in N.B. (C.H. Godwin) and on Sebago at Cornwall, P.E.I. (J.E. Campbell), and in a few fields in N.S. (R.C. Layton).

SPINDLE TUBER (virus). Tr. infections were found in 2 Man. fields of Columbia Russet and Kennebec (D.J. Petty). It was reported from Ont. District 3 in Katahdin, Sebago and Huron. All lots of Huron grown in the District were affected (H.W. Whiteside). Tr. amounts were observed on Sebago and Huron at bin inspection in e. Ont. (E.H. Peters). It occurred in a few fields of Kennebec and in 4/451 bins inspected in Que. (B. Baribeau). Spindle tuber was slightly more prevalent in N.B. in 1957, particularly in Kennebec and Netted Gem (C.H. Godwin), while in P.E.I. the disease showed a slight decrease from the 1956 incidence (H.L. McLaren). Sl. infections occurred in Irish Cobbler, Sebago and Kennebec in N.S. (R.C. Layton). Sev. infections in Arran Victory and sl. infections in Green Mountain and Katahdin occurred in the Cormac area, Nfld. (G.C. Morgan).

WITCHES' BROOM (virus) was 17-tr. 1-sl./18 fields inspected in B.C. (N. Mayers). It was tr. in 1 field of Netted Gem in s. Alta. (R.P. Stogryn) and tr. in n. Alta (E.C. Reid).

YELLOW DWARF (virus). A few affected plants were found in 1 field of Katahdin near Komoka, (J.T. McKercher), and in a small plot of Keswick in n. Simcoe Co., Ont. (H.W. Whiteside).

Some Recent Findings in Potato Virus Research

R.H. Bagnall

Resistance to virus Y in the potato:

Results obtained in field and greenhouse experiments during the past six years show that a number of American potato varieties are field resistant to a strain of virus Y commonly found in Eastern Canada. This resistance was correlated with necrotic response to infection. Included amongst the resistant varieties are the widely grown Katahdin, Kennebec, and Warba. Varieties reacting with rugose mosaic, such as Canso, Green Mountain, Irish Cobbler, and Keswick were relatively susceptible to field infections with virus Y. On the basis of necrotic response to virus Y, it is probable that the following varieties are also field-resistant to the common strains of virus: Canus, Cherokee, Chippewa, Earlaine, La Salle, Marygold, Norkota, Saco, Seneca, and White Cloud. (See: Bagnall, R.H. and R.H.E. Bradley. Resistance to virus Y in the potato. Phytopathology 48: 121-125. 1958).

Uncommon viruses in potatoes imported for breeding:

Studies of the reactions of different potato varieties to the common viruses have indirectly uncovered a number of unsuspected viruses in the material being tested. Several stocks of the variety Albion received from different sources in Canada and the United States were found to carry symptomlessly a virus resembling potato virus F (Clinch, Loughnane and Murphy). Similarly, several stocks of the variety Thorbecke carried a virus resembling potato virus C (Bawden), a non-aphid-transmitted strain of virus Y. It would appear that the original stocks of these varieties imported for breeding purposes, were infected with the respective viruses. These varieties have been maintained at various Experimental Stations for more than twenty years. Neither virus F nor virus C has ever been reported from Canadian or United States seed growing areas and it is improbable that they are now of serious consequence. Nevertheless if the viruses could go undetected for so long by specialists, it is doubtful if field inspectors or even plant pathologists could identify them by visual means. Several other viruses, as yet unidentified, have been found in imported potato stocks.

