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THIRD SUPPLEMENT

TO

PARTIAL BIBLIOGRAPHY OF VIRUS DISEASES OF PLANTS *

By JOSÉ I. OTERO, *Librarian* and MELVILLE T. COOK, *Pathologist.*

Abbot, E[rnest] V[ictor]
Conditions influencing germination of seed cane and stands with disease resistant varieties. Sugar Bull. **14**(20) : 1–6, 1936.

This paper contains brief references to mosaic but gives much more attention to other diseases.

Abegg, F. A., & Owen, F. V.
A genetic factor for curly-top disease resistance in beets (*Beta vulgaris* L.) and linkage relationships. Amer. Nat. (Abstract) **70**(726) : 36, 1936.

Acqua, C.
Sulla natura degli ultravirus. (On the nature of ultraviruses.) Rend. Sed. Reale Acad. Naz. Lincei **21** : 593–599, 1935.

Adams, J[ames] F[owler]
The curly top virus on spinach. Canning Trade **59**(10) : 7–8, 1936.
Popular.

Adams, R. L.
The California beet blight. Thesis for the M. S. degree. Univ. California 1909.

Afzal, Husain M.
Symposium on virus diseases of plants. Proc. Indian Sci. Congr. **20** : 445–454, 1933.

Ainsworth, G. C.
Spotted wilt of tomatoes. Expt. & Res. Sta. Cheshunt 18th Ann. Rpt. **1932** : 29–45, 1933.

Virus diseases. Expt. & Res. Sta. Cheshunt, 20th. Ann. Rpt. **1934** : 60–66, 1935.

(*) Journ. Agric. Univ. Puerto Rico 18(1–2) : 1–410, 1934; 19(2) : 129–313, 1935; 20(3) : 741–818, 1936.

Virus diseases. Expt. & Res. Sta. Cheshunt, 21st. Ann. Rpt. **1935**: 56–62, 1936.

Record of bushy stunt and fern leaf of tomatoes, fig mosaic, a mosaic of water cress, recovery from spotted wilt and effects of tobacco mosaic on seedlings of tomato plants.

Virus diseases. Expt. & Res. Sta. Cheshunt, 22nd. Ann. Rpt. **1936**: 59–62, 1937.

Record of Several diseases.

"Enation mosaic" of tomato caused by a virus of tobacco I type. Ann. Appl. Biol. **24**(3): 545–556, 1937.

This disease causes pronounced malformations of the leaves especially outgrowths on the under sides. This is caused by a strain of tobacco virus I.

Akenhead, D., Harris, R., Berkeley, G[arven] H[ugh] & Massee, A. M.

The degeneration of the strawberry. Imp. Bur. Fruit. Prod. East Malling, Tech. Comm. **5**, 28 p., 1934.

Probably crinkle or yellow edge.

Aleksandrov, A. G., & Aleksandrova, O. G.

(On the mosaic disease of wheat endosperm.) Compt. Rend. (Doklady) Acad. Sci. U.S.S.R. **17**(9): 495–498, 1937.

Allen, J.

Control of pests and diseases. Gard. Chron. **99**: 390, 1936.

Contains notes on "Big bud" on black currants.

Ando R.

(On dwarf disease of rice plant.) Journ. Japanese Agric. Soc. **347**: 1–3, 1910.

Andrews, F. W.

The effect of leaf curl disease on the yield of the cotton plant. Empire Cotton Grow. Rev. **13**(4): 287–298, 1936.

The disease is the cause of significant losses.

Anonymous

Experiments for the control of dwarf disease of potatoes. Oklahoma Agric. Expt. Sta. Ann. Rpt. **1915**: 143–144, 1916; **1916**: 183–184, 1917.

Varietal susceptibility of the potato to the curly dwarf. Oklahoma Agric. Expt. Sta. Ann. Rpt. **1915**: 20, 1916; **1916**: 20, 1917; **1919**: 65–66, 1921.

Effect of selection of "seeds" on the yield of the potato crop. Journ. Dept. Agric. Ireland **22**:378–380. 1923.

Popular notes on leaf roll diseases.

Bunchy-Top.—Departamental Action. Queensland Agric. Journ. **26**: 297–298, 1926.

Scotland: Plant diseases and pests. Intern. Rev. Agric. **22**(6): 94–95, 1931.

Contains a note on a virus disease of Aurantium lilies.

Investigations on the spike-disease of sandal I, IV, Bangalore, 1931–32. Indian Inst. Sci. Bangalore, 1932.

Contribution á la connaissance de la maladie del' enroulement des feuilles de la pomme de terre. (Contribution to the knowledge of the leaf roll disease of the potato.) Prog. Agric. & Vitic. (Montpellier) **100**: 507–509, 1933.

Insect transmission of spike-disease. Nature **132**(3337): 592–593, 1933.

Spotted wilt of tomatoes. Expt. & Res. Stat. Cheshunt, Circ. **7**, 3 p., 1933.

The "degeneration" of the strawberry. Imp. Bur. Fruit Prod. Tech. Comm. **5**: 28, 1934.

The "kromnek" disease of tobacco. Rhodesia Agric. Journ. **3** (1): 9–10, 1934.

Poor potato stands traced to yellow dwarf. Wisconsin Agric. Expt. Sta. Ann. Rpt. **1932–1933**: 84–85, (Bull. **428**), 1934.

Recent research on Empire products. A record of work conducted by Government Technical Department overseas. Agriculture. Bull. Imp. Inst. **32**(3): 437–467, 1934.

Discusses cassava mosaic.

Summary report of progress, 1934. Maine Agric. Expt. Sta. Bull. **377**: 323–326, 1934.

Reports transmission studies of latent mosaic, mild leaf rolling, rugose mosaic and streak on potatoes.

Virus disease research. Scott. Soc. Res. Plant Breeding (Edinburg) Report **1933–34**: 15–17, 1934.

False blossom. U.S.D.A. Plant Disease Rept. **19**(8) : 121–128, 1935.

Mosaikkrankheiten in Perú. (Mosaic diseases in Perú.) Zeitschr. Zuckerind. Cechosl. Rpt. **60** : 204–205, 1935.

Mosaksyge hos agurke. Gartn. Tid. **51**(33) : 417–419, 1935.

Virus apparently made visible at last. The Literary Digest July 13, p. 18, 1935.

Apparently popular.

Die Abbaukrankheiten der Kartoffel. Wiener Landw. Zeitg. **86** : 135, 1936.

Big bud currant reversion and the B.B.C. Gard. Chron. **99** (2577) : 305, 1936.

Burgonya sárgafoltossága. Mezögazdaság **13** : 189, 1936.

The Columbian purple raspberry carries the virus causing mosaic in red and black raspberries. Farm. Res. New York State Stat. 2, No. 4, 12 p., 1936.

Filtrierbares Virus als Kranheitserreger bei Mensch, Tier und Pflanze. Ernährg. d. Pflanze **32** : 420–422, 1936.

High temperature favors yellow dwarf. Wisconsin Agric. Expt. Sta. Ann. Rpt. **1934–1935** : 103–105, 1936.

Learn manner in which tobacco mosaic overwinters in the soil. Wisconsin Agric. Expt. Sta. Ann. Rpt. **1934–1935** : 133, 1936.

Occurrence of English mosaic on red raspberry in Oregon. U.S.D.A. Plant Disease Rept. **20**(7) : 123–125, 1936.

Phony peach disease under control. U.S.D.A. Plant Disease Rept. **20**(8) : 138, 1936.

Peach virus diseases in Michigan in 1935. U.S.D.A. Plant Disease Rept. **20**(9) : 145–146, 1936.

Phony peach disease found in Indiana and Pennsylvania. U.S.D.A. Plant Disease Rept. **20** : 296, 1936.

Potato Leaf-roll. Min. Agric. & Fisheries, London Adv. Leaflet 278, 4 p., 1936.

La rosette de l'arachide. (Peanut rosette) Sta. Expt. de L'arachide Bombey. Bull. des Matiéres Grasses Inst. Col. Marseille **20**(8) : 201–205, 1936.

Virus diseases of peach. Michigan Agric. Expt. Sta. Bienn. Rpt. **1934–1936**: 21, 1936.

Virus diseases. Gard. Chron. **99**: 209, 353, 300, 1936.

Virus diseases of sugar cane. Int. Sugar Journ. **38**(453) : 330–332, 1936.

Streak disease in South Africa. Mr. Wuthrich's observations from India. South Africa Sugar Journ. **20**(8) : 503–505, 1936.

Notes from a letter from Mr. E. G. Wuthrich.

New sugar-beet varieties for the curly-top area. U.S.D.A. Circ. **391**, 4 p., 1936.

Origen y desenvolvimiento del mosaico de la caña de azúcar. (Origen and development of sugar cane mosaic.) Rev. Agric. Puerto Rico **28**(4) : 749–763, 1937.

Review of conference by C. E. Chardon at the Sociedad de Agricultores de Colombia on January 22, 1937. Dr. Chardon made a review of the study of sugar cane mosaic with special reference to the work done in Puerto Rico.

Potato virus disease control. Agric. Gaz. New South Wales **48** (10) : 573–677, 1937.

Plant diseases recorded in New South Wales. Dept. Agric. New South Wales, Suppl. No. **7**, 1937.

Records virus diseases on 27 hosts, some of them new.

Report Proc. Second Int. Congr. Microbiol. Contr. **1936**: 71–91, 1937.

Viruses and virus diseases in animals and plants. Discussion on the general characteristics of viruses, including bacteriophage. R. P. White, J. Henderson Smith, W. M. Stanley, K. M. Smith, F. C. Bawden, R. N. Salaman, H. H. Storey, and T. Matsumoto discussed on plant viruses.

Recovery from virus diseases causes immunity in tobacco. Journ. Term. Acad. Sci. **12**(2) : 178, 1937.

Dr. James Johnson has announced that tobacco plants recovering from tobacco streak acquire a considerable degree of immunity from further infections.

Ziekten en Beschadigingen van het aardappeloof. Virusziekten, Verslagen en Meded. van den Plantenziekten-kundigen Dienst te Wageningen. **6**, 31 p., 1937.

Contains a brief discussion of leaf-roll (phloemnecrosis, leptonecrosis) mosaic, crinkle in aucuba and stipplestreak.

Anson, R. R.

Leaf curl disease of cotton in the Fiji islands. Second Conf. Cotton Growing Problems, London, Rpt. **1934**: 195–196, 1934.

A record.

Antal, Gulyás

A magyar dohányok virusbetegségei. (Virus disease on Hungarian tobacco.) Különleyomat a Kiser Koz. **39**(1–3) : 1–35, 1936.

The author states that the object of the paper is to study the biology of virus diseases of tobacco. He gives the behavior and symptoms of several tobacco virus diseases and their relative damage to the crop. Concludes by giving advise as to tobacco fertilization.

A burgonya virusbetegégei. (The virus diseases of the potato.) Különlenyomat a M. Kir. Gazdssagi Akadémia I. Kötet **3** füzetebol 63 p., 1938.

A study of the virus diseases of the potato that occur in Hungary.

Arnaud, G[abriel,] & Arnaud, M.

Les maladies a virus des Rosacées amygdalées. (The virus diseases of Amygdalaceous Rosaceae.) Compt. Rend. Acad. Sci. (Paris) **202**(10) : 869–871, 1936.

A study of virus diseases of *Prunus persicae, P. spinosa* and *P. avium*.

Les maladies a virus des plantes. (Virus diseases of plants.) Prog. Agric. & Vitic. **106**(50) : 562–567, 1936; **107**(2) : 35–38, (4) : 86–90, (5) : 110–113, (6) : 138–141, 1937.

The author discusses in semipopular form virus diseases of plants in general and some virus diseases in particular.

Artem'ev, G. V.

Virusnye Zabolevaniia rasteniia vo vlazhbykh subtropikakh. (Virus diseases of plants in humid subtropics.) Sovetsk. Subtrop. (Moskva) **1936**(12) : 10–19, 1936.

Artschwager, Ernst, & Starrett, Ruth C[olvin]

Histological and cytological changes in sugar-beet seedlings effected with curly top. Journ. Agric. Res. **53**(9) : 637–657, 1936.

A very complete study of the histology and cytology of the diseased plants.

Arthur, J[oseph] C[harles], & Golden, K. E.

Diseases of sugar beet root. Indiana Agric. Expt. Sta. Bull. **39**: 54–62, 1892.

The disease referred to in this paper and supposed to be due to bacteria was probably a virus disease, recently described by Coons et al as "Savoy".

Attanasoff, D(imitr)

(Diseases of cultivated plants.) Imprimerie de la Cour, Sofia, University Library No. **137**: 62–181, 1934.

Includes tobacco mosaic and ring spot, potato virus diseases, plum, peach, cherry and apricot mosaic, grape vine mosaic, apple bitter pit, peanut mosaic and curl.

Mosaic of stone fruits. Phytopath. Zeitschr. **8**(3): 259–284, 1935.

Descriptions of mosaic on apricot, cherry, peach and plum. Infection experiments gave positive results. The disease is spread by *Anuraphis padi.*

Infectious chlorosis of citrus or mal seco. Rapp. Nat. Sec. V., Theme 9, (No. 4) Congr. Intern. Hort. II, Rome, 4 p., 1935.

Believes that *Deuterophoma tracheiphila* follows virus infections and that "mal seco" is the same as "Trabut's infectious chlorosis."

Mosaic diseases of pome and stone fruits. Rapp. Nat. Sec. V. Theme 9, (No. 5) Congr. Intern. Hort. II, Rome, 6 p., 1935.

Virus diseases of plants: A bibliography. I Supplement. Phytopath. Zeitschr. **10**(4): 339–463, 1937.

Azevedo, Nearch

Observacoes sobre uma doenca virus en tomateiro. (Observations on a virus disease of the tomato.) Rodriguesia **2**(6): 209–212, 1936.

A description of a disease resembling the American ring spot but different from the spotted wilt.

Baines, R[ichard] C[ecil]

The status of peach virus diseases in Indiana. Hoosier Hort. **18**(12): 180–182, 1936.

Popular.

Bald, J[ames] G[rieves]

An F-type potato virus in Australia. Nature **139**(3525): 674, 1934.

This strain has been reported from Australia. It attacks pepper and *Solanum nigrum.*

The use of numbers of infections for comparing the concentration of plant virus suspensions. I. Dilution experiments with purified suspensions. Ann. Appl. Biol. **24**(1) : 33–55, 1937.

The author states that many virus properties can be measured only indirectly in terms of the relative concentration of the virus particles in a suspension and there are two types of reactions which are generally called virological. He describes the one based on "the production of symptoms in a susceptible host plant inoculated with a sample of virus". The other based on "the liberation of specific antibodies into the sera of experimental animals infected with the virus" have been described in previous papers.

The use of numbers of infections for comparing the concentration of plant virus suspensions. II. Distortion of plant virus dilution series. Ann. Appl. Biol. **24**(1) : 56–76, 1937.

A continuance of previous studies, with special reference to distortions in the dilution experiments. The author discusses two types: (*a*) unpurified viruses of tobacco mosaic group and (*b*) potato virus X, viruses of tobacco ring spot, tobacco necrosis, cucumber mosaic and tomato spotted wilt which are less resistant to loss of virulence.

The use of numbers of infections for comparing the concentrations of plant virus suspensions. III. The effect of carbon on the production of lesions by viruses of the tobacco mosaic group. Ann. Appl. Biol. **24**(1) : 77–86, 1937.

A comparative study of the spreading power of distilled water suspensions of plant juice, suspensions of finely divided carbon (lamp black) and a commercial spreader. The best results were obtained with the carbon. The experiments were conducted with *Nicotiana glutinosa*.

Virus molecules. Journ. Austral. Inst. Agric. Sci. **3**(2) : 93–96, 1937.

The author refers to the confusion resulting from the invasion of virus borders by workers in other fields; reviews the work of Stanley, Beale and others and says:

"Here we have the same two opinions about viruses, as have been held about bacteria, that they are a bridge between lower and higher forms of organization, and that they are derived by a gradation of higher forms. The matter is not likely to be settled soon, not perhaps until a free-swimming pelagie form of virus is found in equatorial waters; even then perhaps diehards of either opinion will still be found."

Investigations on "spotted wilt" of tomatoes. III. Infection in field plots. Bull. Council Sci. & Ind. Res. Australia **106**, 32 p., 1937.

The author discusses (1) the fluctuations in the severity of infections, (2) the influence of the weather on infection and (3) the distribution of infected plants in field plots.

The disease is transmitted almost entirely by *Thrips tabaci* and *Frankliniella insularis*. The development and dispersal of the insect vectors is dependent largerly on weather conditions, especially temperature.

----------, & **Briggs, G. E.**
Aggregation of virus particles. Nature **140**: 111, 1937.

The authors refer to the description by Bawden and others of the shape of the particles of tobacco mosaic virus which has been confirmed by a photograph recently published by Best. They also say that "Further evidence that virus particles, even in dilute solutions, may form chain aggregates is obtained from experiments on the relation between dilution of virus and number of infections caused." This is followed by a brief report of studies with purified preparations.

Ballard, W. S., & Lindner, R. C.
Studies of the little-leaf disease in California. Proc. Amer. Soc. Hort. Sci. (1934) **32**: 1–10, 1935.

Barner, J[ohannes]
Intrazellulare Stäbe bei Viruskranken Tabak-und Kartoffelpflanzen. (Intracellular bodies in virus diseases of tobacco and potato plants.) Nachrichlanbl. Deut. Pflanzenschtzl. **17**(4): 33–34, 1937.

Intrazellulare Stäbe bei Viruskranken Solanaceen und Cucurbitaceen. (Intracellular bodies in virus diseased solanaceous and cucurbitaceous plants.) Angew. Bot. **19**(6): 553–561, 1937.

Barton-Wright, E[ustace]
Recent advances in Botany, 1932.

This is a text book. The last chapter is devoted to virus diseases.

----------, & **McBain, Alan**
A comparison of the nitrogen metabolism of normal with that of leaf-roll potatoes. Trans. R. Soc. Edin. **57**: 309–349, 1933.

----------, & ----------
Possible chemical nature of tobacco mosaic. Nature **133**(3355): 260, 1934.

----------, **et al.**
Virus disease research. Scott. Soc. Res. Plant Breeding, Rpt. Ann. Gen. Meetg. p. 13–17, 1935.

Basset, J., Gratia A(ndré), Machebocuf, M., & Manil, P.
Action of high pressures on plant viruses. Proc. Soc. Expt. Biol. & Med. **38**(2): 248, 1938.

Tobacco mosaic virus was inactivated at 8,000 atmospheric pressure for 45 minutes.

Bawden, F. C.

The virus causing top necrosis (Acronecrosis) of the potato. Ann. Appl. Biol. **23**(3) : 487–497, 1936.

The disease can be produced by several viruses. The author has studied the reaction of several hosts to these viruses.

----------, **Pirie, N. W., & Spooner, P. C.**

The production of antisera with suspensions of potato virus X inactivated by nitrous acid. Brit. Journ. Expt. Path. **17**(3) : 204–207, 1936.

The authors summarize their results as follows: "Antisera indistinguishable from those prepared by injecting suspensions of active virus can be prepared in rabbits by intravenous injection of suspensions of virus X inactivated by nitrous acid. Both fix complement and flocculate with virus suspensions, but not with the sap of healthy tobacco plants and both are equally effective in neutralizing the virus *in vitro*."

----------, ----------, **Bernal, J. D., & Fankuchen, I.**

Liquid crystalline substances from virus infected plants. Nature **138**(3503) : 1051–1052, 1936.

The authors follow the work of Stanley and say: "We have confirmed these results, but have found that by further purification the protein in neutral aquous solution, can be obtained in liquid crystalline states."

After giving the results of their studies, they said,—"These results have a certain intrinsic interest, but this would naturally be greatly enhanced could it be shown that these rods are in fact virus particles. This conclusion seems to us both reasonable and probable, but we feel it is still not proved, nor is there any evidence that the particles we have observed exist as such in infected sap."

----------, & ----------

Liquid crystalline preparations of cucumber viruses, 3 and 4. Nature **139**(3517) : 546–547, 1937.

The authors report that they were unable to transmit three strains of tobacco mosaic (previously reported by them) to cucumber plants and that cucumber plants are immune to tobacco mosaic virus. They described their most effective method of isolation and give other data.

----------, & ----------

The relationship between liquid crystalline preparations of cucumber viruses 3 and 4 and strains of tobacco mosaic virus. Brit. Journ. Exp. Path. **18**(4) : 275–291, 1937.

The authors made comparative studies of strains 3 and 4 of cucumber mosaic virus with tobacco mosaic virus, aucuba mosaic virus and enation mosaic virus. They say that,—

"Although these viruses have a distinct host range from tobacco mosaic virus, the purified preparations have similar chemical composi-

tions and many properties in common with purified preparations of strains of tobacco mosaic virus; they differ from tobacco mosaic virus however, more widely than the recognized strains of tobacco mosaic virus from each other. The cucumber viruses and the tobacco mosaic viruses have common antigens.''

----------, & ----------
The isolation and some properties of liquid crystalline substances from solanaceous plants infected with three strains of tobacco mosaic virus. Proc. Roy. Soc. London Ser. B. No. **832** p. 274–320, 1937.

The author studied viruses of tobacco mosaic, aucuba mosaic and enation mosaic. They isolated nucleoproteins with characteristic optical properties from all three strains but not from healthy tobacco. They describe the properties of these nucleoproteins.

----------, & ----------
A plant virus preparation in a fully crystalline state. Nature **141**: 513–514, 1938.

Specific proteins believed to be virus have been isolated and found to lack three dimensional regularity characteristics of true crystals.

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Liquid crystalline preparations of potato virus X. Brit. Journ. Exp. Path. **19**(1): 66–82, 1938.

The authors describe methods for the isolation of nucleoprotein from *Nicotiana Tabacum. N. glutinosa* and *Lycopersicum esculentum*. The virus is less filterable after purification than in the untreated sap. These are two types of inactivation,—''one leads to a loss of infectivity without changing the optical properties or serological reactions, where as the other denatures the protein and destroys all three.''

Discussion on recent work on heavy proteins in virus infection and its bearing on the nature of viruses. Proc. Roy. Soc. Med. **31**: 199–210, 1938.

A discussion of protein crystals.

