrow, pumpkin, squash, pea and soybean. A trace of powdery mildew (Erysiphe polygoni) was seen on peas in two owners' gardens. A leaf spot, overgrown by Botrytis cinerea, was seen on over-mature plants. A necrotic leaf spot of undetermined origin was seen on old pumpkin leaves. The other crops were free of disease.