Early and late-maturing Irish Cobbler potatoes correlated with strains of virus X:

The Irish Cobbler potato variety has long been known to be entirely infected with virus X. During greenhouse eye-indexing tests of different stocks of this variety, selections were made of plants showing distinct foliar mottling and others appearing entirely healthy. Sap inoculations to Datura tatula and Nicotiana tabacum (var. White Burley) indicated that the mottled Irish Cobbler harbored a relatively "severe" strain of virus X, while the "healthy" Irish Cobbler harbored a relatively "mild" strain of the virus. All stocks of Irish Cobbler so far tested, have been found infected with virus S, but in the present instance, no viruses other than S and X could be demonstrated. Tubers from the Irish Cobbler selections were regrown in the field for multiplication, the progeny of each original selection being kept separate. During 1956 and 1957, replicated trials were run to determine the growth habit and yielding ability of the various selections. The results showed that the plants appearing mottled in the greenhouse gave rise to large, upright, dark-green, comparatively late-maturing field plants which blossomed profusely and set two or three seed-balls per plant. The "healthy" greenhouse plants on the other hand, gave rise to comparatively small, spreading, light-green, and early-maturing field plants which developed few blossoms and set no seed. There appeared to be no difference in yielding ability between the early and late maturing types when they were top-killed 90 days after planting. Yields in 1957 averaged 398 and 405 bu. per acre, respectively, at this stage. The early maturing plants top-killed more readily however, and were more easily harvested. When the two types of Irish Cobbler were left 110 days before top-killing,

yields of the late maturing type were significantly higher, averaging 503 bu. per acre against 436 for the early maturing type. As a result of these selections, we have two distinct types of Irish Cobbler potato. It is probable that the extremes can be widened still further by selection amongst the individual tuber-lines. There is reason also, to believe that similar results could be obtained with other potato varieties. With one variety, earliness may be of prime importance, while yield at a later date would be the main consideration with another. It is therefore suggested that some fresh thought should be given to what is actually being accomplished by the extensive eye-indexing programs. These, after all, are conducted under artificial greenhouse conditions.

HAYWIRE (? virus). Thirteen affected plants were seen in 6 fields in B.C. Eleven of these were in 1 field of 60 acres in the Pemberton district (N. Mayers). It was tr. in 2/105 fields in s. Alta. (R.P. Stogryn), and tr. in 7% of the fields inspected in n. Alta. (E.C. Reid).

FROST INJURY was tr. in the n. Okanagan and s.e. B.C. (N. Mayers). In n. Alta. low temperatures during the harvesting season rendered tubers unduly brittle and subject to bruising or cracking (E.C. Reid). It caused quite extensive losses in some parts of Sask. (A. Charlebois). Sl. damage occurred in the Guelph district (W.L.S. Kemp) and in e. Ont. (E.H. Peters). Frost injury in Que. was confined to the n.w. portions of the province where frost occurred in late Sept. (B. Baribeau). Some injury occurred on the west coast of Nfld. (G.C. Morgan).

BLUE SPOTTING (physiological) was economically important in Netted Gem tubers grown in the lower Fraser Valley, B.C. in 1956 and in the dry, southern interior of B.C. in 1957. It has been identified as a disease previously described in Holland, Great Britain and the U.S.A. as "blue spotting", "black spotting" and "internal black spot". The direct cause is an enzymatic reaction probably involving polyphenoloxidase which is incited in susceptible tubers following handling bruises. Predisposing factors are those which contribute to flaccidity in tubers such as potash deficiency, soil moisture shortage, or low humidity in storage. Insufficient soil moisture during the month preceding maturity is believed to be the principal predisposing factor in B.C. (N.S. Wright). see P.D.R. 41: 608-611. 1957. (D.W.C.).

BROWN EYE (cause unknown). This disease was noted for the first time in P.E.I. in 1957. It occurred in tr. amounts in Sebago. A similar disease called "pink-eye" has been reported in Maine and Connecticut where it has sometimes caused sev. damage. Wherever found, brown-eye has occurred in Verticillium infected fields but it is apparently only indirectly associated with wilt. Verticillium has not been

recovered from brown-eye lesions but Pseudomonas bacteria are often present in great abundance (D.B. Robinson).

HOLLOW HEART (physiological) was encountered in a number of fields in B.C., but was rarely serious (N. Mayers).