Bayma, A. Da Cunha
(Mosaic disease of sugar-cane in the State of Ceará, Brazil.) O Compo (Río de Janeiro) **4**(7): 74–78, 1938.

Beale, Helen Purdy (see **Purdy Beale, Helen Alice**)

Bechhold, H.
Enzyme oder Lebewesen? (Ferment or living entity?). Kolloid Zeitsch. **66**(3): 329–340, **67**(1): 66–79, 1934.

The author concludes that viruses are not enzymes.

----------, **& Erbe, F.**

Versuche zur aufklärung des Mechanismus der "Kupferprobe" zur feststellung des Kartoffelabbaus. (Attempts at the explanation of the mechanism of the copper test for the determination of potato degeneration.) Phytopath. Zeitschr. **9**(3): 259–296, 1936.

There was no appreciable difference between diseased and healthy potatoes.

Bechwith, C[harles] S[teward]

False blossom. Amer. Cranbery Growers' Assoc., Proc. Ann. Meetg. **6**(1935): 25–26, 1936.

Popular appeal for control.

Bell, A[rthur] F[rank]

Fiji disease. Eradication of diseased stools in young sugar cane. Cane Grow. Quart. Bull. Queensland **4**(2): 39, 1936.

Report of the Division of Entomology and Pathology. Rpt. Bur. Sugar Exp. Sta. Ind. **1935**: 19–27, 1936.

Gives data on Fiji disease and chlorotic streak (fourth disease.)

Save P.O.J. 2878. Queenland Agric. Journ. **48**(6): 714–718, 1937.

This variety is threatened by the Fiji disease.

Fiji disease of sugar cane. Proc. Queensland Soc. Sugar Cane Tech. **9**: 211–218, 1938.

Bellair, G.

Chlorosis of peaches and roses. Rev. Hort. & Agric. Afrique Nord **38**: 261–264, 1934.

Benes, G.,

Court-noué et chlorose. (Court-noué and chlorosis.) Prog. Agr. & Vitc. **102**(29): 81–84, 1934.

Benllock, M., & Domínguez, F.

La enfermedad de los pimentales en Aldeanueva del Camino. (Virus disease of chillies). Bol. Pat. Veg. & Ent. Agric. **7** (7): 27–30, 1934.

Description of this disease of occurrence in Spain, known as "niebla nueva" and "niebla vieja", early and late blight, probably due to a virus..

Bennett C[arlyle] W[ilson], & Esau, Katharine

Further studies on the relation of the curly top virus to plant tissues. Journ. Agric. Res. **53**(8): 595–620, 1936.

"Anatomical evidence indicates that the curly top virus invades the phloem of the entire vascular system of beet and tobacco. In susceptible

varieties of beet the disease is characterized by necrosis of the phloem and hyperthrophy of the phloem and pericycle. Liquid content of the phloem moves through the intercellular spaces of the extraphloem tissue and accumulates on the surface of petioles and leaves.''

There is less exudation in resistant beets and no abnormalities. The authors also made a study of this disease on tobacco plants. Also a study of the virus in the seeds.

Correlation between movement of the curly top virus and translocation of food in tobacco and sugar beet. Journ. Agric. Res. **54**(7) : 479–502, 1937.

This paper gives the results of studies of the movements of curly top virus in the beet, *Nicotiana tabacum* and *N. glauca*. The rate of movement was extremely variable and the author concludes that ''The way in which the curly top virus invades the plant indicates that virus movement bears little or no relation to virus multiplication or to virus concentration gredients, but is dependent on physiological processes that take place in the normal plant.''

---, & **Wallace, H. E.**

Relation of the curly top virus to the vector, *Eutettix tenellus*. Journ. Agric. Res. **56**(1) : 31–51, 1938.

A viruliferous insect can pick up the virus in one minute and transmit to a healthy plant in one minute. A non-viruliferous insects may pick up enough virus to transmit by feeding on diseased plants for two days. Fasting reduces the power to transmit. Virus was found in the blood, salivary glands, feces and alimentary tract of the insects. Ability to cause infections decreased over a period of 8 to 10 weeks. Some insects with low charge of virus lost power to transmit in 54 days. Several other species of insects picked up the virus but lost it in a short time.

Berkeley, G[arven] H[ugh]

The ''degeneration'' of strawberry. III. The phenomenon of root rots in connection with strawberry degeneration. Imp. Br. Fruit Prod. Tech. Comm. **5** : 16–19, 1934. (East Malling Res. Sta. 22nd. Ann. Rpt. **1934** : 65, 1935.)

Suspected mosaic disease of strawberry. Canada Progress Rpt. Dom. Bot. **1931–34** : 58, 1935.

A strain of the virus which causes streak in tomato. Canadian Journ. Res. **C 14** : 419–424, 1936.

The author gives the results of experiments with these strains of the virus causing tomato streak—(*a*) tomato streak virus K, (*b*) tomato streak virus I (Ontario strain) and (*c*) tobacco virus I. The last can be used for immunizing against the other two. The first and second are believed to be strains of the last.

Mosaic and ring spot, two dahlia diseases. Canada Hort. Floral Ed. **60**(2) : 25–26, 1937.

Popular.

Prevention of virus diseases of greenhouse-grown tomatoes. Canada Dept. Agric. Circ. **118**, 7 p., 1937.

A study of losses due to several virus disease in greenhouses and recommendations for their control.

Prevention of tobacco mosaic in Ontario. Canada Dept. Agric. Circ. **119**, 7 p., 1937.

Dahlia mosaic and its control. Canada Hort. **61**(5) : 146–147, 1938.

Popular.

Berkner, F. W., & Hecker, G.

Die Nachwirkung von verschiedenen Kalidungeru und Pflanzeiten des vorjahves auf den Pflanzgutwert von Kartoffeln. (The after-effect of various potash manures and planting times in the previous year on the value of potatoes for seed.) Landw. jb. **82**(1) : 125–139, 1935.

The best results with respect to degeneration were on potatoes without potash.

Ein weiterer Beitrag zur Frage des Abbauproblems der Kartoffel. (A further contribution to the degeneration problem in potatoes.) Pflanzenbbau **12**(7) : 243–274, 1936.

A review of the literature and summarization of recent studies.

Zur Frage des Kartoffel-Abbaus. Ist es möglich, die neigung zum Kartoffel-Abbau-limduszuschieben? (On the question of potato degeneration. Is it possible to postpone the tendency to potato degeneration?) Dutsch. Landw. Pr. **63**(4) : 167, 1936.

The symptoms are more severe on the early crops.

Bernal, J. D., & Fankuchen, I.,

Structure types of protein "crystals" from virus-infected plants. Nature (London) **139**(3256) : 923–924, 1937.

A study of the dimensions of the molecules.

Best, Rupert J.

The effect of environment on the production of primary lesions by plant viruses. Journ. Australian Inst. Agric. Sci. **1**(4) : 159–161, 1935.

A study of the effect of light on the virus of tomato spotted wilt and tobacco mosaic. Spotted wilt in tobacco is inhibited by bright sunlight and controlled by artificial light. Tobacco mosaic virus in *Nicotiana glutinosa* developed more lesions in the glass house than in the laboratory. More lesions are observed at 20°C than at 15°C.

----------, & **Samuel, Geoffrey**

The reaction of the viruses of tomato spotted wilt and tobacco mosaic to the pH value of media containing them. Ann. Appl. Biol. **23**(3) : 509–537, 1936.

The pH value must be taken into consideration or the results will be erroneous because certain pH values cause inactivation while others do not. A study of the pH relationships may aid in classification. Two viruses in a mixture may be separated by the use of the pH values. The determination of the host range or the occurrence of the virus in various parts of a plant by reinoculation is not sufficient. The negative results may be due to inactivation of the virus by acids or other substances. The pH must be taken into consideration. The activity pH curves resemble enzyme curves more than living organism curves. A virus may be inactivated at certain pH values as rapidly as formed.

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The effect of various chemical treatments on the activity of the viruses of tomato spotted wilt and tobacco mosaic. Ann. Appl. Biol. **23**(4) : 759–780, 1936.

The authors give a brief review of the subject, describe their experiments in full. In the summary they say: ''It is concluded that secondary oxidation products caused the inactivation observed.'' ''Attempts to reactivate virus which had been inactivated by exposure to air or by means of Hg Cl_2 were unsucessful.'' It has been shown that the inactivating effects observed are due to an action on the virus itself.

Precipitation of the tobacco virus complex at its isoelectric point. Australian Journ. Expt. Biol. Med. Sci. **14**(1) : 1–13, 1936.

A study of the precipitation of ordinary tobacco mosaic (tobacco virus I) with buffer solutions at varying hydrogen-ion concentrations.

Studies on a fluorescent substance present in plants. I. Production of the substance as a result of virus infection and some applications of the phenomenon. Australian Journ. Expt. Biol. & Med. Sci. **14**(3) : 199–213, 1936.

This fluorescence was observed when the plants were examined with ultraviolet light but was found to be present in other types of injuries.

The effect of light and temperature on the development of primary lesions of the viruses of tomato, spotted wilt and tobacco mosaic. Australian Journ. Expt. Biol. & Med. Sci. **14**(3) : 223–239, 1936.

A study of the environmental effects of the viruses of the tomato and tobacco mosaic on *Nicotiana tabacum* and *N. glutinosa*.

Neither sunlight nor artificial light appeared to affect tobacco mosaic virus lesions quantitatively.

Sunlight was found to exert and inhibiting action on the appearance to tomato spotted wilt lesions on *N. tabacum*. A similar but much feebler effect was observed with artificial light.

Prevention of virus disease of greenhouse-grown tomatoes. Canada Dept. Agric. Circ. **118**, 7 p., 1937.

The relationship between the activity of tobacco mosaic virus suspensions and hydrion concentration over the pH range 5–10. Australian Journ. Expt. Biol. & Med. Sci. **14**(4) : 323–328, 1936.

The virus was inactivated at about pH. 7.8 and the fraction inactivated became larger with increasing pH values up to pH 10.2. ''It is concluded that inactivation of the virus is associated with the naturalization of acidic groups.''

Investigations on plant virus diseases. Waite, Agric. Res. Inst. Univ. Adelaide Rpt. **1933–36** : 1–7, 1936.

A review of the author's work on spotted wilt of tomato.

Visible mesomorphic fibres of tobacco mosaic virus in juice from diseased plants. Nature **139**(3519) : 628–629, 1937.

The author refers to a short paper in Nature by Bawden, Pirie, Bernal and Fankuchen on ''Liquid crystalline substances from virus-infected plants.'' He states that he has arrived at similar conclusions and describes long mesomorphic fibers which he obtained. When agitated the fibres break into short rods. He concludes by saying—''The circumstance that under certain conditions the fibres have the appearance of short needles or rods raises the question as to whether the needles obtained by crystallization from ammonium sulphate solution, as first worked out by Stanley, may not in fact be short mesomorphic rods rather than true crystals.''

Artificially prepared visible paracrystalline fibers of tobacco mosaic virus nucleoprotein. Nature **140** : 547, 1937.

The author refers to a previous article containing photographs of mesomorphic or paracrystalline fibers obtained from tobacco mosaic virus. He now reports obtaining similar crystals by using a suitable pH (5 being most satisfactory) and by precipitation with 15 per cent ammonium sulphate at pH 7.

Investigations on plant virus diseases. Waite Agr. Res. Inst. Univ. Adelaide. Rpt. **1933–36** : 84–90, 1937.

This paper is a discussion of tomato spotted wilt and tobacco mosaic. The author summarizes his work as follows,—

"Viewing the plant viruses as a class and taking into account the property possessed by them in common with other viruses, of being able to multiply in living cells, and their wide range in size, the most logical picture of them appears to be of that class of complex organic structures built on a protein base with a large number and variety of active prosthetic groups, these latter entering into the biochemical reactions through which the viruses become evident and which are at same time concerned with processes which we have come to associate with life and living. This picture is essentially similar to that of Alcock's "living molecules" and in the present state of our knowledge seems to fit the facts best and to form a logical conception of this group of entities."

The quantitative estimation of relative concentrations of the virus of ordinary and yellow tobacco mosaics and tomato spotted wilt by the primary lesion method. Australian Journ. Exp. Biol. & Med. Sci. **15**(2) : 65–79, 1937.

"It is concluded that, on account of the number of factors involved, we could scarcely expect a single equation to represent the relationship between lesion number and virus concentration over the whole range. However, in practice under controlled conditions both with respect to inocula and test plants, that portion of the curves over which direct proportionality between lesion number and virus concentration holds, provides a useful working range in which to estimate relative concentrations with a reasonable degree of accuracy."

On the presence of an "oxidase" in the juice expressed from tomato plants infected with the virus of tomato spotted wilt. Australian Journ. Expt. Biol. & Med. Sci. **15** : 191–199, 1937.

The author summarizes his work in part as follows,—

"It has been shown that the juice expressed from the leaves of tomato plants infected with the virus of tomato spotted wilt contains an 'oxidase' enzyme tentatively identified as tyrosinase) which catalyses the oxidation of phenol, catechol, guinol and tyrosine in the presence of air. The reaction does not proceed to a demonstrable extent in suspensions of juice expressed from comparable parts of healthy plants but it does in suspensions of root juice."

The chemistry of some plant viruses. Australian Chem. Inst. Journ. & Proc. **4**(10) : 375–392, 1937.

The author discusses the viruses of spotted wilt of tomato and tobacco mosaic with special reference to the chemical properties. In his summary he says,—

"To sum up, it appears that there is no sharp break between living and non-living matter, and that viruses may be regarded as complex chemical structures, built on a protein base with a large number and

variety of prosthetic groups, through which they enter into those reactions by which they become evident and by which they multiply—reactions which we have come to associate with life and living. If we accept this view, then viruses may be regarded as living molecules of graded complexity of structure and organization covering the transition between the architecture of the larger non-living chemical molecules and the architecture of the simplest living cell.''

Beurnier.,

La rosettee de l' arachide. (Peanut rosette.) Bull. Mat. Grass. Inst. Colon. Merseille **20**(8) : 201–205, 1936.

Popular.

Bewley, W[illiam] F[leming], & Corbett, W[ilfred]

Mosaic disease investigation. Ann. Rpt. Expt. & Res. Sta. Nurs. & Mark. Gard. Industr. Deve. Soc. Cheshunt **15** : 51–52, 1930.

A paper on the control of cucumber and tomato mosaic by the use of clean seed.

Spotted wilt of tomatoes. Cheshunt Expt. Sta. Cheshunt, Hert. Circ. **1**, 3 p., 1933.

Popular.

Some factors which affect the quality of tomatoes. Fruit Grow. Flor. & Mark. Gard. **83**(2) : 748–750, 1937.

A popular paper. The first part is a discussion of virus diseases.

Bitancourt, A[gegislan] A.

As doencas de virus dos citrus (Virus diseases of Citrus.) Biológico **1**(8) : 255–262, 1935.

The author states that studies based on the relevant literature and his own observations show evidence enough to consider citrus psorosis, leprosis, ring blotch and zonate chlorosis as produced by viruses.

Black, L. M.

Some insect and host relationship of potato yellow dwarf virus. Phytopathology **26**(1) : 87, 1936.

A study of potato yellow dwarf in New York. Cornell Agric. Expt. Sta. Memoir **209**, 23, p. 1937.

A very thorough study of this disease, including symptoms, insect, transmission, hosts, and overwintering.

Mechanical transmission and properties of the potato yellow dwarf virus. Phytopathology (Abstract) **28**(1) : 3, 1938.

Blaringhem, L[ous Florimond]

Nouveau cas de mosaïque presente par un hybride de giroflées (*Cheiranthus chevri* et *Erysimum cheirantoides.*) A new case

of mosaic on a hybrid of wall flower (*Cheiranthus chevri* and *Erysimum cheirantoides.*) Comp. Rend. Acad. Sci. **203**(2): 1039–1042, 1936.

Blood, H[erbert] L[oren]

Curly top (Western yellow blight) of tomatoes in Utah. U.S.D.A. Plant Disease Rpt. **18**(11): 131–133, 1934.

The tomato curly top situation in Utah. U.S.D.A. Plant Disease Rept. **19**(11): 191–192, 1935.

The Utah tomato disease situation in 1935. U.S.D.A. Plant Disease Rept. **20**(6): 96–102, 1935.

Contains important data on curly top of sugar beet. Also a note on mosaic and streak of tomato.

Curly top of tomato in Utah. U.S.D.A. Plant Disease Rpt. **22**(14): 226, 1936.

A record of this disease in Utah for the third consecutive year.

Blümke.,

Wie lässt sich der Kartoffelabbau bekämpfen? (How can potato degeneration be combated? Mitt. Landw., Berlin. **52**(49): 1048–1050, 1937.

The author urges a thorough roguing during the month of May. The most important vector is *Lygus pabulinus.*

Bodine, E[dward] W.

Occurrence of peach mosaic in Western Colorado. Journ. Colorado–Wyoming Acad. Sci. **2**(1): 49, 1935.

The disease was found in Colorado May 19, 1934. Only previous records are from Texas.

---, **& Durrell, L. W.,**

The Maynard plum—a carrier of the peach mosaic. Science **86**(2221): 81, 1937.

Budding and root-grafting tests indicate that plums may be carriers of this disease.

The Maynard plum—A carrier of the peach mosaic. Phytopathology (Abstract) **27**(9): 954, 1937.

Abstract of paper read before the 21st Annual meeting of the Pacific Division of the American Phytopathological Society. The plum was suspected of being a carrier. It was proved to be a carrier by grafting buds from plum to healthy peach trees.

Bonazzi, A[ugusto]

Study on sugar cane mosaic. Science. **64**(1665): 529–530, 1926.

Boning, Karl

Über den Einfluse der Anionen der Düngesalze auf Abbau and Abbaukrankheiten der Kartoffel. (On the influence of the anion of the fertilizer salts on degeneration and degeneration disease of the potato.) Angew. Botanik **17**(2) : 323–335, 1935.

Boning-Senbert, E.,

Die Mosaikkrankheit der Gurken. (Mosaic disease of cucumber.) Prakt, Blätt. Pflanzenb. u, Pflanzensch, **33**(9–10) : 215–221, 1933–34.

Boyd, O[ran] C[ecil]

Losses due to leaf roll in potato variety test. U.S.D.A. Plant Disease Rept. **20**(21) : 333, 1936.

A brief note.

Boyle, L[ytton] W., & McKinney, H[arold] H[all]

Trichomes of incidental importance as centers for local virus infections. Science **85**(2210) : 458–459, 1937.

The authors report that the trichomes are of less importance than the epidermal cells.

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Local virus infections in relation to leaf epidermal cells. Phytopathology **28**(2) : 114–122, 1938.

This is a study of infections in trichomes and surface epidermal cells. The authors used common tobacco mosaic and inoculated leaves of *Nicotiana glutinosa, N. rustica* and *Capsicum frutescens.* The work involved mutilation of surface cells and trichomes and immediate inoculation.

Boysen-Jensen, P.,

Die Stoffproduktion der Pflanze (Blattrollkrankheit). Jena 108 p., 1932.

Branas, J., & Bernon, G.

Contribution a l'etude du court-noué de la vigne. (Contribution to the study of "court-noué" of the vine.) Rev. Path. & Ent. Agr. **22**(1) : 19–24, 1935.

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Contribution a l'etude du court-noué de la vigne. (Contribution to the study of "court-noué" of the vine.) Ann. Ecole Nat. Agr. (Montpellier) n.s. **23**(3–4) : 150–154, 1935.

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Troisiéme contribution a l'étude du court-noué de la vigne (Third contribution to the study of "court-noué" of the vine.) Rev. Vitic (Paris) **85**(2216) : 469–472, 1936.

The leaves from the diseased vines contain a higher content of glucosides than the leaves of healthy plants.

----------, ----------, & **Levadoux, L.**
Note sur la transmission par le sol de la dégénérescence de la vigne. (Note on the transmission of the degeneration of the vine by the soil.) Rev. Vitic. (Paris) **87**(2258) : 263–268, 1937.

This is a discussion of the importance of *Phylloxera* in the spread of degeneration diseases such as ''court-noué,'' ''arriciamiento,'' ''reisigkrankheit,'' fasciation, anomalie and panachure.

Brentzel, W. E.
''Purple top'' wilt of potato in North Dakota. U.S.D.A. Plant Disease Rept. **22**(2) : 44–45, 1938.

This disease has some symptoms that indicate that it is due to a virus, but this has not been definitely proven.

Bremer, H.
Zur Krauselkrankheit der Pelargonien. (On the curl disease of *Pelargonium*.) Blemen—u Pflansenbau. **48**(2) :—, 1933.

Brierley, Philip, & McWhorter, Frank P[aden]
A mosaic disease of iris. Journ. Agric. Res. **53**(8) : 621–635, 1936.

This disease was found to be widely distributed on the Pacific Coast. Intracellular bodies were present. Transmitted by tissue, by juice and by *Illinoia solanifolia* and *Myzus persicae*.

----------, & **McKay M[arion] B[ertice]**
Experiments with aphids as vectors of tulip breaking. Phytopathology **28**(2) : 123–129, 1938.

These studies show that the two viruses distinguished by McWhorter are transmitted by *Myzus persicae* and *Macrosiphum (Illinoia) solanifolia*. *Myzus circumflexus* transmitted in one trial. *Myzus solani* previously reported as a vector fails to transmit.

Briton-Jones, R. H., & Staniland, L. N.
The effects of strawberry aphids on the strawberry plant. Journ. Pom. & Hort. Sci. **6**: 127–136, 1927.

This paper probably referred to a virus carried by the aphids.

Bruner, S[tephen] C[ole]
Experimento sobre el daño que ocasione el mosaico a la caña Cristalina (Experiment on the damage of mosaic to Cristlina cane.) Cuba Est. Agron. Expt., Santiago de las Vegas, Dept. Entom. & Fitopat. Ann. Rpt. **1929–30** : 41–46, 1931.

Burns
Über das Durchwachsen der Kartoffeln. D. Kartoffelbau **20**: 38–39, 1936. (D. Kartofellhandel **22**(27) :—, 1936.)

Bukart, A., & Soriano, S.
Observaciones sobre el mosaico de las leguminosas. (Observations on the mosaic of luguminous plants.) Rev. Agron. Argentina **1**(3) : 229–230, 1934.

Burnet, F. M., Keogh, E. V., & Lush, D.
Immunology of plant viruses. The immunological reactions of the filterable viruses. Australian Journ. Expt. Biol. & Med. Sci. (3 suppl.) **15**: 279–283, 1937.

Burr, W. W.
A study of potato spindle tuber and combinations of spindle tuber with other degeneration diseases. Nebraska Agric. Expt. Sta. Ann. Rpt. **42**: 30–31, 1929.

Busse, (G.)
Zur Frage der Kartoffelabbaues. (On the question of potato degeneration.) Deutsche Landw. Presse **63**(17): 207, 1936.

Kartoffel–Abbau, Pflanzzeit und Ernteverfahren, Deutsche Landw. Presse **63**: 566, 1936.

Butler, E[dwin] J[ohn]
Views on the "spike" disease in sandal-wood. Reported by M. Muthannab, 6 p., 1904.

The nature of immunity in plants. Third Int. Cong. Comp. Path. Rpt. **1**(2): 1–16, 1936.

The author recognizes five types of acquired immunity, viz. (1) following initial infection in the case of virus diseases, (2) local immunity following initial infection, (3) immunity following vaccination in which antibodies may be present, (4) intracellular immunity and (5) immunity symbiosis.

Butler, O[rmond] R[ourke]
Potato disease experiments. New Hampshire Agric. Exp. Sta. Ann. Rpt. 1934, (Bull. 284), p. 15, 1935.

A report of progress on temperature studies on mosaic of potatoes.

Caldwell, John
Factors affecting the formation of local lesions by tobacco mosaic virus. Roy. Soc. (London) Ser. B, **119**(815): 493–507, **1936.**

The production of lesions may be reduced or abolished by the addition of certain substances (normal serum) to the juice containing the virus. These inhibitory substances may act on the virus by neutralizing its activity or the leaves by reducing susceptibility. The author proposes a method by which a distinction can be made.

The agent of virus disease in plants. Nature **138**(3503): **1065,** 1936.

This is a brief paper in which the author makes reference to his own published work and to the work of Stanley. The virus moves out of the young leaves rapidly. The movement of the food material has very little effect on the movement of the virus. The movement of the virus in protoplasmic strands is confirmed.

The movement of the agent in the plant. Deux. Cong. Int. Path. Comp. (Paris) 1931. II Compt. Rend. et. Comm. p. 480, 1931.

A note in English.

---, & **Smith, Kenneth M[anley]**

An air-borne plant virus. Nature **139**(3522) : 761–762, 1937.

A criticism.

---, & **James, A. L.,**

An investigation into the "stripe" disease of narcissus. I. The nature and significance of the histological modifications following infection. Ann. Appl. Biol. **25**(2) : 244–253, 1938.

There is a wide variation in the appearance of infected plants. It inhibits or destroys chlorophyll, stimulates cell division and cell growth. Inclusion bodies resemble X-bodies.

Caley, D. M.

Panachure infectiouse (breaking) des tulipes. (Infectious variegation (Breaking) of tulips.) Deux. Cong. Int. Path. Comp. (Paris) 1931, II Compt. Rend. et Com. p. 446–447, 1931.

A brief review.

Calinisan, M[elanio] R., & Hernández, Crispiniano C.

Studies on the control of abaca bunchy-top with reference to varietal resistance. Phil. Journ. Agric. **7**(4) : 393–408, 1936.

A study on varietal resistance and rouging. Some varieties are more resistant than others.

Caminha, Adriao

Sugar cane diseases in Brasil. Brasil Assuc. **7**(4) : 209–213, 1936. (Facts About Sugar (Abstract) **31**(12) : 471, 1936.)

Contains records of well known virus diseases.

Carne, W[alter] M[ervyn]

Spotted wilt of tomatoes. Journ. Dept. Agric. West Australia **2**(5) : 58, 1928.

---, & **Martin, D.**

Preliminary experiments in Tasmania on the relation of internal cork of apples and cork of pears to boron deficiency. Journ. of the Counc. for Sci. and Inds. Res. **10**(1) : 47–56, 1937.

This paper is included in the bibliography although there is some difference of opinion as to whether the disease is caused by a virus. This paper gives the results of fertilizer experiments for the control of the disease.

Carsner, E[ubanks]

Seasonal and regional variations in curly top of sugar-beets. Science **63**: 213–214, 1926.

Gives the results of studies on relation of weather to outbreaks of the disease.

----------, & **Piemeisel, R[obert] L[ouis]**

Sugar-beet curly top's spread aided by vast increase in host weeds. U. S. Dept. Agric. Year Book **1931**: 791–793, 1931.

Results from U. S. No. 1 resistant beet seed. Facts About Sugar **30**(2): 70, 1935. (Landb. Tijdschr. **48**(584): 179, 1936.)

Carter, W(alter)

Seasonal and regional variations in the curly top of sugar beets. Science **63**(1625): 213–214, 1926.

The toxic dose of mealy-bug wilt of pineapple. Phytopathology **27**(10): 971–981, 1937.

A study of *Pssudococcus brevipes* (Ckll.) as a carrier of the causal agent of this disease. The percentage of infection increases with number of insects but is not directly proportional to the number. There is a point of dosage beyond which there is a very little increase. Variability between different experiments is very high.

Aphis transmittal of *Commelina nudiflora* Linnaeus mosaic to pineapple. Ann. Ent. Soc. Amer. **30**(1): 155–158, 1937.

The virus of *C. nudiflora* is transmissible to the pineapple where it produces a spot very similar to yellow spot. The vectors are *Aphis gossypii, Myzus persicae* and *Macrosiphum solanifolii.*

Casella, Dominico

L' apiature del limone e la selezione gemmaria. (Variation in lemons and bud selection.) Ann. R. Sperim Agrumicolt. e Futticolt. Aciseale **1**: 47–49, 1933.

The author describes corrugated or ribbed strains of lemons which he believes be due to a virus. This character is transmitted by an aphid, *Toxoptera aurantii.*

Cation, Donald

An infectious rosette of peach trees. Michigan Agric. Exp. Sta. Quart. Bull. **16**(2): 79–84, 1933.

The role of plums in the spread of peach virus diseases. Michigan State Hort. Soc. Ann. Rpt. **65**: 61–63, 1935.

Popular.

Catoni, G.

Malattia e degenerazione della patata. (Disease and degeneration of the potato.) Boll. R. Stat. Pat. Veg. **15**(1) : 234, 1935.

Brief commentary on a manual published under the above title.

Malattia e degenerazione della patata. (Disease and degeneration of the potato.) A. G. Saturnia, Trento, 140 p., 1935. (Review in Riv. Agric. Rome **31** : 157–158, 1935.)

La degenerazione della patata (Degeneration of the potato.) First Convegno Nazionale per l'Incremento della Produzione della Patate etc., p. 29–30, 1935.

La degenerazione della patata. (Potato degeneration). Atti del Primo Convegno Incremento della Prod. della Patata, Como, p. 82–106, 1935.

Programma per la rigenerazione della patata e la produzione di buena semente nella Provincia di Trento. (Program for the regeneration of the potato and the production of good seed in the Trenton Province.) Trento, 8 p., 1936.

Cavanagh, A. E.

Report on phony peach disease control. Proc. Tennessee State Hort. Soc. **32** : 48–53, 1937.

A popular review. The disease has been known for 50 years or more.

Cayla, V.

La canne á sucre et le "sereh" á Java. (Sugar cane and "sereh" in Java.) L'Agron. Colon. (Paris) **22**(183) : 81–86, 1933.

Chabrolin, C.

Notes phytopathologiques Tunisiennes. (Tunisian phytopathological notes.) Bull. Soc. Hist. Nat. Afr. Nord. **26**(2) : 26–41, 1935.

Mosaic of *Vicia faba.*

Chamberlain, E[dward] E[dinborough]

Pea-mosaic. Host range and methods of transmission. New Zealand Journ. Sci. & Tech. **18**(6) : 544–556, 1935.

A virus disease of crucifers. New Zealand Journ. Agric. **53**(6) : 321–330, 1936.

A description and discussion of this disease which attacks *Brassica rapa, B. cernua, B. Japonica, B. Napobrassica, Sinapsis arvensis, Raphanus* sp. *B. napus* var. *chinensis, S. alba B. nigra, B. napus* var. *typica, B. oleracea* var. *bullata, B. oleracea* var. *botrytis* and *B. oleracea* var. *acephala.* It is transmitted by *Brevicoryne brassica* and *Myzus persicae.*

Nicotine content of tobacco. New Zealand Journ. Sci. & Tech. **18**(8) : 628–637, 1937.

Mosaic causes reduction in amount of nicotine.

Pea insects. Its systems, economic significance, and preventative treatment. New Zealand Journ. Agric. **54**(3) : 129–136, 1937.

A description of the disease and list of host plants. It is transmitted by *Myzus persicae. Aphis rumicis* and *Macrosiphum gei.* The virus overwinters in red-clover.

Tobacco-mosaic. Its appearance, cause, and control. New Zealand Journ. Agric. **55**(3) : 163–174, 1937.

Tobacco mosaic. New Zealand Journ. Sci. & Tech. **19**(4) : 209–226, 1937.

Yellow blotch-curl : a new virus disease of the red rasberry in Ontario. Canada Journ. Res. C. (Bot. Sci.) **16**(3) : 118–124, 1938.

Raspberry virus diseases and certification. Canad. Hort. (Fruit ed.) **60**(5) : 145–146, 1937.

Popular.

Chandler, W. H., Hoadland, D. R., & Hibbard, P. L.

Little-leaf or rosette of fruit trees. III. Proc. Amer. Soc. Hort. Sci. 1933, **30** : 70–86, 1934.

Little-leaf or rosette of fruit trees. IV. Proc. Amer. Soc. Hort. Sci. **32** : 11–19, (1934), 1935.

Chardon C[arlos] E[ugenio]

Informe sobre el "mosaico" de la caña de azúcar al Señor Ministro de Agricultura y Comercio, Dr. Manuel José Vargas. (Report of sugar cane mosaic to the Minister of Agriculture and Commerce, Dr. Manuel José Vargas.) Agricultura (Bogotá) **9**(6) : 108–120, 1937.

Observations on the mosaic disease in Colombia.

Orígenes y desenvolvimiento del mosaico de la caña de azúcar. (Origin and development of sugar cane mosaic.) Rev. Agric. Puerto Rico **28**(4) : 749–753, 1937.

Extract from a paper read before "La Sociedad de Agricultores de Colombia", Jan. 22, 1937.

El mosaico de la caña de azúcar en Colombia. (Sugar cane mosaic in Colombia). Rev. Agric. Santo Domingo, **28**(92) : 239–242, 1937.

Chattergee, N. C.

Entomological investigations on the spike disease of sandal. Pentatomidae (Hempt.) Indian Forest. Rec. **20**(9) : 1–31, 1934.

A study of the insect fauna of the sandal.

Entomological investigations on the spike disease of sandal (25), *Lepidoptera*. Indian Forest Rec. Ent. **1**(10) : 185–204, 1935.

A list of species collected.

---, **& Ramakrishna Ayyar, T. V.**

Entomological Investigations on the spike disease of sandal (26), *Coccidae* (Homopt.), Indian Forest Rec. Ent. **1**(12) : 233–242, 1936.

A list of species collected.

Chester, K[enneth] S[tarr]

The problem of acquired immunity of plants. Quart. Rev. Biol. **8** : 129–154, 275–329, 1933.

A serological estimate of the absolute concentration of tobacco mosaic virus. Science **82** : 17, 1935.

Serological tests with Stanley's crystalline tobacco-mosaic protein. Phytopathology **26**(8) : 715–734, 1936.

The author gives the following summary:

"1. The Schultz-Dale method was applied to materials containing several plant viruses, including tobacco-mosaic virus. It was found that the viruses tested gave no anaphylactic reactions. This was shown both by absorbing the muscles with healthy-plant juices prior to testing for virus reaction, and by using as virus hosts for sensitization and testing, respectively, two species of plants so remotely related that the virus was the only common serological element. Healthy-plant proteins, on the contrary, were highly anaphylactogenic. The proteins of healthy tobacco and healthy tomato were very similar serologically.

"2. The uteri of animals sensitized with healthy-plant proteins reacted to solutions of crystalline tobacco-mosaic virus protein, and the uteri of animals sensitized with the crystalline protein reacted to dilute extracts of healthy-tobacco proteins. Complement-fixation tests confirmed the anaphylactic tests in showing cross reactivity between the crystalline protein and healthy-plant protein. The evidence indicates that this cross reactivity is due not to a serological affinity between virus and healthy-tobacco protein, but to the presence in the crystalline material of a contaminating protein serologically allied or identical to protein of the healthy tobacco plant.

"3. Precipitin and complement-fixation experiments revealed the presence in the crystalline materials of considerable quantities of virus.

"4. Precipitin tests of the sera from sensitized guinea pigs showed that in a given animal tobacco-mosaic virus may be a highly active precipitinogen but inactive anaphylactically, while healthy-tobacco pro-

teins in the same animal may be comparatively inert in producing precipitins but highly active in stimulating anaphylaxis. This implies that the mechanisms of the two reactions are different, although the same antibodies may be concerned in both. It is possible that the molecular size or solubility of the respective antigens underlies this difference in antigenic manifestation.''

Separation and analysis of virus strains by means of precipitin test. Phytopathology **26**(8) : 778–785, 1936.

The author concludes by saying, ''From the evidence reported above it is concluded that the absorption technique used permits the diferentiation of strains of this same virus type. By using such a technique it has been shown that serological differences exist among certain strains of tobacco mosaic virus. Strains of latent potato-mosaic virus also separable from one another serologically. It was found that the precipitin absorption technique described, not only serves to distinguish virus strains, but also give some index of the constitution of the different virus.''

Liberation of neutralized virus and antibody from antiserum precipitates. Phytopathology **26**(10) : 949–964, 1936.

This paper gives the results of experiments which are summarized in part as follows:

''These findings demonstrate that when tobacco mosaic virus neutralized by its specific immune serum, the virus is not destroyed but is held in an impotent non-inefective condition from which it may be liberated if the antibodies are destroyed by pepsin digestion.''

The limitations of plant virus serology. Phytopathology (Abstract) **27**(2) : 124, 1937.

A critique of serology I. The nature and utilization of phytopathological procedures. Quart. Rev. Biol. **12**(1) : 19–46, 1937.

A simple and rapid method for identifying plant viruses in the field. Phytopathology **27**(6) : 722–727, 1937.

The author describes a method for the determination of viruses in the field which is much shorter and easier than the laboratory blood or precipitin test.

Serological studies of plant viruses. Phytopathology **27**(9) : 903–912, 1937.

The author has classified 34 viruses into 8 groups. Twenty-one viruses were found to be nonreactive. The author used a modified precipitin method which enables a rapid identification of the viruses. This is a very promising method for the identification and classification of viruses.

Cucumber mosaic in greenhouse petunias. U.S.D.A. Plan Disease Rept. **22**(5) : 81–82, 1938.

Chona, B. L.

Scheme for research on mosaic and other diseases of sugar cane. Scient. Rpt. Imp. Inst. Agric. Res. (New Delhi) **1935–36**: 112–122, 1937.

Chonard, P., & Dufrénoy, J[ean]

Assais sur les pommes de terre par les maladies a virus en haute montagne. Bull. Soc. Nat. Acclim. (France) **85**(192) : 40–44, 1938.

Choudina, I. P.,

(The virus disease of tobacco plants in the U.S.S.R.) (Narkompishchenprom S.S.S.R.—Glavtabak. Vscsoiuzuyi Nanchni Issledovatelskii Institut Tabachnoi i Makhorochnoi Promyshleunosti im A. I. Mikoiana V (I.T.I.M.), Septor Zashchity Tabaka. Vykusk Krasnodar, No. **126**. 76 p., 1936.

Christoff, Alexander

Mosaikfleckigkeit Chlorose und Stippenfleckigkeit bei Atpfeln, Birmen und Quitten. (Mosaic spotting, chlorosis and bitterpit spotting in apples, pears and quinces.) Phytopath. Zeitschr. **8**(3) : 285–296, 1936.

The author describes and compares in brief notes the different virus diseases of the mentioned fruits. Although the space devoted to each fruit is small his explanations are very comprehensive.

Ciccarone, A.,

Una virosi del Pomodoro. (Nota preliminare.) (A virus disease of tomato.) (Preliminary note.) Rev. Pat. Veg. **27** (3–4) : 73–77, 1937.

Perfection variety grown from English seed developed from leaf.

Clauss, G.

Anbauversuch mit start eisenfleckingen Kartoffelsastgut der Sorte "Sickingen". Tätigk,—Ber. Staatl. Landw. Vers.—Anst. Augustenberg f. **1933–34**, 76 p., 1935.

Clayton, E[dward] E[astman], Smith, H. H. & Foster, H. H.,

Mosaic resistance in *Nicotiana tabacum*. Phytopathology (Abstract) **28**(1) : 5, 1938.

Abstract of paper read before the American Phytopathological Society, December, 1937. Thirty-six strains collected in Colombia were resistant.

Mosaic resistance in *Nicotiana tabacum* L. Phytopathology **28** (4) : 286–288, 1938.

A brief note giving results of recent work.

Clinch, Phyllis E. M. Loughnane, James B., & Murphy, Paul A[loysius]

A study of the aucuba or yellow mosaic of the potato. Roy. Dublin Soc. Sci. Proc. n.s. **21**(41) : 431–448, 1936.

This is a study of aucuba mosaic of potato, tuber blotch virus which is isolated out of interveinal mosaic of potato and a latent virus in Dutch variety of Monocraft potato. These viruses attack several other plants and tuber blotch virus has been transmitted by *Myzus persicae*, but only in the presence of virus A. These viruses are similar in physical properties, including filterability, thermal death point and longevity *in vitro*. Tuber blotch and Monocrat viruses are identical and probably correspond to the viruses underlying pseudonetnecrosis, the aucuba virus being a distinct but related form and the calico virus is probably related as well. The authors propose to designate the tuber blotch virus as F. with Monocrat virus as a synonym and the aucuba mosaic as G. They classify the potato viruses in three groups as follows: (1) virus X of Smith, (2) virus F of Clinch, Lounghnane & Murphy and (3) virus Y of Smith.

Cobb, N. A.

Stigmonose. Agric. Gaz. New South Wales. **14**: 692, 1903.

At the time of this publication the disease was not considered by any investigator as due to a virus.

Cochran, L. C., & Hutchins, Lee M[ilo]

Peach-mosaic host-relationship studies in southern California. Phytopathology (Abstract) **27**(9) : 954, 1937.

Abstract of paper read before the 21st Annual Meeting of the Pacific Division of the American Phytopathological Society. Mosaic has been found on apricot, almond, prune, plum and myrobolan plum. Some cross inoculations with buds have been made. "Identity of the viruses with peach mosaic, however, should not be regarded with more than strong suspicions until cross-inoculations have been completed."

----------, & Smith, Clayton O.

Asteroid spot, a new virosis of the peach. Phytopathology **28** (4) : 278–281, 1938.

A description.

Cochran, W. G.

The statistical analysis of field counts of diseased plants. Journ. Roy. Statist. Soc. (Suppl.) **8**(1) : 49–67, 1936.

Studies of spotted wilt of tomatoes which are correlated with studies of transmission by *Thrips tabacci*.

Cockerham, George, & McBain, Alan M.

Virus disease research. Scottish Soc. Res. in Plant Breeding, Ann. Rpt. pp. 13–17, 1936.

Potato flowers and dissemination of potato viruses. Nature **140**: 1,100, 1937.

The author concludes that the tendency of varieties to flower or not flower has little effect on the transmission of potato virus diseases.

---, **Ferguson, Hugh., & Lyoll, Charles A.**

Virus Disease Research. Scottish Soc. Res. in plant Breeding, Ann. Rpt. 1937. p. 14–17, 1938.

A report of progress. Potato viruses reduced yields as follows,—X virus (least effect), A + X complex, Y virus, Leaf roll (greatest). All viruses reduced sexual reproduction by reducing number of flower trusses.

Cole, J[ohn] R[ufus]

Bunch disease of pecans. Phytopathology (Abstract) **27**(2): 125, 1937.

A description of a disease which resembles some of the virus diseases. Cause not definitely known but it is transmitted by grafting.

Bunch disease of pecans. Phytopathology **27**(5): 604–612, 1937.

This disease is distinct from the rosette disease of pecan. It resembles some of the virus diseases. It has been transmitted by grafting.

Coleman, Leslie C[arles]

Virus diseases of plants. Journ. Mysore Agric. & Expt. Union **10**(3): 125–132, 1929.

Cook, Harold T[hurston]

Mosaic-like trouble of elm in Virginia. Plant Disease Rept. **20** (14): 227–, 1936.

Cook, Melville T[hurston]

Insect transmission of virus diseases of plants. Sci. Month. **44** (2): 174–177, 1936.

A semi-popular review of the subject with special reference to the work in Japan on the rice dwarf.

Descriptions of virus diseases of plants, criticisms and suggestions. Journ. Agric. Univ. Puerto Rico **20**(3): 689–690, 1936.

Suggestions and criticisms for authors of papers on these diseases.

Phloem necrosis in the stripe disease of corn. Journ. Agric. Univ. Puerto Rico **20**(3): 685–688, 1936.

The results of a study of the histology of corn plants infected with this disease.

Enfermedades nuevas o poco conocidas de la caña de azúcar en los Antillas. (New or little known sugar cane diseases in the Antilles.) Rev. Agric. Puerto Rico. (Suppl. 1, Mem. Assoc. Sugar. Cane Tech.) p. 5–13, 1936.

Short description of diseases of minor importance. Some of them appear to be due to viruses.

Records of virus diseases of plants in Puerto Rico. Journ. Agric. Univ. Puerto Rico **20**(3) : 681–684, 1936.

Records and notes on 17 virus or virus—like diseases.

First supplement to the host index of virus diseases of plants. Journ. Agric. Univ. of Puerto Rico. **20**(3) : 691–727, 1936.

A continuation of the host index published in the above Journal 19(3): 315–406, 1935. It contains 10 new families, more than 50 new genera and about 150 new species of host plants.

First supplement of the index of vectors of virus diseases of plants. Journ. Agric. Univ. Puerto Rico **20**(3) : 729–739, 1936.

Continuation of the index published in the above Journal 19(3): 407–420, 1935. It adds about 25 genera and more than 25 species to the original index.