GIANT HILL was present in trace amounts in 20 fields in s. Alta. (R.P. Stogryn). Symptoms of the disease were observed in a few fields in the Dufferin district on Ont. (H.W. Whiteside). It was seen in 9/216 fields in N.S., particularly in Netted Gem, Green Mountain and Irish Cobbler (R.C. Layton).

STEM END DISCOLORATION (non-parasitic) was reported in 5% of the bin lots inspected in Que. One lot of Green Mountain with 60% of the tubers affected was rejected (B. Baribeau).

MAGNESIUM DEFICIENCY was sev. causing interveinal necrosis and brown lesions on the foliage of Irish Cobbler and Katahdin and to a lesser extent on Green Mountain at Ste. Foy, Que. (D. Leblond).

In August, 1957, Mr. H. Genereux made a survey of potato fields and home gardens in communities on the north shore of the St. Lawrence from Riviere au Tonnerre in Quebec to Forteau Bay in Labrador. He reports the following diseases in the Quebec communities.

Early Blight (Alternaria solani) was sev. in 1/12 fields at Riviere au Tonnerre, in 1/17 at Magpie and in 2/11 at Longue Pointe de Mingan; sl.-sev. in 8/45 at Hâvre St. Pierre; sl. in 7/43 at Ile à Michon and in 2/14 at Natashquan; tr. in 5/56 at Aguanish.

Bacterial Ring Rot (Corynebacterium sepedonicum) was found in tr. amts. in 2/43 fields at Ile à Michon.

Black Leg (Erwinia atroseptica) appeared in tr. amts. at Riviere au Tonnerre, Magpie, Riviere St. Jean and Tête à la Baleine. It was also tr. in 6/45 fields at Hâvre St. Pierre, 3/26 at Aguanish, 4/40 at Ile à Michon, and 6/17 at Lourdes de Blac Sablon.

Rhizoctonia (Pellicularia filamentosa (R. solani) was sl. in 1/45 fields at Hâvre St. Pierre and tr. in 1/14 at Natashquan.

Late Blight (Phytophthora infestans) was sl.-mod. in 3/45 fields at Hâvre St. Pierre and sl. in 1/11 at Longue Pointe de Mingan.

Powdery Scab (Spongospora subterranea) was present in 1/17 fields at Lourdes de Blanc Sablon.

Common Scab (Streptomyces scabies) was present in most fields at Riviere au Tonnerre, Longue Point de Mingan, and at St. Augustin; 9/22 fields at Ile à Michon had sl.-sev. scab; 7/37 fields at Hâvre St. Pierre, 8/26 at Aguanish, and 10/14 at Natashquan showed tr. amts. of common scab.

Leaf Roll (virus) was tr. in 1/43 fields at Ile à Michon.

Mosaic (virus) was the predominant disease at Riviere au Tonnerre; it was sev. on Green Mountain at Magpie; a few sev. affected plants were found in 16/26 fields at Aguanish, 12/43 at Ile à Michon, 1/14 at Natashquan and 1/17 at Lourdes de Blanc Sablon; a tr. of mosaic was observed at Tête à la Baleine and St. Augustin.

In the 3 Labrador communities surveyed these diseases were recorded.

Black Leg (Erwinia atroseptica) was sl. in 5/10 fields at Forteau Bay and tr. in 5/14 at Pointe Anse Eclair.

Mosaic (virus) was seen in 1 field at Pointe Anse Eclair and in 1/10 at Forteau Bay.

PUMPKIN

POWDERY MILDEW (Erysiphe cichoracearum) was general on all varieties of pumpkin foliage late in the season in the Okanagan Valley, B.C. (G.E. Woolliams). It was prevalent in several fields in Essex Co., Ont. on pumpkins grown for canning. Foliage was prematurely destroyed in Sept. (C.D. McKeen).

RADISH

WHITE RUST (Albugo candida) infected greenhouse-grown radishes at Beauport, Que. (D. Leblond).

RHUBARB

RING SPOT (virus) sev. affected a single plant in a planting at Charlottetown, P.E.I. (R.R. Hurst).