The witches' broom of *Tabebuia pallida* caused by a virus. Phytopathology (Abstract) **27**(2) : 125, 1937.

This disease has been attributed to a fungus. It is due to a virus.

Cucumber mosaic in Puerto Rico. Phytopathology (Abstract) **27**(2) : 125, 1937.

The first severe outbreak in Puerto Rico during the past 13 years.

Pioneers in the study of virus diseases of plants. Sci. Mon. **46**: 41–46, 1938.

The author arbitrarily places 1920 as the end of the pioneer period and selects eight workers as pioneers. They are Adolph Edward Mayer, Dmitri J. V. V. Iowanowski, Martinus Willem Beijerinck, Hendrick Marius Quanjer, Erwin F. Smith, Albert F. Woods, Harry A. Allard and James Johnson. Brief statements are made concerning the reasons for selecting them as the pioneers in this branch of plant pathology.

Coons, G[eorge] H[erbet], Stewart, Dewey, & Elcock, H. A.
Sugar-beet strains resistant to leaf spot and curly top. U. S. Dept. Agric. Yearbook **1931**: 493–496, 1931.

----------, **Kotila, J[ohn] E[rnest], & Stewart, Dewey**
Savoy a virus disease of beet transmitted by *Piesma cinera*. Phytopathology (Abstract) **27**(2): 125, 1937.

A description of symptoms and some experiments. Is the same as the disease described by Arthur and Golden in 1892. Occurs in many central and western states.

Improvement of the sugar beet. U.S.D.A. Yearbook **1936**: 625–656, 1937.

Contains a brief discussion on resistance to curly top.

Cooley, L[uster] M[anrina]
Sources of raspberry mosaic infections and how to get rid of them. Proc. New York State Hort. Soc. **80**: 273–277, 1935.

Semi-popular.

Wild brambles in relation to spread of virus diseases in cultivated black raspberries. New York Agric. Expt. Sta. (Geneva) Bull. **665**, 5 p., 1936.

Wild red raspberries are numerous in western New York. They are usually with either green or yellow mosaic virus or with both. They support a large population of the *Amphorophora rubi* which is a vector. Any control must take into consideration the eradication of the wild red raspberry host. Other wild raspberries and black berries did not appear to be as important as the red raspberries. Leaf curl was rare but the vector *Aphis rubicola* common. The spread of this disease was slow. Streak viruses were rare.

Wild bramble eradication. New York Agric. Expt. Sta. (Geneva) Bull. **674**, 32 p., 1936.

A discussion of methods of eradication.

Retarded foliation in black raspberries and its relation to mosaic. New York Agric. Expt. Sta. (Geneva) Bull. **675**, 20 p., 1936.

The green mottle mosaic virus retards the development of the foliage. The yellow mosaic virus has much less influence.

The control of raspberry mosaic. New York State Hort. Soc. Proc. **81**: 277–278, 1936.

Popular.

Costantin, Julien [Noel]
(Potatoes in highlands.) Compt. Rend. Acad. Sci. **181**: 633–636, 1925.

Actualités biologiques. Evolution de nos conceptions sur la dégénérescence et la symbiose (Biological notes. Evolution of our conception on degeneration and symbiosis.) Ann. Sci. Nat. X ser. Bot. (Paris) **15**(2) : 1–43, 1933.

In this article the author makes reference of Sereh disease of sugar cane.

Pathologie végétale. Exteriorisation des dégénérescenses pai l'action de l'altitude. (Plant Pathology. Exterioration of degeneration by the action of the altitude.) Compt. Rend. Hebd. Séanc. Acad. Agric. (France) **20** : 414–419, 1934.

Crépin, C.

Quelques réflexions á propos de la pomme de terre. (Some observations in conection with the potato.) Compt. Rend. Acad. Agric. (France) **22**(11) : 437–440, 1936.

The author gives a review of our knowledge. The aphid vectors were the most important factors in the growing of healthy plants.

Cristinzio, M.

Un grave attacco dimosaico nella zucca. (A serious attack on pumpkin.) Riverche Osserv. e Divulg. Fitopat. Camp. ed Mezzog. R. Osserv. Reg. Fitapat. Portici. **6** : 95–102, 1937.

Damm, R.

Abbau-und Viruskrankheiten der Kartoffeln. (Degenration and virus diseases of potatoes.) Mitt. Landwirtsch **51**(2) : 1116, 1936.

Dana, B[liss] F., & McWhorter, F[rank] P[aden]

An outbreak of curly top on pansy. Phytopathology **25**(9) : 894, 1935.

Occurrence of curly top in the Pacific coast in 1935. U.S.D.A. Plant Disease Rept. **20**(24) : 72–76, 1936.

Records of field studies.

Occurrence of curly top in the pacific Northwest in 1936. U.S.D.A. Plant Disease Rept. **21**(3) : 53–54, 1937.

Records of the occurrence of this disease in many localities and data of losses.

Curly top or western yellow blight of tomato. Oregon State Hort. Soc. An. Rpt. **28**(1936) : 72–74, 1937.

The curly top disease of vegetables in the Pacific Northwest. Oregon Agric. Expt. Sta. Circ. Inform. **180**, 5 p., 1938.

Occurrence of curly top in the Pacific Northwest in 1937. Plant Disease Rept. **22**(5) : 82–84, 1938.

Records.

Darlington, C. D.

Reversion in black currants: a study of the chromosome complement. Journ. Pomol. & Hort. Sci. **6**: 242, 1927.

Darcy, C.

Les maladies de dégénérescence de la pomme de terre. (Degeneration diseases of the potato.) Jardinage **23**(198) : 28–30, 1935.

Darrow, G. M., & Demaree, J. B.

Northern type of strawberry dwarf serious on the Chesapeake Peninsula. U.S.D.A. Plant Disease Rept. **23**(7) : 109, 1938.

Davis, J[ohn] J[une]

Nature of disease producing viruses. Nature **124**: 267, 1929.

Davis, M. V., & Blair, P. S.

Virus diseases of cherries in British Colombia. Canadian Hort. (Fruit Ed.) **59**(9) : 208, 1936.

Popular.

Decoux, L., & Roland, G.

Recherches effectuées en 1936 sur la jaunisse et la mosaique de la betterave (Research work on virus yellows and mosaic of the beet-root in 1936.) Publ. Inst. Belge Amel. Betterave **5**(5) : 449–454, 1937.

---., **Vanderwaeren, J., Roland, G. & Simon, M.**

Revue des travaux de l'Institut Belge pour l'Amelioration de la betterave de 1932 a 1936. (Review of work on the improvement of the beet during 1932 to 1936 at the Belgium Institute.) Publ. Inst. Belge. Amel. Betterave **6**(1) : 4–35, 1938.

Deighton, F. C.

Preliminary list of fungi and diseases of plants in Sierra Leona. List of fungi collected in Sierra Leona. Bull. of Misc. Information. Roy. Bot. Gard. Kew **7**: 397–433, 1936.

This list contains mention of several virus diseases.

Demaree, Juan B., & Darrow, George M.,

Leaf variegation in strawberries not considered a virus disease. U.S.D.A. Plant Disease Rpt. **21**(22) : 400–403. 1937.

A description of the disease and evidence to show that it is not due to a virus.

Denley, C. L.

Mosaic control on Godchaux properties. Sugar Bull. **15**(20) : 3–5, 1937.

De Long, W. A.
Variation in the chief ash constituents of apples affected with blotchy cork. (= bitter pit) Plant Physiology **11**: 453–456, 1936.

Desai, S[hirishkent] V[rijray]
Scheme for research on mosaic and other diseases of sugar cane. Agric. Res. Inst. Pusa (India) Scient. Rpt. **1933–34**: 154–167, 1936.

Dickson, B[ertram] T[homas], Wright, H. D., Carne, H. R., & Noble, R[obert] J[ackson]
Filterable viruses. Australian & New Zealand Ass. Adv. Sci. **21**: 437–439, 1933.
Popular.

Diehl, R.
Les problémes actuels de l'amélioration et des champs d'experiences de pomme de terre. (Present problems of improvements and the experimental fields of potato.) Le Sélectionneur Versailles **5**(2): 81–89, 1936.
Varietal test of potatoes in regard to degeneration.

Dixon, H. H.
Are viruses organisms or autocatalysts? Nature, **139**(3508): 153, 1937.
A discussion of the work by Stanley, Bawden and others.

Dobroscky, Irene D[orothy]
Insect studies in relation to cranberry false blossom disease. Amer. Cranberry Grow. Ass. Proc. Ann. Meet. **58**: 6–7; 10–11, 1928.

Doidge, E. M.
Scaly bark (psorosis) of citrus trees. Journ. Dept. Agric. South Africa **12**(1): 61–67, 1926.

D' Oliveira, M. de L.
Aspectos actuales do problema dos virus filtraveis. (Present aspects of the problem of filterable viruses.) Rev. Agron. (Lisbon) **24**(1): 52–63, 1936.

Doerr, R.
Allgemeine merkmale der virusarten. (General characteristics of viruses.) Z. Hyg. Infekt. Kr., **118**(6): 738–747.
A lecture before the Second International Congress of Microbiology.

Doolittle, S[ears] P[olydore], & Alexander, L. J.
Injury to greenhouse tomatoes as a result of a combined infection with the viruses causing tomato and cucumber mosaic. Phytopathology **26**(9): 920–922, 1936.
Description of a disease caused by Johnson's tobacco virus 1 and Doolittle's cucumber virus 1.

----------, & **Beecher, F. S.**
Seed transmission of tomato mosaic following the planting of freshly extracted seeds. Phytopathology **27**(7) : 800–801, 1937.

This paper refers to tobacco virus 1. The authors report a low percentage of seed transmission when freshly extracted seeds are use. There was a smaller percentage in old seeds. "The present note seeks to emphasize the possibility of seed transmission of mosaic in breeding work, where, to produce several generations of plants in close succession, seed is planted soon after its extraction from the fruit. Where this is done there seems to be a definite danger of an appreciable amount of seed transmission of the virus."

Dorst, J[acobus] C[ornelius]
Transmission de la maladie de la mosaique par blessure ou par contact des plantes. (Transmission of mosaic disease through wounds or by contact of plants.) Rev. Bot. Appl. d'Agric. Trop. **11** : 264–265, 1931.

Transmission of potato mosaic.

Dounin, M. S.
A study of fungi and bacteria having virophoric and virocide properties. Summary Sci. Res. Inst. P. R., U.S.S.R. p. 509–510, 1936.

Dufrénoy, Jean
Étude cytologique des plantes affectées par des maladies a virus. (Cytological study of plants affected with virus diseases.) Ann. Epiph. **14** : 163–171, 1928.

Changes induced in cells of sugar cane mosaic. Proc. Pacific Sci. Congr. 4th. Java, 1929. **4** : 25–27, 1930.

Sur un virus des Renonculacées transmissible su *Nicotiana tabacum*. Compt. Rend Soc. Biol. Réunion Bordeaux **117** : 373–375, 1934.

Les maladies á virus. (Virus diseases.) Défensa Sanitaire Végétaux. Compt. Rend. Trav. Congr., (Paris) **1934** : 24–26, 1935.

Les maladies a virus. (Virus diseases.) Defense Sanitaire Végétaux Compt. Rend. Trav. Congr. (Paris) 1934, **1** : 207–210, 1935.

L'immunité des plantes vis-vis des maladies virus. (The immunity of plants vis-a-vis of virus diseases.) Ann. Inst. Pasteur **54** : 461–512, 1935.

In this rather extensive work the author discusses his points of views in regard to plant immunization specially the effect of inoculations.

Structure et métabolisme cellulaire. (Structural and *cellular* metabolism.) Arch. Anat. Mic. **31**(1) : 1–77, 1935.

Cytological studies of virus diseases of plants.

Le "spotted-wilt" (The spotted wilt). Ann. Epiphytes & Phyto. **3**(2) : 187–223, 1937.

General account of the disease known as spotted wilt; the author gives the different hosts subject to the symptoms of that form of mosaic. Gives also a list of viruses which cause local lesions.

---, & **Bouget, J.**

Études sur des maladies a virus de la pomme de terre. (Studies of virus *disease* of the potato.) Ann. Sci. Nat, Bot. **19**(10) : 181–202, 1937.

General discussion on the different types of virus diseases of potatoes. The authors give a brief description of symptoms in each case. They also discuss the effect of climate.

Duggar, B[enjamin] M[inge], & Hollander, Alexander

Inactivation of the virus of typical tobacco mosaic and of *Escherichia coli* in the shorter ultra-violet. Journ. Bact. (Abstract) **31**(1) : 52, 1936.

Dumon, A. G.

La propagation des maladies de dégénérescence en Belgique. (The propagation of degeneration diseases in Belgium.) Sattion D' Amélioration des Plantes (Héverle) Inst. Agron. Univ. Catholique de Louvain No. **4**, 20 p., 1931.

Popular account of five years observations on field work.

---, & **Swartele, A.**

Het ontaar-dingsvraagstuk bij Fragaria. (Le probleme de la dégénérescence chez le fraisier.) (The problem of strawberry degeneration.) Lanbou van de Univ. te Louven. voor owgepaste Genetica. pp. 1–10, 1937.

The serological method did not show in virus in degenerate strawberry plants.

The authors do not consider the method of value.

Dutt, N. L. Hussainy, S. A., & Krisbnaswani, M. K.

A note on the breeding of sugar cane varieties resistant to mosaic. Indian Acad. Sci. Proc. **3**(6) : 425–431, 1936.

The data indicates that resistance is correlated with the presence of bristles on the leaves.

Dykstra, T[heodore] P[eter]

Report on potato virus diseases in 1936. Amer. Potato Journ. **14**(4) : 117–124, 1937.

Popular.

Eckerson, S[ophia] H[emion], & Webb, R[obert] W[illiam]

The intracellular bodies associated with rosette disease and mosaic-like mottling of wheat. Journ. Agric. Res. **26**(12) : 605, 1923.

Edwards, E. T.

The witches' broom disease of lucerne. Australian & New Zealand Assoc. Adv. Sci. Rpt. **22** : 323–324, 1935.

The witches' broom disease of lucerne. New South Wales Dept. Agric. Sci. Bull. **52**, 31 p., 1936.

This is a report of the continuation of the studies by the author which have been reported in two previous papers. He discusses the symptoms, distribution and economic importance of his work. He also gives a detailed account of his own investigations. The disease has been transmitted by grafting.

Witches' broom of lucerne. A series disease in inland areas. Agric. Gaz. New South Wales **47**(8) : 424–426, 1936.

Popular account of the work reported in Res. Bull. 52.

Ehrke, G.

Die Eisenfleckigheit der Kartoffel. Forschungen u. Fortschritte **12** : 24–25, 1936.

Eide, C. J.

Plant viruses. Minnesota Hort. **65**(10) : 191–193, 1937.

Emmerez de Charmoy, D[onald d']

Die mosaikkrankheit des Tabaks auf Mauritius. (Tobacco mosaic disease in Mauritius.) Internat. Idw. Rundschau, p. 775, 1928. (Zeitschr. f. Pflanzenkrank. (Planzenpathologie) und Pflanzenset. **40** Band, heft 6, 1930.)

Mosaic of recent appearance.

Nouvelle contribution a l'étude du streak. (New contribution to the study of streak.) Rev. Agric. Ille. Reunion **39** : 193–202, 1934.

La lutte contre la mosaïque de la canne a sucre a la Reunion. (The fight against sugar cane mosaic in Reunion.) Revue Agr. Ille Reúnion **42** : 1–10, 1937.

Emon, J.

Une opinion sur la court-noué. (An opinion on "court noué".) Progr. Agric. & Vit. **105**(2) : 41–43, 1936.

Eriksson-Quensel, Inga-Britta, & Svedberg, The
Sedimentation and electrophoresis of the tobacco mosaic virus protein. Journ. Amer. Chem. Soc. **58**(10) : 1863–1867, 1936.

The authors worked on tobacco virus protein furnished by Stanley. They found a considerable inhomogeneity with regard to molecular weight but said that it was not improbable that the virus protein might be homogenous with regard to molecular weight in its native state. The electrophoretic determinations showed the virus protein to be chemically well-defined and practically homogenous.

Evans, I[lltyd] B[uller] Pole
Bitter-pit of apple. South African Dept. Agric. Tech. Bull. **2**, 1911.

Pasture research and crop production. Annual Report of the Division of Plant Industry, Farming in South Africa, **10**(117) : 548–560, 1935.

Mentions leaf curl and kromnek of tobacco (which is probably same as spotted wilt). Also scaly bark or psorosis.

Ewart, A. J.
Cause of bitter-pit. Proc. Roy. Soc. Victoria, Australia n.s. **30** : 15–20, 1917.

At the time of this publication the disease was not considered by any investigator as due to a virus.

Ewert, R.
Zum Abbau der Kartoffel. Beobachtungen über den abbau der Kartoffel unter besonderer Berücksichtigung des vergangenen Jahres. Deutsche Landw. Presse **62** : 41–42, 55–56, 1935.

Eyer, J. R.
Observations on the pathological history and phyto-chemistry of psyllid-yellows. Phytopathology **25**(9) : 895, 1935.

Fawcett, G[eorge] L[orenzo]
El enrulamiento de las hojas de la tomatera. (The curling of the leaves of the tomato.) Rev. Ind. Agr. (Tucumán) **10** : 49–54, 1929.

El encrespamiento de las hojas de la remolacha y el insecto transmisor. (The curling of the leaves of the beet and the transmitting insect.) Rev. Ind. Agr. (Tucuman) **18** : 61–66, 1937.

Fawcett, H[oward] S[amuel]
Scaly bark, citrus scab, gumming of citrus, fungi on citrus whitefly. Florida Agric. Expt. Sta. Rpt. **1906–07** : 43–49, 1907.

Scaly bark of citrus. (A preliminary report.) Florida Agric. Expt. Sta. Bull. **98** : 73–78, 1909.

Stem-end rot, gummosis, nail-rust, citrus scab, *Aegerita Webberi, Cephaloporium lecanii.* Florida Agric. Expt. Sta. Ann. Rpt. **1909–10**: 45–65, 1910.

Scaly bark or nail-rust of citrus. Florida Agric. Expt. Sta. Bull.. **106**, 41 p., 1911.

New information on psorosis or scaly bark of citrus. Calif. Citrograph. **18**(12): 326, 1933.

A new symptom indicates that the diseases may be due to a virus.

Feiginson, N.

(Determination of the crops susceptible to virus diseases, geographical distribution and injuriousness of virus diseases of plants.) Summ. Sci. Res. Work Inst. Pt. Prot., **1935**: 505–507, 1936.

Contains very valuable data on a number of virus diseases.

Ferguson Wood, E. J.

Some anatomical and cytological studies on fiji disease of sugarcane. Proc. Roy. Soc. Vict. N. S. **49**(2): 308–313, 1937.

A very complete discussion.

Fernandes, D. S.

Vootlookinge mededeeling over de corzaak van de zeefvatenziekte (phloemnecrose) bij de Liberia koffie en hare bestrijding. (Preliminary note on the cause of the sieve tube disease) (Phloem-necrosis) of Liberian coffee and its control.) Meded. Landbouwproefstat. (Suriname) **2**, 12 pp., 1928.

Fielitz, F.

Los ultravirus en patologia vegetal. (Ultraviruses in plant pathology.) Agron. Assoc. Estud. Agron. (Montevideo) **6**: 23–33, 1935.

Ensayo sobre "Crespadura de las papas" enfermedad a virus filtrante. (Test on leaf-roll of potatoes a filterable virus disease.) Rev. Assoc. Rural Uruguay **63**(4): 23–28, 1936.

Ensayo sobre "crespadura de las papas", enfermedad a "virus filtrante" (Test on leaf-roll of potato, disease due to a filterable virus.) Rev. Asoc. Rural Uruguay **63**(6): 9–15, 1936.

---, **& Bertelli, J. C.**

Enfermedad a ultravirus en las plantas "crespadura de las papas" primera comunicación 1934. (Virus disease of plants, potato leaf roll first note 1934.) Archivo Coc. Biol. Montevideo. **8**(1): 46–57, 1937.

Filho, A. C.

As chlorosis de canna de açucar. (The chlorosis of sugar cane.) Brasil Azucareiro **6**(6) : 360–362, 1936.

Fife, J[ames] M[ilton] & Frampton, V. L.

The pH gradient extending from the phloem into the parenchyma of the sugar beet and its relation to the feeding behavior of *Eutettix tenellus*. Journ. Agric. Res. **53**(8) : 581–593, 1936.

When sugar beet seedlings are exposed to a high concentration of carbon dioxide preceding and during the period of inoculation of infection in the normal plants to that in the treated plants was 4.7:1. *Eutettix tenellus* feeds on the petioles of the plants treated with carbon dioxide it appears to lose its sense of direction in reaching the phloem. The ratio is 4.6:1. The insect prefers an alkaline food (pH 8.5) rather than a food with an acid reaction (pH 5.0). "The evidence indicates that leaf-hoppers feeding under normal conditions are probably guided to the phloem by pH gradient.

Föex, [Edmund] E[tienne]

Les maladies á virus. (Virus diseases.) Rev. Path. Comparée. 1925.

Au suject de la pomme de terre et des maladies dites de dégénérescence. (On the subject of the potato and the so-called degeneration diseases.) Compt. Rend. Acad. Agric. (France) **22**(14) : 573–576, 1936.

The author agrees for the most part with Crépin.

Folsom, D[onald], & Bonde, R[einer]

Some properties of potato rugose mosaic and its components. Journ. Agric. Res. **55**(10) : 765–783, 1937.

This disease is attributed to at least two viruses, the pure rugose mosaic or veinbanding virus and the latent mosaic virus.

---, **et al.**

Net necrosis of potatoes. Maine Agric. Expt. St. Ext. Serv. Bull. **246**, 12 p., 1938.

A popular discussion of this disease with special reference to its relation to leaf roll.

Franke, H. M.

Untersuchungen über die Physiologie der pflanzlichen Virose. (Investigations on the new ideas of the physiology of plant viroses.) Biochem. Zeitschr. **293**(1–2) : 39–63, 1937.

Zur Physiologie der pflanzlichen Virose. (New ideas on the physiology of plant viroses.) Biochem. Zeitschr. **296**(1–2) : 149–152, 1937.

Freeman, Monroe Edward

Separation of one component of potato rugose mosaic by pH difference. Science n. s. **82**: 105, 1935.

Different pH values were used. Rugose mosaic of potato at pH 3.6 or less no symptoms. At pH 4.0 to 5.5 latent mosaic only. At pH 5.6–7.6 rugose mosaic symptoms. At pH 9.7 latent mosaic only was transmitted.

Freitag, J[ulius] H[erman]

Negative evidence on multiplication of curly top virus in the beet leafhopper, *Eutettix tenellus*. Hilgardia **10**(9): 305–342, 1936.

The author states that: "The results of the investigation indicate that the curly top virus does not multiply in the beet leafhopper. No evidence was found to support such a theory as has often been surmised on the basis of indirect evidence." The paper contains very interesting data.

----------, **& Severin, H[enry] H[erman] P[aul]**

Ornamental flowering plants experimentally infected with curly top. Hilgardia **10**(9): 263–298, 1936.

The disease was produced by experimental transmission in 92 species of ornamental plants in 73 genera and 33 families.

Friebe, P.

(The electrical measurement of the degree of "degeneration" of potato planting stock: A practical test with the new method of Hey and Wartenberg.) Pflanzenbau **9**(9): 351–355, 1933.

Friecklinger, H. W.

Eine neve Rubenkrankheit. (A new beet disease.) Die Umschan. **34**: 72–74, 1930.

A virus disease.

Fukushi, T[eikichi]

(An insect vector of the dwarf disease of rice plant.) Proc. Imp. Acad. Japan **13**(8): 328–331, 1937.

Gadd, C[aleb] H[erbert]

Phloem necrosis of tea. Inst. Ceylon, Ann. Rpt. **1936**: 27–28, 1937.

May be a virus disease. Causes a curling of the leaves.

Gaddis, B. M.

Eradication of citrus canker and control of phony peach and peach mosaic. Journ. Econ. Entom. **29**(5): 940–944, 1936.

The phony peach disease has been greatly reduced. The peach mosaic has spread with great rapidity.

Control of phony peach disease. U.S.D.A. Plant Disease Rept. (Supplement) **96**: 36–41, 1937.

A brief history and discussion of methods of control. Also a statement as to present status and geographical distribution.

Eradication of the peach mosaic disease. U.S.D.A. Plant Disease Rept. **96**: 45–46, 1937.

A brief review with statements as to progress on survey, eradication, present status and geographical distribution.

Progress in peach mosaic eradication. California Dept. Agric. Spec. Pub. **155**: 50–54, 1938.

Gallis, P.,

L' Ugni blanc et le court-noué. (White "Ugni" and "court-noué".) Progr. Agric. Vitic. **107**(15): 346–347, 1937.

Observations supporting the work of Rous.

Galloway, L. D.

Report of the Imperial Mycologist. Scient. Rep. Imp. Inst. Agric. Res. (Pusa) **1934–35**: 121–140, 1936.

Contains a plan for research on mosaic of sugar cane.

Garbowski, L[udwik]

(Determination of the health of potato seed tubers by preliminary culture from the eyes.) Proc. Wudz. Chorn. Rosl. Panstw. Inst. Nank. Gosp. Wiejsk. Bydgoszczy. **15**: 31–41, 1936.

Experimental work demonstrated the value of the tuber-indexing method.

Wplyw na rozwoj mosaiki smugowatej w doswiadczeniu z odmiana ziemniakow industria Modrowa. (Influence of soil on the development of streak mosaic in tests with the potato variety modrows Industrie.) Roczu. Neukrol., **41**(2): 387–391, 1937.

A test of diseased potatoes on sandy and on well manured soil. The plants on the sandy soil showed more pronounced symptoms of disease but the per centage of lose in yield was about the same.

Próby przeszczepiania chorób wirusowych ziemniaków. (Tests on the transmission of virus diseases of potatoes.) Prece Wydzielu Chorob I Szkodników Roselin. Panstwowy Inst. Nankowy Gospoderstwa Wiejskiego. **16**: 5–39, 1937.

Wplyw gleby na rozwój mosaiki smugowatej w doswiadczeniu z odmiana ziemniaków Industria Modrawa. (Influence of the soil in the development of "bigarrare" mosaic in the culture

of the variety of potato "Industria de Modrow".) Prace Wydsialu Chorób I Szkodnikow Roslin. Panstwowy Inst. Nankowy Gospoderstwa Wiajskiego **16**: 41–69, 1937.

Details of observations on the influence of soil on the behavior of potato mosaic of the type known as "bigarrure".

Postepy badan nad chorobami wirusowymi roslin. Referat zbiorowy. (Progress on the studies concerning virus diseases of plants.) Prace Wydzialu chorób I Szkodnikow Roslin. Panstwowy Inst. Naukowy Gospodarstwa Wiejskiego. **16**: 127–173, 1937.

Gardner, M[ax] W[illiam,] Allard, Harry A[rdell,] & Clayton, E[dward] E[astman.]

Superior germ plasm in tobacco. U.S.D.A. Yearbook **1936**: 785–830, 1936.

Contains a short note on virus diseases. The Ambalema is the only variety tested that does not contract ordinary tobacco mosaic.

---, **Tompkins, C[hristian] M[ilton,] & Thomas, H. Rex.**

Factors affecting the prevalence of the spotted wilt virus. Phytopathology (Abstract) **27**(2): 129, 1937.

Ghimsú, V.

Virusurile fitopatogene si virozele principalelor plante cultivate. Pagina Agrare Si Sociale 20 p., n. d.

Starting with a brief historical sketch the author, reviews the work of others and then discusses viruses of a great number of cultivated plants.

Afectiunile patologici si inamici tutumulni din Romania in 1935. Bull. Cultiv. Ferment. Tutum. **24**(4): 410–418, 1935.

Notes on virus diseases of tobacco.

Giddings, N[ahum] J[ames]

A greenhouse method for testing resistance to curly top in sugar beets. Phytopathology **27**(7): 773–779, 1937.

The author describes a method, more rapid than the field method and gives some of the results.

Gigante, R[oberto]

Nota preliminare sulla "Necrosi del cuore" di patata. (Preliminary note on the heart necrosis of potato tubers.) Boll. R. Staz. Patol. Veg. **13**(1): 155–159, 1933.

A disease which is transmitted by the tuber.

(Preliminary studies of the response of some Italian varieties of potatoes to the viruses.) Bol. R. Staz. Patol. Veg. (Rome), n.s. **15**(4) : 533–547, 1935.

A discussion of the reaction of four varieties of potatoes to the X and Y virus and to combinations of the same.

Secondo contributo all conoscenza della necrosi del cuore dei tuberi di patata. (A second contribution to the knowledge of heart necrosis of potato tubers.) Boll. R. Staz. Paz. Veg. Roma, n.s. **15**(4) : 555–560, 1935.

Plants from diseased tubers grew as well as those healthy tubers but the disease appears to be hereditary.

Una nueva virosi della rosa in Italia (A new viroses of the rose in Italy) Bol. R. Staz. Patol. Veg. Roma n.s. **16**(2) : 76–94, 1936.

Rome. Transmitted by a *Macrosiphum* aphid.

Il mosaico del sedano (Celery mosaic). Boll. R. Staz. Patol. Veg. Roma, n.s. **16**(2) : 99–114, 1936.

Description of the disease and of experimental work in inoculation with aphids and from squash plants.

Il mosaico della violaciocca. (Mosaic of the Stock (Gillflower).) Boll. R. Staz. Patol. Veg. Roma n.s. **16**(3) : 166–174, 1936.

Although brief, very comprehensive description of a virus disease of Stock flower (Gillflower) *Matthiola incana,* Histological, cytological and transmission studies were made.

Una nuova malattia del pomodoro. (A new disease of tomato.) Bol. R. Staz. Pat. Veg. Rome n.s. **16**(3) : 183–199, 1936.

The author describes a disease of the tomato and the tomato plant ocurring in Sicily in 1935–36. Characterized by leaf variegation. After histological studies and observations the author concludes that the malady is due to a virus.

La laciniatura da virosi delle foglie di pomodoro (The "fern leaf" virose of the tomato leaf) Bol. R. Staz. Pat. Veg. Rome n. s. **17**(1) : 87–119, 1937.

The author makes a very complete description of the disease. The cytological studies showed the presence of intracellular bodies which the author took for X bodies. Experimentally the disease was transmitted from plant to plant and from tomato plants to tobacco plants causing local lesions on the later. The author concludes by stating that the virus producing this type of disease in tomato is of a complex. character.

Ricerche istologiche sulle ''Omeoplasis crestiform'' (Enations) delle foglie di vite affette da rachitismo. (Histological investigations on ''Omeophasia crestiformi'' (Enations) of the vine leaf affected by ''rachitism''.) Bol. R. Stat. Patol. Veg. Rome. n. s. **17**(2) : 169–192, 1937.

The author reviews the work of others in regard to enation of several plants making comparison. Discusses thoroughly his histological studies. He concludes that transmission experiments will be the final sure proof that this disturbance may be due to a virus.

Esperienze sulla trasmissibitá della ''necrosi del cuore'' dei tuberi di patata. (Experiences in the transmissibility of ''heart necrosis'' of the potato tuber.) Bol. R. Stat. Patl. Veg. Roma n. s. **17**(3) : 277–292, 1937.

Summarizing the author states that potato tuber ''heart necrosis'' is a hereditary disease which diminish the number of tubers produced in size and quantity and spoils its quality. He concludes that it is caused by a virus of the ''Eisenfleckigkeit'' type.

Il mosaico della fava (*Vicia faba* L.) in Italia e comportamento di alcune leguminose di fronte ad esso. (The mosaic of the broad bean (*Viccia faba* L.) in Italy and the behavior of some leguminous that confront it.) Bol. R. Stat. Pat. Veg. **17**(4) : 497–530, 1937.

The author discusses the characters of *Vicia faba* L. mosaic disease, describes the disease, its histology and its transmission. He compares and discusses other leguminous virus diseases and concludes that the broad bean mosaic disease is not specific of the plant under study but that it presents characteristics of a complex virus.

Gokhale, V. P.

Preliminary observations on small-leaf disease in cotton. Indian Journ. Agric. Sci. **6**(2) : 475–480, 1936.

Golden, Katherine E.

Diseases of the sugar beet root. Proc. Ind. Acad. Sci. **1891**: 93–97, 1891.

The disease referred to in this paper and supposed to be due to bacteria was probably a virus disease recently described by Coons et al as ''savoy''.

Golding, F. D.

Cassava mosaic in Southern Nigeria. Nigeria Agric. Dept. Bull. **11** : 1–10, 1936.

The diseased plants yield 30 per cent less than the healthy plants.

Golding, M. I.

On the so-called masking of virus diseases. Compt. Rend. (Deplady) Acad. Sci. U.S.S.R. **15**(9) : 567–569, 1937.

Goodwin, W. & Salmon, E[rnest] S[tanley]
Infectious sterility in hop gardens in Czecho-Slovakia. Journ. Inst. Brew. n. s. **33**(4) : 209–210, 1936.

A summary based on description by Blattny and Vukolov.

Goss, R[obert] W[hitmore]
A review of the disease problems confronting the Nebraska growers of certified seed. Nebraska Potato Improvement Assoc. Ann. Rpt. **1935–36** : 6–14, 1936.

Contains records of virus diseases.

A review of the disease problems confronting the Nebraska growers of certified seed potatoes. Nebraska State Bd. Agric. Ann. Rpt. **1936** : 682–690, 1936.

Summary of potato disease records from certification inspection in Nebraska for the past five years. U.S.D.A. Plant Disease Rept. **20**(6) : 102–106, 1936.

Contains data on losses due to several virus diseases.

Gowen, John W[hitemore], & Price, William C[onway]
Inactivation of tobacco-mosaic virus by X-rays. Science **84** (2189) : 536–537, 1936.

The authors determined the type of curve in these experiments and say that:

"The type of curve obtained suggests that the absorption of a single unit of energy in a virus particle is sufficient to cause inactivation of the particle. This same type of curve can be used for the killing of many organisms."

The authors give a brief comparison of tobacco mosaic particles and genes, and say: "The fact that tobacco-mosaic virus is inactivated by radiant energy of the X rays and ultra-violet bands in a manner similar to that of genus suggested and alteration in the virus particles comparable to that which takes place in genes."

Graber, L. F., & Sprague, V. G.
Alfalfa yellows. Science **78**(2033) : 556, 1933.

Grainger, J[ohn]
An infectious chlorosis of the dock. Proc. Leeds Phil. & Lit. Soc. Sci. Sect. **1**(8) : 360, 1929.

---, **& Angood, E.**
The insect transmission of raspberry mosaic. Proc. Leeds Phil. & Lit. Soc. Sci. Sect. **2**(4) : 183–184, 1931.

Some economic aspects of virus diseases in potatoes. The Naturalist, p. 151–153, 1933.

Low-temperature masking of tobacco mosaic symptoms. Nature **137**(3453) : 31–32, 1936.

The symptoms were masked at 51° and 45°F. The optimum temperature for the plant growth was about 75°. The movement of the virus was greatest at 75° to 85°F.

Gram, Ernst.

Virusy domme hos kartoffler. Tidsskr. Landökon **2**(2) : 61–81, 1935.

Grant, Theodore J., & Hartley, Carl.

A witches' broom on black locust and a similar disease on honey locust. U.S.D.A. Plant disease Rept. **22**(2) : 28–31, 1938.

The authors give a large number of records and also describe a witches' broom on honey locust. It has not been definitely proven that these diseases are due to a virus. Cause not given. Resembles a virus disease.

Gratia, A[ndré]

Bacterophage et virus des plantes. (Bacterophage and virus of plants.) Bull. Acad. Méd. Belge. **5**(15) : 208–225, 1935.

----------, **& Manil, P.**

Virus des plantes et herédite. (Plant viruses and heredity.) Compt. Rend. Soc. Biol. (Paris) **122**(22) : 814–815, 1936.

The authors give their results of studies and give evidence against the hereditary theory of virus perpetuation.

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Perte et récupération de la propriété "carrier" de virus X chez le pomme de terre. (Loss and recovery of the property of "carrier" of virus X in the potato.) Compt. Rend. Soc. Biol. (Paris) **123**(27) : 325–326, 1936.

These studies indicate that seedlings from virus X inoculated with the virus were found after two weeks to possess a principle which was lost through sexual reproduction.

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Pourquoi le virus de la mosaique du tabac et le virus X de la pomme de terre ne pressent-ils pas á la descendance par les graines? (Why are the tobacco mosaic and X potato viruses not transmitted to the progeny through the seed?) Compt. Rend. Soc. Biol. (Paris) **123**(29) : 509–510, 1936.

Antisera studies show that the virus does not exist in the pollen and that it is attenuated in the floral organs.

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De l' ultracentrifugation des plantes. (On the ultracentrifugation of plants.) Compt. Rend. Soc. Biol. (Paris) **126**(27) : 423–425, 1937.

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Ultracentrifugation et cristallization d' un mélange de virus de la mosaïque du tabac et de bacteriophage. (Ultracentrifugation and crystallization of virus of tobacco mosaic & bacteriophage.) Compt. Rend. Soc. Biol. (Paris) **126**(32): 903–906, 1937.

Gray, George W.
Where life begins: Search among the gene, the virus and the enzyme. Harpers' Magazine **174**: 279–289, 1937.

A part of this paper (pages 285–289) is devoted to a popular discussion of the work of Stanley with some reference to the work of others.

Green, D. E.
The virus of spotted wilt in Gloxinias. Gard. Chron. **2**(2488): 96, 159, 1934.

Popular.

Gregory, G. H.
Water-core in apples. Queensland Agric. Journ. **44**(6): 748–750, 1935.

Gulyás, Antal
Die Fasciation der Tabakblätten und die Mossikkrankheit. (Sports of tobacco leaf and the mosaic disease.) Jahrb. K. und Landw. Acad. Debrecen p. 129–136, 1928.

Die mermorierte Panaschierung der Tabakblätter und das Mosaik. (The marmoreal variegation of tobacco leaf and mosaic.) Keisérlet. Közlem., Budapest **31**: 261–273, 1928.

A magyar dohanyok virus-betegeegei. (On the virus disease of Hungarian tobacco.) Rep. Hung. Agri. Expt. Sta. **39**(1–3): 1–34, 1936.

A discussion of several well known virus diseases.

Gutermann, C[arl] E[dward] F[rederick]
The lily project. Month. Bull. Hort. Soc. of New York. **1936**: 3–7, 1937.

Popular. Some data on mosaic.

Hansen, Henning P.
Virussygdomme hos kartoffel. (Virus diseases of potato.) Ugeskrift for Landmaend. **39**(81): 610–613, 1936.

Brief popular descriptions of the most common potato diseases.

Spredningsbetingelser for kartoffelens virussydomme i Forhold til praktisk Kartoffel-fremavl. Reprint from Ugeskrift for Landmaend 4 p., 1937.

The writer accounts for the finding of X, Y, and leaf roll virus diseases in Denmark.

Studier over kartoffelviroses I (Studies on potato virosis in Denmark.) Saortryk of Tidsskrift for Planteavl 42. Bind Glydendalske Boghandel Nordisk Forlag 631–681, 1937.

A discussion of the potato virus diseases in Denmark and the viruses involved.

Studier over kartoffel-viroses in Danmark (Studies on potato virosis in Denmark). Tidsskr. Planteavl. **43**(4): 631–681, 1938.

Hansford, Clifford] G[erald]

Anual Report of Mycologist 1934. Rpt. Dept. Agric. (Uganda) year **1934** (Part II): 73–88, 1936.

Mentions three types of rosette of *Arachis hypogaea*. (1) Typical rosette. (2) mottling of the leaves and (3) yellows or a pronounced mosaic.

Harley, C[arl] P[ierce]

Water-core of apples. Washington State Hort. Ass. Proc. **1934**: 105–108, 1935.

Harrington, F[rank] M.

Tuber index work. Potato Ass. Amer. Proc. 1928, **15**: 332–338, 1929.

Harris, R. V.

Mosaic disease of the raspberry in Great Britain. I. Journ. Pomol. & Hort. Sci. **11**(3): 237–255, 1933.

The author recognizes types A, B, and C of mosaic, Devon leaf curl and Devon chlorosis. The author reported on susceptibility of varieties and other observations.

Zanthosis-virus of strawberry. Canada Dept. Agric. Canadian Plant Disease Survey **1930**: 60, 1934.

---, **& Grubb, N. H.**

Raspberry mosaic disease. East Malling Res. Sta. Ann. Rpt. **1934**: 62–63, 1935.

Virus diseases of strawberry. East Malling Res. Sta. Ann. Rpt. **1934**: 63, 1935.

Growing healthy raspberries; the control of diseases and pests. East Malling Res. Sta. Ann. Rpt. **1935**: 232–242, 1936.

Includes a discussion of mosaic and two nutritional disorders in relation to mosaic, leaf-scorch and effect of manuring on mosaic.

----------, & **Hildebrand, A. A.**
An investigation of strawberry virus disease in Ontario. Canadian Journ. Res. **C 15**: 252–280, 1937.

A discussion of experimental studies in Canada.

Virus diseases in relation to strawberry cultivation in Great Britain. A synopsis of recent experiments at East Malling. Report on Mycology and Bacteriology of the year 1936. East Malling Res. Sta. Ann. Rpt. **1936–37**: 201–211, 1937.

A review containing historical notes, methods of determination of yellow edge and crinkle. Also notes on vectors and control. Crinkle is transmitted by *Capitophorus fragaefolii* Col. which the author believes be the same as *Myzus fragaefolii* Cockll.

Studies in Strawberry virus diseases. III. Transmission experiments with crinkle, 1935. Report on Mycology and Bacteriology for the year 1936. East Malling Res. Sta. Ann. Rpt. **1936**: 212–221, 1937.

The author describes his experiments which lead to the opinion that yellow edge and crinkle are distinct diseases.

----------, & **Hildebrand, A. A.**
An investigation of strawberry virus disease in Ontario. Canadian Journ. Res. C. (Bot. Sci.) **15**(6): 252–280, 1937.

Yellow edge in southeastern England and in southern Ontario may be identical. It is not known that either of these diseases is the same as the xanthosis of California. Three Ontario varieties are symptomless carriers. Varieties of *F. chiloensis* which have proved to be symptomless carriers with high resistance may prove to be absolute. *F. virginiana* are highly susceptible. Some highly resistant varieties are not entirely resistant.

Harrison, A[rthur L.]
The pea mosaic situation in New York State in 1936. U.S.D.A. Plant Diesase Rept. **20**(16): 259–260, 1936.

Varietal susceptibility of lima beans to mosaic. U.S.D.A. Plant Disease Rept. **20**(18): 291, 1936.

----------, & **Burkholder W[alter] H[agemeyer]**
Canning bean diseases in New York in 1936. U.S.D.A. Plant Disease Rept. **22**(8): 290, 1936.

A report on the prevalence of common bean mosaic and of a new dwarfiing disease.

Hartung, W. J.
Evasion of curly leaf disease or "blight", Farm Bureau Mon., Monterey County **6**(3): 13–16, 1924.

Popular.

Hartzell, Albert

A study of peach yellows and its insect vector. Cont. Boyce Thompson Inst. **7**: 183–207, 1935.

The author gives a brief history of the disease, its distribution, symptoms and studies on insect transmission. *Macropsis trimaculata* is the only insect known to transmit this virus. Forty seven other insects were tested.

Incubation period of peach yellows in its insect vector. Contr. Boyce Thomp. Inst. **8**(2): 113–120, 1936.

The incubation period ranged from 10 to 26 days. All experiments were made with nymphs except in one case in which adults were used. In the case of the adult the time was 16 days.

Movement of intracellular bodies associated with peach yellows. Contr. Boyce Thomp. Inst. **8**(5): 375–388, 1937.

The author reports the movement of these bodies by means of cinephotomicrography. Bodies similar in appearance were found in the salivary glands of living *Macropsis trimaculata* which had feed on yellows trees for one to three weeks. Bodies were not found in insects fed on healthy trees. There appears to be a parallel relationship in aster yellows and the insect vectors. There is a much greater cellular disturbance in diseased plants and insects than in corresponding tissues from healthy plants and insects. Movement was also observed in infected tissues that were crushed on a microscope slide. This does not appear to be a Brownian movement.

Bionomics of the plum and peach leafhopper, *Macropsis trimaculata*. Contr. Boyce Thomp. Inst. **9**(2): 121–136, 1937.

A careful study of this insect which is the vector of peach yellows.

Movement of intracellular bodies associated with peach yellows. Phytopathology (Absiract) **27**(2): 130, 1937.

Harvey, R[oney] B[eecher]

Blanching celery. Minnesota Agric. Expt. Sta. Bull. **222**, 20 p., 1925.

The author gives the results of diseased celery plants when blanched. He states. "It is indicated that the blanching of some varieties is hastened by the infection of the plants by mosaic disease. Chlorotic varieties are more easily blanched than dark leafed plants."

Heberdey, Rudolf R.

Entomological investigations on the spike disease of sandal (anthicidae.) Indian Forest Rec. **20**(6): 1–24, 1934.

A study of the insect fauna of the sandal.

Heierle, E.

Untersuchungen einers unter dem famen Rosts in der Schweiz stark verbreiteten Tabakkrankheit. Ber. Schweiz Bot. Ges. **47**: 363–368.

The name "rost" is used for wildfire, angular leaf spot and virus diseases.

Heinicke, A. J.

Seed content and position of fruit as influencing stippen. Proc. Amer. Soc. Hort. Sci. 1920; **17**: 225–232, 1921.

Heinze, K.

Zur frage der uebertragung der Kartoffelvirosen duch jassiden. Phytopath. Zeitschr. **10**(6): 606, 1937.

Hervé, J.

Au subjet de la panachure de nos Hibiscus et de la panachure infectieuse des malvacées. Considerations pratique sur la culture des Hibiscus. (Variegation of our *Hibiscus* and infections variegation of the *Malvaceae*. Practical considerations on the culture of Hibiscus.) Bull. Agric. Fort. de France. n. s. **5**(2): 137–141, 1936.

Herzberg, K.

Filtrierbares Virus als Krankheits erreger bei. Mensch Tier, und Pflanze. Chemiker Zeitsg. **60**: 824, 1936.

Hewitt, J. Lee, & Truax, H. E.

An unknown apple disease. Arkansas Agric. Expt. Sta. Bull. **112**: 481–491, 1912.

To vizualize a distinction between viruses and organisms. Phytopathology (Abstract) **25**: 892, 1935.

Hill, A. V.

Yellow dwarf of tobacco in Australia. I. Symptoms. Journ. Counc. Sci. & Ind. Res. Australia **10**(3): 228–230, 1937.

A description of a disease which appears to be caused by a virus.

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t Big bud of tobacco. Journ. Counc. Sci. & Ind. Res. Australia **10**(4): 309–312, 1937.

A description of this disease.

Hirayama, Shigekatsu, & Yuasa, A.

(Cytological study of tobacco mosaic, II.) Ann. Phytopath. Soc. (Japan) **6**(2): 119–128, 1936.

This is a continuation of a previous paper on this same subject. There were no irregularities in the reduction division and the tetrads were normal. Diseased plants 88.91 per cent apparently normal pollen grains, while healthy produced 83.34 per cent. The degeneration appears

to develop after tetrad formation. A high percentage of seed crosses between diseased and healthy plants failed to germinate. Inoculation with boiled juice from diseased plants does not cause X bodies. Healthy plants placed in 0.05 per cent of ammonium molybdate wilted in 3 days and produced bodies resembling X-bodies.

(On the germination of pollen obtained from mosaic tobacco plants.) Proc. Imp. Acad. Tokyo, **12**(7) : 203–204, 1936.

This work was suggested by Kostoff's reports. The author tested a large number of pollen grains. Sterile pollen was found in both healthy and diseased plants. Comparing the degree of the germination of apparently normal pollen between healthy and diseased plants, the average percentage of the germinated pollen is rather higher in the diseased plants than in the healthy ones. The writer observed the X or inclusion bodies in the pollen of the diseased plants.

---, & **Yuasa, A.**

(Cytological study of tobacco mosaic, I.) Ann. Phytopath. Soc. (Japan) **5**(3) : 197–205, 1936.

The study was made on *Nicotiana tobacum* var. Hatano. The authors found X-bodies in all leaf tissues, in stems with hairs, in roots except in root hairs, root caps and calyptrogens and in the various parts of the flowers. However, they were rare in microsporogenous cells, pollen mother cells, pollen and pollen tubes. Striated materials, raphids, crystalline plates and amorphous bodies were found in all tissues contain X-bodies. The X-bodies and all other types of bodies appear to be derived from the cytoplasm.

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Occurrence of inclusion bodies in the guard cells of the stomata of mosaic-tobacco plants. Ann. Phytopath. Soc. (Japan) **6**(4) : 305–306, 1937.

The authors report the finding of inclusion bodies in guard cells of stomata. These results are contradictory to the results obtained by Sheffield.

Ho, William T. H., & Li, L. Y.

Preliminary notes on the virus diseases of some economic plants in Kwangting province. Lingnan Sci. Journ. **15**(1) : 67–78, 1936.

A report on virus diseases of *Capsicum* sp., *Carica papaya, Crotalaria saltiana, Ficus carica, Lycopersicon esculentum, Morus alba, Nicotiana tabacum, Phaseolus vulgaris, Solanum melongena, S. tuberosum, Saccharum officinarum and Zea mays* (sweet).

Hoggan, Isme A[ldyth], & Johnson, James.

Behavior of the ordinary tobacco mosaic in the soil. Journ. Agric. Res. **52**(4) : 271–294, 1936.

The authors made greenhouse and laboratory experiments with tobacco virus No. 1. The virus leached readily from decaying plants

into the soil. The degree of water saturation of the soil above a low minimum, and the range of hydrogen-ion concentration occuring naturally in soils, did not appear to affect the inactivation of the virus. Aeration evidently inactivated both directly and through its influence on microbial activity, but it separated relatively slowly. "Soil temperatures between 5° and 30°C. did appreciably affect the rate of inactivation of virus extract in the soil. At 40°C., inactivation was definitely greater. Freezing the soil, however, caused rapid inactivation of virus extract in the soil . . . . Neither freezing not desiccation caused any appreciable inactivation of virus present in undecayed plant tissues in moist soil."

Holmes, Francis O[liver]

Comparison of derivatives from distinct strains of tobacco-mosaic virus. Phytopathology **26**(9) : 896–904, 1936.

The author worked with two strains, masked and distorting. Other derivatives were derived from these strains. A symptomless strain may give rise to derivatives causing severe symptoms. A symptomless strain may be introduced into a country and then give rise to severe derivatives. The author gives suggestions for detection of symptomless strains.

Interspecific transfer of a gene governing type of response to tobacco-mosaic infection. Phytopathology **26**(10) : 1007–1014, 1936.

The author gives the following summary:

"A necrotic type of response to infection with tobacco-mosaic virus was introduced into the species *Nicotiana paniculata.* This was accomplished by the transferring a dominant gene N(necrosis) from *N. rustica,* through repeated back crosses of the hybrid *N. paniculata* X *N. rustica* using *N. paniculata* pollen, but retaining in each generation only individuals responding to inocculation by production of necrotic lesions. The necrotic-type variety of *N. paniculata* thus produced was self fertile and, in appearance, resembled the ordinary mottling-type *N. paniculata.* In its response to infection, however, it was essentially like *N. rustica,* dying from systemic necrosis if infected when young, localizing virus if infected when old."

"A dominant gene D(unmodified necrosis), not found in *Nicotiana rustica,* was observed in the newly derived necrotic-type *N. paniculata* plants. It was found to segregate independently with respect to the gene N.(necrosis). In the presence of N, the gene D allowed necrotic primary lesions to appear promptly, and prevented extensive yellowing of surrounding tissue."

Hereditary factors affecting tobacco-mosaic disease in solanaceous plants. Phytopathology (Abstract) **27**(2) : 131, 1937.

Genes affecting response of *Nicotiana tabacum* hybrids to tobacco-mosaic virus. Science **85**(2195) : 104–105, 1937.

The author gives the results of his studies on hybridization. The author believes that the virus would be unable to survive in plants containing certain genes and that it might disappear or be reduced by the elimination of the reservoir in the host plant.

Inheritance of resistance to tobacco-mosaic disease in the pepper. Phytopathology **27**(5) : 637–642, 1937.

The author reports four types of the disease produced by infection of *Capsicum frutescens* with tobacco mosaic virus I(distorting strain) and that they are controlled by three genes.

Taxonomic relationships of plants susceptible to infection by tobacco-mosaic virus. Phytopathology **28**(1) : 58–66, 1938.

This is a paper on plants susceptible to tobacco virus I. A total of 46 species in 30 genera and 16 families were found susceptible.

Strains of tobacco resistant to tobacco mosaic. Phytopathology (Abstract) **28**(3) : 9, 1938.

Inheritance of resistance to tobacco-mosaic disease in *Browallia*. Phytopathology **28**(5) : 363–369, 1938.

When identical plants of *Browallia speciosa* var. *major* were inoculated some of them developed systematic and some local symptoms. The necrotic-type plants were found to possess a dominant gene N.

Honing, J. A.

Een steriele dwergvorm van Deli-tabak, ontstaan als bastaard. A sterile dwarf form of Deli-tobacco originated as a hybrid. Deli Proefs., Medan, Sumatra. Bull. **10**, 24 p., 1917.

In the results obtained in his studies he made observations in relation to "kroepoek" disease relating them to the work of others.

Hope, C[laude King], C[halmers] J[ackson], & Parker O[rlan]

The effect of crazy top disorder on cotton plants and its control by irrigation management. U. S. Dept. Agric. Tech. Bull. **515**, 44 p., 1936.

A history, description and other data on this disease. A discussion of its economic importance and reaction to water supply.

Hopkins, J. C. F.

Seasonal notes on tobacco disease. 2. Mosaic. Rhodesia Agric. Journ. **28**(12) : 1095–1100, 1931.

Seasonal notes on tobacco diseases. 7–9. Rhodesia Agric. Journ. **32**(2) : 108–113, 1935.

Part 7 refers to mosaic.

Horning, G.

Vergleichende Untersuchung verschiedener Methoden zur bestimmung des Abbau-grades bei Pflanzkartoffeln. (Comparative study of various methods for the determination of the degree of degeneration of potato seed tubers.) Pflanzenbau **13**(6) : 209–234, 1936.

A report of comparative tests of the infection seed tubers of potatoes infected with virus diseases. A very low correlation was established.

Horsfall, J[ames G.]

A study of meadow-crop diseases in New York. Cornell Univ. Memoir **130**, 1930.

Contains some data on red clover mosaic.

---, **& Burkholder, W[alter] H[agemeyer], & Reinking, Otto A[ugust]**

Diseases of green refugees beans in New York in 1937. U.S.D.A. Plant Disease Rept. **21**(17) : 318–319, 1937.

A short paper devoted almost entirely to mosaic of *Phaseolus vulgaris* (green refugee). The types produced by Pierce and Walker and the Idaho refugee were practically immune to ordinary mosaic. A new disease designated as "one sided mosaic" was reported. This had been mentioned in 1936 by both Harrison and Burkholder. The authors give a description of the disease.

Hudson A. W., & Woodcock, J. W.

Locality in relation to seed potato production. Experiments on the effect of place of growing on yield and incidence of virus in potatoes. New Zealand Journ. Agric. **50**(2) : 98–106, 1935.

Very comprehensive discussion of the results of their tests and observations.

Hurt, R. H.

The phony peach and other peach diseases in Virginia. Virginia State Hort. Soc. Rpt. **38** : 64, 69, 1933.

Hurst, R. R.

Resistance studies of Irish cobbler and Green mountain strains for late blight and virus diseases. Canada, Progress Rpt., Dominion Botanist, **1931–34** : 69–70, 1935.

Hus, P.

Stippigheid. De Nieuwe Veldbode **3**(9) : 7–9, 1935.

Hutchins, L[ee] M[ilo]
Phony peach, a new and dangerous peach disease. Proc. Maryland State Hort. Soc. **34**: 43–51, 1932.

Peach mosaic. A new virus disease. Science **76**: 123, 1932.
A description of a new diseases.

The peach mosaic disease. California Dept. Agric. Selec. Pub. No. **145**: 60–61, 1937. .

---, **& Bodine, E. W., & Thornberry, H. H.**
Peach mosaic, its identification and control. U.S.D.A. Circ. **427**, 48 p., 1937.
A very excellent publication which gives a very thorough discussion of our knowledge of this disease up to this time. It is well illustrated.

Hutchinson, C. B.
Mottle leaf of citrus: Other diseases of citrus. California Agric. Expt. Sta. Rpt. **1932–34**: 59, 1934.
Mention of scaly bark or psorosis.

Imle, E. P., & Samson R[ayburn] W[alter]
Studies on a ring-spot type of virus of tomato. Phytopathology (Abstract) **27**(2): 132, 1937.

Ingram, J. W., & Summers, E. M.
Insects that carry mosaic disease of sugar cane. Sugar Bulletin **16**(6): 4–7, 1937.
The author refers to the three known carriers of this virus. *Aphis maidis, Hysteroneura setariae* and *Toxoptera graminum.* Also to other insects that may be carriers. Although *H. setariae* is not as efficient as *A. maidis,* it occurs in much greater numbers. The paper also refers to host plants and states that in studying insect transmission of mosaic it was considered that the amount of spread caused by insects is in proportion to the number of carriers present, and to the kind and number of alternate host plants in and around the field.''

Ivanic, M.
Ispitivanja etiologije nolesti mozaika u nekih fanerogamih biljaka (Untersuchungen über die altiologi der mosaik-krankheiten bei einighen phaneorogamen pflanzen.) Archiv. Monst. Poljopr. Smotra Mauch. Poljopr. Rad. (Yugoslavia) **1**(1): 107–133, 1934.

Jacob, J.
Tulip notes; suggestions about rectifications and arrangment. Garden (London) **82**: 304, 1918.

Jahnel, H.
Wuchsstoffauntersuchungen au Abbaukrankken Kartoffeln. (Auxin investigations on degenerate potatoes.) Phytopath. Zeits. **109**(1): 113–117, 1937.

Jamalainen, E. A.

Herneen sementen sisainen turmeltuminen. (Internal necrosis of pea seeds.) Valtion Maatalouskoeto iminnan Julkaisuja No. **79**. (Agric. Expt. Sta. Activities of Finland No. **79**.)

This disease is not due to bacteria or fungi. It shows some symptoms of a virus.

Boorin vaikutus knoppatandin ssüntymisseen omenissa. (The effect of boron on the occurrence of the cork disease in apples.) Valtion Maatalonskoeto iminnan Julkaisuja No. **89**, (Agric. Expt. Sta. Bull. **89** of Finland.)

We have included this paper because some workers believe this disease is due to a virus. Most of the trees treated with boron were free from the disease.

Janson, A.

Stippe der Kernobstfrüche. Gardenflora **78**: 241–242, 1929.

Jensen, James H[erbert]

Studies on representative strains of tobacco-mosaic virus. Phytopathology **27**(1): 69–83, 1937.

The author reports 55 strains of tobacco mosaic virus and describes 12 of them. They vary greatly in severity. Some of the strains were tested for reactions to heat and withstood a temperature of 80°C for 10 minutes.

Johnson E[dward] M[arshall] & Valleau W[illiam] D[ornay]

Susceptibility of tobacco plants visibly affected with mild tobacco mosaic to other strains of the virus. Kentucky Agric. Expt. Sta. Res. Bull. **360**: 192–201, 1935.

The authors give the results of a series of experiments and say,—"The tests seem to prove that if a tobacco leaf inoculated with a second strain of a virus is unoccupied or partly occupied by the first strain, so that the second may multiply, the second virus will eventually be transported to the growing point where it will have an opportunity for multiplication equal to that of the first strain. The growing point of a tobacco plant appears to be entirely unprotected by one strain of a tobacco mosaic virus against another strain if the latter has sufficient uninvaded tissue in which to multiply and from which it may be transported to the growing point. Protection is afforded individual groups of cells, perhaps, but the plant as a whole does not develop immunity."

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The ring symptoms of the virus diseases of plants. Kentucky Agric. Expt. Stat. Res. Bull. **361**: 239–263, 1935.

The extensive studies recorded in the paper are summarized as follows:

"Chlorotic or necrotic rings may be present as the only definite symptom or as an accompanying symptom in plants affected with various virus diseases. Rings may be present as local symptoms on inoculated leaves or as transitory or permanent symptoms in un-inoculated, completely or partially invaded tissue."

"The following tobacco viruses capable of producing rings in tobacco are discussed: Ring tobacco mosaic (2 strains), yellow and white mosaic, cucumber mosaics, etch viruses, viruses from *Delphinium* sp. *Plantago major*, and *Mertensia virginica* (possibly cucumber mosaic), and two unidentified."

"It is suggested that the ring symptom is not diagnostic for any specific virus disease because similar rings may occur in plants, especially tobacco, affected with such unlike viruses as tobacco ring spot, healthy potato, etch, tobacco mosaics, cucumber mosaics, and others. Usually other symptoms accompany the rings, which make classification possible, but sometimes property and host-range studies may be necessary for more exact classification."

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Mosaic from tobacco one to fifty-two years old. Kentucky Agric. Expt. Sta. Res. Bull. **361**: 264–271, 1935.

The authors summarize this paper as follows,—

"Turkish tobacco plants never touched by hands were inoculated with decoctions made from dried tobacco material 1 to 52 years old. Forty-one ground samples 24 to 39 years old were used to inoculate 241 tobacco plants of which 45 plants, representing 17 samples, developed mosaic. At least 5 different strains of mosaic, recognizable by different degrees of severity of symptoms, were produced from the Chemistry Department samples."

"Seventy-six samples, 1 to 15 years old, known to contain mosaic when collected, were used as inoculum for 84 tobacco plants of which 79 developed mosaic. There was no evident loss in infectivity of the mosaic virus in dried tobacco 7 years old. After 8 years there seemed to be gradual decrease in the concentration of the virus. At least 12 strains of the mosaic virus were tested and all survived in dried tobacco."

"Dried leaves from tobacco grown in 1882, the year Adolf Mayer published the first description of tobacco mosaic, were tested for tobacco mosaic virus. Of 30 plants inocculated with this materials, 18 developed mosaic. Two strains, a yellow, and a green distorting type, appeared."

Johnson, F[olke], & Jones, L[eon] K[ilby]

Two mosaic diseases of pears in Washington. Journ. Agric. Res. **54**(8): 629–638, 1937.

The authors report two virus diseases; (1) enation mosaic and (2) severe mosaic. They are rarely transmitted in the seed. The latter has a wide range of hosts and the former a much more limited range. The viruses are quite different.

Johnson, H[oward] W., & Lefebyre, C. L.
Crotalaria mosaic. Phytopathology (Abstract) **28**(1) : 10, 1938.

Johnson, James, & Hoggan, Ismé A[ldyth]
The inactivation of the ordinary tobacco-mosaic virus by micro-organisms. Phytopathology **27**(10) : 1014–1027, 1937.

Tobacco virus I is inactivated or occasionally attenuated by a number of bacteria and fungi. The fungi are more effective than the bacteria.

An acquired immunity to the tobacco streak disease. Trans. Wisconsin Acad. Sci. **30** : 27–34, 1937.

Plants that are naturally infected show signs of recovery. Eight-hundred plants inoculated in the green house have shown similar character; 130 of these plants were inoculated a second time but did not develop the diseases. Six other viruses did not yield any significant protection against the streak virus. The streak virus did not give protection against these six viruses.

Factors relating to the control of ordinary tobacco mosaic. Journ. Agric. Res. **54**(4) : 239–273, 1937.

The author used tobacco virus I. The virus survives in fairly high concentration in cigar and cigarretes but very slight in other commercial tobaccos. Virus in refuse may be inactivated under weather conditions in 5 or 6 months. It will survive in roots of the proceeding crop.

Jones, L[eon] K[ilby]
The mosaic disease of beets. Washington Agric. Expt. Sta. Bull. **250**, 16 p., 1931.

---, **& Vincent, C[hester] L[eon]**
The susceptibility of potatoes to the vein-banding virus. Journ. Agric. Res. **55**(1) : 69–79, 1937.

This virus spreads rapidly. Crosses show that katahdin was the only variety which transmitted resistance to seedlings. Some varieties were more resistant than others. Some varieties carrying a latent virus showed symptoms of rugose mosaic when infected with vein-banding virus.

Crinkle and mosaic of Geranium. Phytopathology (Abstract) **28**(1) : 11, 1938.

---, **& Burk, Earl F.**
The resistance of Katahdin potato seedlings to infection by the veinbanding virus and the tobacco mosaic virus. Phytopathology (Abstract) **28**(1) : 11, 1938.

Kadow, K[enneth] J[ohn,] & Anderson, H[arry] W[arren]
Brittle root of horse-radish in Illinois. U.S.D.A. Plant Disease Rept. **22**(18) : 288, 1936.

This disease has been known for several years. It is identical with curly top of beet on horae radish as described by Severin. The leaf-hopper (*Eutettix tenellus*) has not been reported from Illinois but other leaf hoppers are abundant.

Kaho, K.
Das Verhatten der Eiweisstoffe gesunder und abbaukranker Kartoffelknollen gegen Salze. Acta Comment. Univ. Tactuensis **A29**: 1–32, 1935.

Kameras, A. T.
(Neueste methoden zur laboratoriellen Bestimmung des Abbanes der Kartoffel an den Knolle.) Trudy Prikl. Bot. Pr. Ser. A. **9**: 63–76, 1934.

----------, & **Anikieff, A. M**
(Investigation of degeneration in the potato by Bechhold and Erbe's method.) Bull. Appl. Bot. Select, 1937. Ser. **2**(11): 201–214, 1937.

Results of year's tests using B. & E. copper strip method. The method is not altogether accurate.

Katsura, Saburo
The stunt disease of Japanese rice, the first plant virosis shown to be transmitted by an insect vector. Phytopathology **26**(9): 887–895, 1936.

A very complete history of the studies by several Japanese plant pathologists.

Kaufmann, O.
Eine gefährliche Viruskrankheit an Rübsen, raps und Kohlrüben. (A dangerous virus disease of rape, colza and kohlrabi.) Arb. Biol. Reichsanst. Land-u-Forstw. (Berlin) **21**(4): 605–623, 1936.

A descriptive of this disease which is transmitted by *Lygus pratensis.*

Kausche, G. A.
Zur Frage der Beziehungen zwischen Virusinfekt und Stoffwechselphysiologie bei pflanzenlichen Virosen. (A contribution to the question of the relationship between virus infection and metabolic physiology in plant viroses.) Biochem. Zeitschr. **294** (5–6): 365–371, 1937.

Kawamura, T.
(The mosaic disease of lily and the effect of deficiencies of potassium on the same host.) Journ. Plant Prot. **22**: 713–718, 771–779, 848–855, 1935.

The author describes three types of virus diseases,—(*a*) crooked neck, (*b*) rosette and (*c*) pimple leaf.

So-called virus diseases of lily in relation to hosts. Ann. Phyto. Soc. Japan **7**(3 & 4) : 163–172, 1937.

The author describes three types of virus diseases,—(*a*) crooked neck, (*b*) rosette and (*c*) pimple leaf.

Khudyne, I. P.

(Virus diseases of tobacco in U.S.S.R.) The A. I. Mikoyan Pan-Soviet Sci. Inst. Tob. and Indian Tob. Ind. V.I.T.I.M.). Krasnoder. Publ. **130**, 79 pp., 1936.

A review of tobacco virus diseases.

Kidd, F.

The bitter-pit problem. Low Temperature Res. Sta. (Unpublished Memoir) Cambridge, 1934.

Klapp, E.

Kartoffelabbau und Viruskrankheiten. (Potato degeneration and virus diseases.) Mitt. f. d. Landwirtsch. **49** : 523, 1934.

---, et al.

Okologie und "Abbau" der Kartoffel. Beziehungen zwischen Ertragshöhe. Nachbaustufen, Krankheitsbefall und praktischem Pflanzewert. Pflanzenbau **11**(6) : 383–395, 1935.

Abbau und Abbaubekämfung im Pflanzkartoffelbau. (Degeneration and degeneration control in seed potato cultivation.) Mitt. Landw., (Berlin) **51**(32) : 692–694, 1936.

A discussion and recommendations.

Kartoffelabbau. (Running out "of potatoes") Forschungsdienst **1**(1) : 33–88, 1936.

A review of the subject with 38 references to literature.

Vordringliche Forschungsziele bei der Bekämfung des Kartoffelabbaus. (Urgent aims of research in the control of potato degeneration.) Forschungsdienst **3**(1) : 10–11, 1937.

The author suggests lines of research.

Klebahn, H[enrich]

Versuche über das Wesen der Mosaikkrankheit des Tabaks und über einige andere Viruskrankheiten. (Experiments on the nature of the mosaic disease of tobacco and on some other virus diseases.) Phytopath. Zeitschr. **9**(4) : 357–370, 1936.

I. Das virus des tabakmosaiks bei gegenwart starker gifte wirksam. II. Zur über-tragbarkeit der abutilon-chlorose. III. Weitere versuche über infektion der anemonen mit alloiophyllis. IV. Eine mosaikkrankheit der gurken. The virus was not destroyed by certain chemicals that destroyed bacteria. Therefore, the author believes that the virus is inanimate.

Klemm, M. J.
(Die Eisenfleckigkeit der Kartoffeln.) Ostpr. Landw.-Zeitg. **12** (7) : 3–5, 1935.

Klump, W.
Methodische Untersuchungen zur Feststellung des abbaugrades der Kartoffel. Diss. Bonn. 40 p., 1935.

Kobus, J[acob] D[erk]
Meded van het Proefstation voor de Java Sulkerindustrie **12** : 320–340. 1907.

Reduction of yield of sugar cane and sugar content by mosaic.

Vergelykende proeven omtrent gelestrepenziekte. Meded van het Proefstation voor de Java-Suikerindustrie **12** : 319–342, 1908.

Koch, G[ustav]
Zur Frage der Ursache des Kartoffelabbaues. D. Kartoffelbau **20** : 37–38, 1936.

Kohler, E[rich]
Der virusnadweis und kartoffeln. Biol. Reichs. Landw.-u. Forstw. 53, 1933.

Kartoffelabbau und Viruskrankheiten. (Potato degeneration and virus diseases.) Mitt. f. Landw. 12, 1934.

Viruskrankheiten der Kartoffel. (Virus diseases of potato.) Phytopath. Zeitschr, **7** : 1–131, 1934.

Der Nachweis von Virusinfektionen am Kartoffelpflanzgut mit der Stecklingsprobe. (The detection of virus infections in seed potatoes by testing the sprouted eyes.) Züchter **7**(3) : 62–65, 1935.

Erfahrungen veim feldmässigen Abbau von künstlich blattrollinfizierten, Kartoffeln (Sorte Kl.—sp. Wohltmann). (Untersuchuger über die Viruskrankreien der Kartoffel. V. Mitteilung.) (Experimental observations on the degeneration under field conditions of potatoes (Kl.—Sp. Wohltmann variety) artificially infected by leaf roll. (Investigations on the virus diseases of potato., Note V.) Arb. Biol. Reichsanst. Landu-u. Forstw. (Berlin) **21**(4) : 517–529, 1935.

Der Virusnachweis an Kartoffeln. Eine Anleitung für Züchter und Kartoffelbegutachter. (The detection of virus in potatoes. A manual for breeders and potato surveyers.) Mitt. Biol. Anst. (Reichsanst.) Berlin **53**, 9 pp., 1936.

The character of this paper is indicated by the title.

Studien über den Verlauf des Kartoffelabbaus auf dem Dahlemer Versuchsfeld der Biologischen Reichsanstalt. (Studies on the course of potato degeneration on the Dahlem experimental plot of the National Biological Institute.) Landw. Jahrbüch **83**: 589–868, 1936.

Untersuchungen über de Lupinenbräune. Nachrichtenbl. Deutsch. Pflanzenschutzd. **15**(2) : 90–91, 1937.

Account of virus disease on Lupin.

Neueve Vorstellungen von der Natur des pflanzenpathogenen Virus. Sammelreferat. (Recent conceptions of the nature of the plant-pathogenic virus. A symposium.) Zeitschr. Bot. **81**(12) : 559–571, 1937.

Weitere Untersuhcungen über das Virus der Lupinenbräune. (Further studies on the Lupin browning virus.) Z. Pflan. Krankl. **97**(2) : 87–97, 1937.

This virus is the same as Ainsworth's yellow mottle mosaic of cucumber, Johnson's cucumber virus I, and spinach virus. It becomes attenuated in tobacco but can be revived in cucumber.

Versuche über Pfropfung und Akronekrose bei Kartoffeln. Vorläufige Mitteilung. (Experiments on grafting and acronecrosis in potatoes. Preliminary note.) Angew Bot., **19**(2) : 158–160, 1937.

The author grafted virus free scions on potatoes carrying virus X and obtained mild symptoms of the same disorder.

Zur Frage derschutzimpfung bei den Veinbanding-viren. (Vorläufige Mitteilung.) (On the question of protective inoculation in the veinbanding viruses. (Preliminary notes.) Nachrichten. Bl. Deut. Pflanschulzd. **17**(4) : 32–33, 1937.

Die Viruskrankheiten der Kartoffel. (The virus diseases of potato.) Kartoffel-Zeitung **27**(21) : 2–5, 1937.

Die Resistenzzüchtung gegen den Kartoffelabbau im Lichte der Virusforschung. (Breeding for resistance to potato degeneration in the light of virus research.) Züchter, **9**(1) : 13–15, 1937.

A study of the practical features of the problem.

Fortgeführte Untersuchungen mit verschiedenen Stämmen des X-Virus der Kartoffel (Ringmosaikvirus) (Continued investigations on various strains of the X virus of the potato ring mosaic virus.) Phytopath. Zietschr. **10**(1) : 31–41, 1937.

A study of strains which the author places in two groups.

Ueber ein "Veinbanding-virus" der Kartoffel. (On a veinbanding virus of potato). Phytopath. Zeitschr. **10**(1) : 17–29, 1937.

Ueber eine äusserst labile Linie des X-Mosaikvirus der Kartoffel. (On an extremely unstable strain of the X-mosaic virus of the potato.) Phytopath. Zeitschr. **10**(5) : 467–479, 1937.

Viruskrankheiten und Kartoffel-züchtung. Forsch-ungsdienst. **5**(7) : 334–338, 1938.

Kokin, A. I.

(Physiological investigation of tobacco plants infected by the common mosaic virus.) Summary Scient. Res. Work Inst. Plant Prot. 1935, Leningrad p. 511, 1936.

Fiziologischeskoe izuchenie vredonosnosti obyknovennoi mosaiki tobaka Dubeck Nikitskli No. **44**. (Physiological study of the injuriousness of common mosaic disease of tobacco Dubeck Nikitsky No. 44.) Zashch. Rast. (Plant Prot. Leningrad. **12**: 95–112, 1937.

Transpiration is reduced, assimilation is diminished and the soluble carbohydrate lower in diseased than in healthy plants. The protein nitrogen, proteid and nicotine higher in the diseased than in the healthy plants.

Koltermann, Alwin

Die Keimung der Kartoffelknoll und ibr beimflusung durch Krankheite. Angew Bot. **9**: 289–339, 1927.

Kostoff, D[ontcho]

Something about sterility of pollen from mosaic tobacco plants. Genetica **15**: 103–114, 1933.

Virus and genic reactions in morphogenetic physiogenetic, and phylogenetic aspects. Phytopath. Zeitsch. **9**(4) : 387–405, 1936.

A very interesting paper in which it is shown that certain phenomena, such as variegations may follow either genes or viruses.

Cytogenetic aspects for producing *Nicotiana tabacum* forms localizing tobacco mosaic virus. Phytopath. Zeitschr. **10**(6): 578–593, 1937.

The author studied 45 species of Nicotiana and many crosses. He states that the problem is complicated by the absence of immune varieties. Environment is an important factor in development of symptoms.

Kotte, W.,

Die Faru-oder Fadenblättrigkeit der Tomate. (Fern or thread leaf of the tomato.) Z. Pflkrankh. **67**(2) : 65–72, 1937.

This disease appeared in the Baden nurseries in plants grown from English seed. In some cases fruit production was completely inhibited.

Kramer, M.

As doencas de virus das plantas. (Virus diseases of plants.) O Biologico (Brazil) **3**(2) : 51–54, 1937.

Brief popular descriptive notes of the work of other investigations.

O reconhecimento das doencas de virus das plantas. (How to recognize virus diseases of plants.) O Biologico **3**(11) : 331–336, 1937.

Popular statement giving the most conspicuous symptoms of virus diseases.

Krickner, Emil O[tto Oscar von]

Die Blatrollkrankheit der Kartoffeln. (Leaf-roll disease of potatoes.) Deutsch Landw. Presse **45**(4) :, 1918. (Zeit. Pflanzenk 29 : 54, 1919.)

Review of O. Appel's paper.

Krishnaswami, C. S.

Studies in disease resistance in crop plants in the Madras Presidency. II. Estimation of disease resistance in sugar cane mosaic. Proc. Indian Acad. of Science **6**(6) : 481–490, 1936.

The author summarizes his results as follows: "It is seen that (1) great differences in susceptibility to mosaic are exhibited in the varieties of sugar cane, (2) that most commercial varieties are susceptible to this disease, (3) that some highly susceptible varieties are tolerant to the disease, (4) that a few immune varieties exist and could be made use of as parents, (5) that certain varieties which escape infection under one set of conditions may take the disease under other conditions, and (6) that though the disease is systemic in certain varieties some recover from the disease and there is a possibility of the covering plant acquiring permanent immunity."

Kunkel, L[ouis] O[tto]

Aster yellows and its control. Flor. Exchange Host. Trade World **85** : 13–17, 1935.

Popular account.

Virus diseases of plants, twenty five years of progress, 1910–35. Mem. Brooklyn Bot. Gard. **4**(7) : 51–55, 1936.

A brief review.

Peach mosaic not cured by heat treatment. Amer. Journ. Bot. **23**(10) : 683–686, 1936.

The author conducted experiments on material received from Colorado and found that the disease was not inactivated in bud sticks at 35°C., 42°C., or 50°C. for periods of time near that which the tissues can endure.

Heat treatment for the cure of yellows and other virus diseases of peach. Phytopathology **26**(9) : 809–830, 1936.

This paper gives the results of extensive studies. Trees with yellows, little peach, red suture and rosette were cured with this treatment. Potted trees with yellows were cured in a room temperature of 34.4° to 36.3°C. The time for different parts of the trees varied. Dormant trees were cured by immersing in water at 50°C. for 10 minutes. Rosette was more difficult to control that the other diseases.

Effect of heat on ability of *Cicadula sexnotata* (Fall.) to transmit aster yellows. Amer. Journ. Bot. **24**(5) : 316–327, 1937.

When insects infected with this virus were subject to heat of one day or longer at about 31° to 32°C. they lost the power to transmit the virus temporarily. When submitted to this temperature for 1 to 11 days they regained the ability to transmit the virus in from a few hours to a few days. The longer the treatment the longer the time required to regain the ability to transmit. It is believed that the short treatment inactivates a part of the virus and that long treatments cause complete inactivation. It is believed that the virus not completely inactivated increases in the insect. After the heat treatments the insects transmit strains which are unchanged in passage from plant to plant.

Field studies show that the transmission of this virus is greater during the latter part of the growing season when the plants are most resistant. It is suggested that the midsummer temperatures inactivate to some extent, the virus in the insects at that time.

Lackey, C[harles] F[ranklin]

Restoration of virulence of attenuated curly top virus by passage through susceptible plants. Journ. Agric. Res. **55**(6) : 453–460, 1937.

Virus that has been attenuated by passage through *Chenopodium murale* has been restored in some cases by passage through cotyledon sized sugar beets. Also by passage through *Lepidium nitidum* and *Erodium cicutarium*.

Larson, R. H., & Walker, J. C.

Properties and host range of a cabbage mosaic virus. Phytopathology (Abstact) **28**(1) : 13, 1937.

Lasinio, E.

Gialume infettivo des pesco. (Infectious yellows of the peach.) Note Fruticulture Pistois **14**(12) : 205–208, 1936.

Latimer, L. P.

The relation of cultural practices to a marked out break of cork in McIntosh apples in Northern New England. Proc. Amer. Soc. Hort. Sci. **26** : 149–150, 1930.

The author describes all forms of bitter-pit disease of apple and considers them the same disease.

Lauffer, Max A.

The molecular weight and shape of tobacco mosaic virus protein. Science **87**(2264) : 469–470, 1938.

Lavin, G. I., & Stanley, W[endell] M[eredith]

The ultraviolet absorption spectrum of crystalline tobacco mosaic virus protein. Journ. Biol. Chem. **117**(3) : 269–274, 1937.

They summarized their work as follows: "The ultraviolet absorption spectrum crystalline tobacco mosaic virus protein has been determined and found to agree essentially with the destruction spectrum previously found for the virus agent in purified preparations . . . . . It has been possible to demonstrate the presence of the virus protein in the partially purified juice from mosaic-diseased Turkish tobacco plants by means of ultraviolet absorption spectrum measurements."

Leake, H. M.

Mosaic and the nature of virus disease. Int. Sugar Journ. **37** (444) : 460–461, 1935.

Lebard, P[aul]

Relations entre l'altitude, l'humidité et les substitutions de dégénérescence de la pomme de terre. (Relation between altitude, moisture and potato degeneration.) Compt. Rend. Acad. Agric. (France) **16**(30) : 999–1004, 1930.

Lee, H[enry] A[therton]

California scaly bark and bark rot of citrus trees in Philippines. Philippine Agric. Rev. **16**: 219–225, 1923.

Leemann, A. C.

Barley stripe disease. Farming South Africa. **10**(110) : 207–208, 1935.

A popular account.

Lehman, S[amuel] G[eorge]

Practices relating to control of tobacco mosaic. North Carolina Agric. Expt. Sta. Bull. **297**, 7 p., 1934.

Popular.

----------, **& Johnson, James**

Soil overwintering of tobacco mosaic. The Ext. Pathologist **14**: 45–47, 1934.

Contaminated soil relation to the epiphytology of tobacco mosaic. Phytopathology (Abstract) **27**(2) : 133, 1936.

Ruffle leaf of tobacco. Phytopathology (Abstract) **28**(1) : 14, 1938.

Lejeune, J. B. H.

La rosette de l'arachide. Étude faite par la Station Experimentale de l'arachide Bombay. (Peanut rosette. Studies made at the presente Experiment Station, Bombay.) Agric. et Elev. Congo Belge **10**: 107–108, 1936.

Studies made on peanut rosette transmitted by *Aphis laburni*.

Lesley, J[ames] W[yvill]

A study of resistance to western yellow blight of tomato varieties. Hilgardia **2**: 47–65, 1931.

Some varieties of tomatoes proved to be resistant to the curly top virus of the sugar beet. "The resistance is weak and seems to be due not so much to tolerance of the virus as to a tendency to escape infection . . . . . no significant difference was found in the length of the incubation period or in the frequency of recovery in resistant and susceptible varieties, and resistance was not increased in plants which had recovered, or in their progeny.

Levshin, A. M.

Mosaic diseases of the sugar beet. Plant Breeding Dept. Union Sugar Indus. Kieffl. **1930**: 286, 1930.

The dwarf varieties of tomatoes have been considered resistant to the virus of beet curly top. Five trials for four seasons in two places showed a 42 per cent loss in the resistant dwarf varieties and a 62 per cent loss in the susceptible varieties. The author says: "The resistance is weak and seems to be due not so much to tolerance of the virus as a tendency to escape infection. The chance of infection is influenced by the number of leafhoppers used in artificial infestation. The incubation period of the disease after artificial infestation of plants not less than 3 weeks after transplanting varied from 2 to at least 7 weeks."

Lewcock, H. K.

Yellow spot disease of pineapples. Queensland Agric. Journ. **48**(6): 665–672, 1937.

A popular account.

Likhité, V. N.

Stenosis in Gujarat cotton. Proc. Assoc. Econ. Biol. Coimbatore **3**: 15–17, 1936.

This disease has been suspected as being due to a virus but the author doubts this diagnosis.

Linn, Manson B[ruce]

A list of diseases found on economic plants on Staten Island (Richmond County), New York, from 1932–36. U.S.D.A. Plant Diseases Rept. **21**(4): 73–76, 1937.

Contains records of several virus diseases.

Loew, C[arl Benedict Oscar]

Über den Abbau der Kartoffeln. (On potato degeneration) Prakt. Bl. Pflanzenb. **14**(10–11) : 308–310, 1937.

A general discussion including a discussion of *Myzus persicae* and the water holding capacity of the soil.

Lojkin, Mary

Inactivation of tobacco mosaic virus by ascorbic acid. Contr. Boyce Thompson Inst. (Abstract) **8**(4) : 335. 1936.

A study of ascorbic acid as an inactivating agent of tobacco mosaic virus. Contr. Boyce Thomp. Inst. **8**(6) : 445–465, 1937.

The author summarizes this work as follows: "Autoxidation of ascorbic acid under the influence of cupric ions is associated with a capacity to inactivate highly purified tobacco mosaic virus in ascorbic acid-virus systems.

"The autoxidation of ascorbic acid which occurs in an alkaline medium or in the presence of the catalyst, hexoxidase, is not accompanied by the capacity to inactivate virus.

"The inactivation of tobacco mosaic virus in the presence of ascorbic acid undergoing reversible oxidation catalyzed by cupric ions is attributable to the formation of a specific intermediate product in the course of the autoxidation of the ascorbic acid. Neither ascorbic acid nor dehydroascorbic acid is capable of reacting directly with the virus to effect its inactivation.

"The inactivation of the virus by the autoxidation of ascorbic acid in the presence of cupric ions is inhibited by catalase, thus indicating that the intermediate product responsible for the inactivation is a peroxide."

Longley, L[ewis] E[dward]

Flower color in "broken" or mosaic tulips. Amer. Soc. Hort. Sci. Proc. **22** : 674–677, 1935.

Studies on varietal susceptibility.

Loring, H[ubert] S., & Stanley, W[endll] M[eredith]

Isolation of crystalline tobacco mosaic virus protein from tomato plants. Journ. Biol. Chem. **117**(2) : 733–754, 1937.

This is a report on the isolation of a crystalline protein from tomato plants infected with tobacco mosaic virus. The crystalline protein obtained from diseased tobacco and tomato plants were almost identical.

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Comparative properties of virus proteins from a single-lesion strain and from ordinary tobacco-mosaic virus. Phytopathology (Abstract) **27**(2) : 134, 1937.

"The single-lesion virus protein has approximately the same crystalline form as the ordinary tobacco-mosaic virus protein, but the crystals somewhat longer and narrower." There are some other slight differences.

----------, & **Wyckoff, Ralph W[alter] G[raystone]**
The ultracentrifugal isolation of latent mosaic virus protein. Journ. Biol. Chem. **121**(1) : 225–230, 1937.

The authors studied the latent mosaic disease of potato in *Nicotiana glutinosa* and *N. tabacum*. "The protein is present to the extent of about 0.02 to 0.1 mg. per cc. of juice of infected plants and was found to reach a somewhat greater concentration in diseased *Nicotiana glutinosa* than in *Nicotiana tabacum* plants. The latent mosaic virus protein was found to be between 1,000 and 10,000 times more infectious than the original juice."

Accuracy in the measurement of the activity of tobacco mosaic virus protein. Journ. Biol. Chem. **121**(2) : 637–647, 1937.

The results of this study are summarized as follows:

A comparison of the differences in the number of lesions produced by the same percentage difference in virus protein concentration over range of from 10^{-9} to 10^{-4} gm. of protein per cc. indicates that the most favorable concentration for the comparison of different samples of crystalline virus protein is about 10^{-6} gm. per cc.

It has been shown in a number of different tests that differences in virus protein concentration of 10 per cent or greater could be readily detected by the half leaf method on *Phaseolus vulgaris* when forty to fifty leaves were used. When *Nicotiana glutinosa* was used as the test plant, the smallest difference in concentration which could be consistently distinguished with the same number of leaves was 20 per cent.

----------, & **Osborn, H. T., & Wyckoff, Ralph W[alter] G[raystone]**
Ultracentrifugal isolation of high molecular weight proteins from broad bean and pea plants. Proc. Soc. Expt. Med. & Biol. **38**(2) : 239–241, 1938.

The authors isolated this protein from diseased bean and pea plants. Healthy broad bean plants yield a similar, non-infectious protein.

Loughnane, James B.
Composition of interveinal mosaic of potatoes. Nature **135** (3420) : 833, 1935.

----------, & **Murphy, Paul A[loysius]**
Mode of dissemination of tobacco virus X .Nature **141**(3559) : 120–121, 1938.

Experiments show that virus X is transmitted by contact, especially in the presence of strong currents of air.

Lounsbury, C. P.
Tobacco wilt in Kat river valley. Agric. Journ. Cape of Good Hope **18** : 1–22, 1906.

The symptoms described lead to the belief that it is due to a virus.

Lysenko, T. D.
(The theory of plant development and the struggle against potato degeneration in the South.) Iarovizansüa **2**: 3–22, 1935.

The symptoms described lead to the belief that is due to a virus disease.

Mader, E. O.
Potato dwarf and medium red clover. Amer. Potato Journ. **14**(9): 295–297, 1937.

Popular.

----------, **& Watkins, T. C.**
Effects of Bordeaux mixture on the control of yellow dwarf of potatoes. Phytopathology **28**(5): 375, 1938.

Plants sprayed with Bordeaux showed less symptoms of this disease than un-sprayed plants. The authors suspect that the copper sulphate counteracts the virus.

Magee, C[arles] J. [Patrick]
Virus diseases of potatoes. Year Book Veg. Grow. Assoc. New South Wales, **1937**: 49–51, 53, 1937.

Magie, R. O.
Hop diseases survey in New York, 1936. U.S.D.A. Plant Disease Rept. **20**(16): 262, 1936.

"Slip-down", a recently discovered disease of hops. Farm Res. **4**(1): 10, 13, 1937.

This is a new disease reported from New York which causes a dwarfing of the plants beginning about the middle of June. Chlorotic ring-spots and chlorotic areas appear on the leaves. Preliminary experiments indicate that the disease is transmitted by the hop aphid.

Maier, E. A.
Mosaic control work on the south coast properties. Sugar Bull. **15**(24): 18–20, 1937.

Mains, E. B.
Observations concerning clover diseases. Trans. Indiana Acad. Sci. **37**: 355–364, 1928.

Contains some data on red clover mosaic.

Manil, P.
L'enigme des virus. (The enigma of virus.) Ann. Gembloux **43**(5): 145–163, 1936.

A review.

A propos de la transmission par les graines de certains virus phytopathogénes. (On the transmission through the seed of certain phytopathogenic virus.) Bull. Inst. Agron. Sta. Rech. Gembloux **5**: 96–98, 1936.

----------, & **Gratia, A[ndré]**

Transmission du virus de la mosaic ordinaire du tabac a l'Orobanche, plate parasite déponoue de clorophylle. Compt. Rend. Soc. Biol. (Paris) **126**(24) : 67–69, 1937.

Une forme nécrosante de la mosaique du tabac. (A form of tobacco mosaic producing necrosis.) Bull. Inst. Agron. Gembloux **4**(3–4) : 186–190, 1937.

Produced more severe symptoms than ordinary mosaic.

----------, & **Dricot, C.**

Relations entre le numero de lesions et la concentration du virus infectant dans les cas de la mosaique du tobac sur *Nicotiana glutinosa.* (Relation between the number of lesions and the concentration of virus in *Nicotiana glutinosa* mosaic.) Compt. Rend. Soc. Biol. (Paris) **126**(32) : 918–922, 1937.

Quelques aspects du probleme des maladies a virus des plantes. (Some aspects of the problem of virus diseases of plants.) Ann. Ferment. **4**(1) : 26–51, 1938.

Manns, T[homas] F[ranklin], Manns, M. M., & Adams, J[ames] F[owler]

Department of Plant Pathology. Delaware Agric. Expt. Sta. Ann. Rpt. **1933–34** (Bull. **192**) : 40–49, 1935.

Additional data on plums as carriers of peach yellows and little peach. *P. myrobalan* may carry these diseases without showing symptoms. *Macropsis trimaculata* breeds abundantly on *P. munsoniana* and *P. salicina.*

----------, & **Davies F[red] R[ees]**

Dissemination of peach yellows and little peach by *Macropsis trimaculata,* Fitch. Delaware Agric. Expt. Sta. Ann. Rpt. Bull. **205** : 37–40, 1936.

It was found that the insect vector was more abundant (1) on *Prunus salicina* (oriental) than on the European species and (2) on wild than on cultivated species. It was also found that some species of spiders feed on the insects. Two species were found to be masked carriers of yellows, five of little peach.

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Dissemination of peach yellows and little peach and factors in their control. Delaware Agric. Expt. Station. Ann. Rept. Bull. **207** : 36–38, 1937.

A progress report on transmission by *Macropsis trimaculata* and the masking of these disease in several species and varieties of *Prunus.*

Marcel, M.

Étude sur la dégénérescence des Fraisieres (ser causes, comment et remédies.) (A study on strawberry degeneration, its causes and how to control it.) Bull. Soc. Nat. Hort. Fr. Ser. 6, **3**: 211–214, 1936.

Descriptions and methods of control.

Marchionatto, Juan B.

Argentine Republic: Plant diseases observed in the country. Int. Bull. Plant. Prot. **8**(11): 241, 1934.

Makes mention of the occurrence of bitter pit of apple in the Argentine Republic.

Enfermedades del trigo poco conocidas y radicadas en la región oeste de la zona triguera. (Little known wheat diseases in the west wheat region.) Bol. Ministerio Agric. Argentina **36**(4): 293–299, 1934.

Merkenschlager, F[ritz]

Nederling und Dahlem. Ein Vergleich zweier Versuchsfelder in bezug auf die Abbaufrage. (Nederling and Dahlem. A comparison of two experimental fields in relation to the degeneration problem.) Prakt. B. Pflanzenb. **14**(10–12): 299–309, 1937.

A discussion of the influence of climatic conditions on degeneration diseases.

Martin, F.

La dégénérescence de la canne á sucre. (The degeneration of the sugar cane.) Bull. Assoc. Chim. Sucrerie Distill. France et Colon. **53**(9–10: 792–794, 1936.

De la dégénérescence de quelques plantes et de la canne a sucre en particulier. (Degeneration of some plants specially of sugar cane.) Gaillon Imp. H. Jehan. 14 p., 1937.

Martin, John N.

The multinucleate condition in maize and its probable relation to the X bodies associated with mosaic diseases. Proc. Iowa Acad. Sci. **42**: 83, 1936.

Reports the finding of these bodies in corn that is apparently healthy.

Martin, Lawrence F., McKinney, H[arold] H[all], & Boyle, L. W.

Purification of tobacco mosaic virus and production of mesomorphic fibers by treatment with trypsin. Science **86**(2234): 380–381, 1937.

A description of a trypsin method.

———————. Balls, A. K., & McKinney, H[arold] H[all]
The protein content of mosaic tobacco. Science 87(2258): 229–230, 1938.

The authors use three types of mosaic in comparison with healthy plants. They conclude that (1) "The total nitrogen of the plants was found to be very little changed from the normal; (2) The total protein seems also to have undergone little if any change but the accuracy of the results is probably not high enough to demonstrate small variations, since they are calculated by difference. This suggests that the virus protein is produced at the expense of the normal protein, though not necessarily directly from it. (3) In the case of the common mosaic the trypsin-resistant protein, regarded by us as virus protein, exists in smaller proportion than has been supposed previously. The amount of resistant protein was found to be greater in a susceptible variety of tobacco than in those generally considered less vulnerable. We have no proof at present, however, that the yellow mosaic virus is resistant to trypsin."

Martyn, E[dward] B[ridgeman]
Report of the Botanical and Mycological Division for the year 1933. British Guiana Dept. Agric. Div. Rpts. **1933**: 105–111, 1934.

Among other diseases reported is a mosaic disease of tomatoes showing fern-leaf type of distortion on the varieties Early Market and Market. Cowpeas were attacked by mosaic disease.

Massee, A. M.
Further observations on the strawberry Tarsonemid mite. East malling Res. Sta. Ann. Rept. **1932**: 117–131, 1933.

The plants were probably infected with a virus disease.

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The warm water treatment of strawberry runners before planting, East malling Res. Sta. Misc. Pub. No. **14**, 1934.

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On the transmission of the strawberry virus "yellow-edge" disease by the strawberry aphis, together with notes on the "Strawberry Tarsonemid mite". Journ. Pom. & Hort. Sci. **13**(1): 39–53, 1935.

The author gives the results of experimental studies. *Capitophorus fragariae* is a vector in June but not during the later part of July and August. The mite (*Tarsonemus fragariae*) was not a carrier but may cause injuries which mask the symptoms of the virus.
Capitophorus fragariae = *Myzus (Capitophorus) fragaefolii.*

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Studies on the transmission of the strawberry virus "yellow-edge" disease by insects: II-Aphid transmission experiments and period of infectibility. East Malling Res. Station, Ann. Rpt. **1935**: 171–176, 1936.

This is a record of a repetition of the work on which the first paper was based. The vector is *Capitophorus fragaefolii* and five insects are sufficient for transmission.

Studies on the transmission of the strawberry virus "yellow-edge" disease by insects. III. Aphid transmission experiments and period of infectibility. East Malling Res. Sta. Ann. Rept. **1936**: 229–231, 1937.

A record of studies which demonstrate that *Capitophorus fragaefolii* Cople. is a vector.

Matouschek, F.

Ein Uberblic über die bisherigen Kenntnisse von den Viruskrankheiten der Pflanzen. (A survey on the present knowledge about the virus diseases of plants.) Wien. Allg. Forst-u Jagdzeitg. **52**: 114, 1934. (Wiener Landwiet. Zeit. **84**(22): 140, 1934.)

Matsulevich, B. P.

Differentsiastsüa rastital 'nykh virusov serologicheskin metodom (Differentiation of virus by the serological method.) Zasahck. Rast. (Plant Prot.) Leningrad **1936**(10): 37–49, 1936.

A review of the work of others and the results of the author's studies which indicate the possibilities of using serological reactions in the identification of viruses.

Metodika opredeleniia virusnykh bolenznei Kartofelia (Poloschatoi i morschinistoi mozaiki) Serologischeskim metodem. (The determination of virus diseases of potatoes with serological methods.) Zasahck. Rast. (Plant Prot.) Leningrad **1936**(10): 151–153, 1936.

Matsumoto, T[akashi], & Hirane, S.

(Immunological studies of mosaic diseases. V. Micro-serological tests as means of detecting the virus in a small area of mosaic tobacco plants.) Journ. Soc. Trop. Agric. Taiwan **7**: 346–350, 1935.

A description of the method.

(A further note on the serological studies of tobacco mosaic bearing malformed flowers.) Agric. & Hort. **12**(7) 1937.

The author summarizes the results as follows: "In the previous paper, the author reported that the peculiar tobacco mosaic bearing malformed flowers (cf. fig. 1–2) was confirmed by the serological tests, particularly, by "precipitin absorption", to be due to the virus complex, i.e. ordinary tobacco mosaic and potato mosaic viruses. In the present paper it is reported that he is able to separate the tobacco mosaic virus from this virus complex without impairing the infectivity of the former in the following way. The diseased plant juice (1: 3) was first reacted against the antipotato mosaic serum at different concentration, i.e. 1: 10, 1: 30, 1: 50, 1: 120, 1: 240, for 2 hours at 37°C., after which all the tubes were kept overnight in the cold room, and

in the next morning they were centrifugalized at about 3,000 r.p.m. for 30 minutes, and the supernatant liquids were used as inocula for inoculating healthy tobacco plants (cf. table 2). From the experiments it is inferred that at serum concentration of 1: 10, 1: 30, and 1: 60 the potato mosaic virus can be completely absorbed without impairing the infectivity of the tobacco mosaic virus excepting the concentration of 1: 10, in which some plants inoculated are left intact, while in the higher dilutions, such as 1: 120, and 1: 240, the potato mosaic virus is not yet completely absorbed and the juice is still capable of causing the composite disease. It is concluded, therefore, that in order to separate the active tobacco mosaic virus from the virus complex under study, the use of the serum dilution of 1: 30 and 1: 60 is recommendable.''

(A further note on the serological studies of the tobacco mosaic bearing malformed flowers.) Fat. Sci. & Agric. Taikoku Imp. Univ. Misc. Rpt. Phytopath. Lab. 3, 5 p., 1937.

Some serological studies on plant viruses and Bacteriophage. Proc. Second Inter. Cong. Microb. (London) p. 579, 1936.

The author gives his methods and a list of viruses studied.

Mayer, H[ans]

Die Stippfleckenkrankheit der ''Apfel'' und Kalk. Erfurt. Führ. Obst-u Gartenbau **32**: 185, 1931.

Mc Clean, A[lan] P[ercy] D[ouglas]

Streak disease of sugar cane. Proc. South African Sugar Tech. Asso. **7**(933) : 73–79, 1933.

Further investigations on the bunchy top disease of tomatoes. Union South Africa Dept. Agric., Sci. Bull. **139**: 5–36, 1935.

The virus was partially inactivated at a temperature of 60° and 70°C. and completely by a temperature above 70°C. It was transmitted to *Nicandra physaloides, Nicotiana tabacum, Petunia hybrida, Capsicum annuum, Lycopersicum pimpinellifolium, Zinnia elegans,* species of *Solanum* and two species of *Physalis* which produced symptoms. The virus was recovered and reinoculated into tomato.

---, & **Halse, R. H.**

Streak disease of sugar cane: its economic importance in South Africa. Proc. South African Sugar Tech. Asso. p. 11, 1936.

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Streak disease of sugar cane. Its economic importance in South Africa. South Africa Sugar Journ. **20**(7) : 433–435, 437, 439, 441, 443, 445, 449, 450, 1936.

A review of the authors' work.

Mc Intosh, J., & Selbie, F. R.
The measurement of the size of viruses by high-speed centrifugalization. Brit. Journ. Expt. Path. **18**(2) : 162–174, 1937.

Description of equipment for the study of virus diseases.

McKay, M[arion] B[ertice]
The curly top disease. Seed World, **23** : 38, 48, 72, 1928.

Popular.

----------, **& Dykstra, T[heodore] P[eter]**
Potato diseases in Oregon and their control. Oregon Agric. Expt. Sta. Circ. **96**, 83 p., 1930.

Popular.

McKinney, H[arold] H[all]
A mosaic disease of winter wheat and winter rye. U.S.D.A. Year Book **1926** : 763–765, 1926.

Mosaic diseases of wheat and related cereals. U.S.D.A. Circ. **442**, 23 p., 1937.

The author gives a history of the disease, geographical distribution, spread, control and descriptions of seven viruses. Studies indicate that viruses are carried in soils east of the Mississippi river but not in the soils west of the river.

Virus mutation and the gene concept. Journ. Heredity **28**(2) : 51–57, 1937. (Nature **140** (3531) : 33, 1937. Trop. Agric. (Trinidad) **12**(2) : 41, 1938.)

The author gives a brief review of the subject, the results of his own studies and his own views. He does not believe that we have any absolute proof as to the cause of the virus diseases.

Mc Larty, H[arold] R[oss]
A suspected virus disease of sweet cherry. Canada, Dominion Botanist Prog. Rpt. **1931–34** : 53, 1935.

Mc Leod, D[onald] J[ohn]
Spindle-tuber. Canada Dept. Agric., Canadian Expt. Farms., Div. Bot. Rpt. **1926** : 1927.

Report of the Dominion Field Laboratory of Plant Pathology. Fredericton. N.B., Canada Dept. Agric. Div. of Botany. Rpt. **1928** : 186–199, 1929.

Mc Rae, W[illiam]
Fungus and virus diseases. The existing organization and scope of sugar cane research and experimental work in India. Rep. Proc. Imp. Sugar Cane Res. Conf. (London) **1931** : 106–107, 1932.

India: New disease reported during the year, 1933. Int. Bull. Plant Protec. **8**: 199–202, 1934.

Mc Whorter, F[rank] P[aden]

The symptoms of narcissus mosaic developed with in the plant. Phytopathology **25**(9): 896–897, 1935.

Mottling or breaking in Dame's rocket in Oregon. U.S.D.A. Plant Disease. Rept. **20**(12): 199, 1936.

A record of a virosis very similar to breaking in *Matthiola incana*. Also a record of a mottle mosaic of the cruciferous ornamental, Hespert's matronalis in Oregon.

A latent virus of lily. Science **86**(2225): 179, 1937.

A brief review of latent viruses. This virus is tulip 1 and it is latent in some species, such as *Lilium tigrinum, L. candidum* and *L. longiflorum*.

Cell inclusions in onion-yellow dwarf. Phytopathology **27**(10): 1027–1028, 1937.

Reports the finding of the cell inclusions in diseased onions.

Narcissus mosaic and early maturity. U.S.D.A. Plant Disease Rept. **22**(9): 147–148, 1938.

The antithetic virus theory of tulip-breaking. Ann. Appl. Biol. **25**(2): 254–270, 1938.

The author suggests the term "antithetic" for associated viruses which are physiologically antagonistic. These are two viruses, I & II. In the commercial broken tulips the viruses are in physiologically balanced mixtures.

Mejía, E. G.

El mosaico, matizado o rayas amarillas en la caña de azúcar. (Mosaic, motling or yellow stripes of sugar cane.) Bol. Agric. Soc. Antioq. Agric., Colombia **221**: 935–939. **288**: 966, 968–969, 1937.

Melhus, Irving E., & Henderson, W. J.

Yellow dwarf and other onion diseases. Iowa Agric. Expt. Sta. Rpt. Agric. Res. **1931**: 49, 1932.

Mention and record of the behaviour of the diseases.

Metzger, C[arl] H[enry]

Some preliminary notes on the effect of psyllid yellows on seed stock from infected plants. Amer. Potato Journ. **13**(10): 277–285, 1936.

Popular.

Curly dwarf in Colorado. Amer. Potato Journ. **13**(11) : 316 317, 1936.

Popular.

Milbrath, D[avid] G[allens]

Peach mosaic. California Dept. Agric. 16th Ann. Rpt. Bull. **14**, p. 501, 1937.

Virus diseases of plants in relation to agriculture. California Dept. Agric. Bull. **26**(3) : 269–274, 1937.

A very excellent popular discussion.

Milbrath, J. A.

An indication of seed transmission of mosaic virus in tomato seed. Phytopathology **27**(8) : 868–869, 1937.

The author reports transmission by seeds.

Millán, R.

El tamaño de los tubérculos que debe emplearse en las próximas siembras de papa. (Size of potato tuber that must be planted in the future.) Rev. Argentina Agron. **2** : 138–139, 1935.

Popular notes in regard to unmottled curly dwarf disease of potato.

Millar, Paul H.

Freedom from "yellows" of certain plantings of the Blackmore strawberry. U.S.D.A. Plant Disease Rept. **21**(4) : 70–71, 1937.

A Record.

Molenaar, F. A. P.

Magnesium in verband met ziekteverschipnselen bij cultuurgewassen. (Magnesium in relation to pathological symptoms in cultivated plants.) Landbouwk. Tikdschr. Wageningen **48** (590) : 637–638, 1936.

Refers to bunchy top disease of Manila hemp.

Moore, E[nid] S[tella]

A virus disease of tobacco in South Africa. Nature **129**(3258) : 544, 1932.

Account of a tobacco virus disease that resembles ringspot.

The "Kromnek" disease of tobacco. Rhodesia Agric. Journ. **31** (1) : 9–10, 1934.

Degeneration of potatoes. Farming South Africa. **10**(115) : 431–433, 1935.

Moritz, O.

Neuere biochemische und serologische Arbeiten auf dem Gebiet der planzlichen Viruskrankheiten. (Recent biochemical and serological studies in the field of plant virus diseases.) Phytopath. Zeitschr. **10**(5) : 544–558, 1937.

Muller, Paul R.

Serum diagnosis of virus diseases of tobacco. U.S.D.A. Plant Disease Rept. **22**(5) : 74–77, 1938.

The results of tests of Dr. K. Starr Chester's methods for identifying tobacco viruses. The results with tobacco mosaic was satisfactory but the results with other viruses were less satisfactory.

Murayama, D.

Studies on the mosaic diseases of tomato. Journ. Sapporo Soc. Agric. & For. **28**(133) : 215–277, 1936.

Murphy, Donald M., & Pierce, W[alter] H[oward]

Common mosaic of the garden pea, *Pisum sativum*. Phytopathology **27**(6) : 710–721, 1937.

The authors discuss the symptoms and give the results of studies with pea virus 3. The virus attacks 29 species of Leguminoseae and is transmitted by *Illinoia pisi*. The thermal death point was 60°C. and the longevity at 22°C. was less than 3 days.

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A mosaic-resistant small red bean. Phytopathology **28**(4) : 270–273, 1938.

A discussion of methods and results.

Murphy, P[aul] A[loysius], Quanjer, H[endrick] M[arius], & Arthur, D[isbrowe]

Leaf roll(curl), mósaic and allied diseases. Paper read before the International Potato Conf. November, 1921. (Reviewed by Cuthbertson in Journ. Roy. Hort. Soc. **47** : 110–121, 1922.)

Leaf-roll and mosaic, two important diseases of the potato. Ireland Dept. Agric. and Tech. Inst. Spec. Leaflet **24**, 4 p., 1923.

----------, & **McKay, R.**

The compound nature of crinkle and its production by means of a mixture of viroses. Sci. Proc. Roy. Dublin. Soc. **5** : 227–247, 1932.

Nature and control of potato virus diseases. Nature **138**(3501) : 955–958, 1936.

The author recommends seed selection and discusses the relationship of *Myzus persicae*, which is a vector of the important leaf roll disease, to climatic conditions. He discusses other virus diseases briefly and records four viruses (X., F., Y. and A.) which singly or in combination produce eight diseases.

----------, & **Loughnane, J[ames] B.**

A comparison of some Dutch and Irish potato mosaic viruses. Sci. Proc. Roy. Dublin Soc. n. s. **21**(40) : 419–430, 1936.

The authors summarize their results as follows:

"Examination of Dutch potato mosaic diseases, carried out in conjunction with similar work in America, showed the presence of viruses X, B, Y, A, F and vein-banding virus, occurring alone and in combinations (List, p. 427).

Symptoms in some cases were absent (X, Y and F) and in others corresponded to those of simple mosaic (X), veinal mosaic (Y or A), rugose mosaic or leaf-drop (X–Y), crinkle (X–A), and interveinal mosaic (X–F).

These viruses and diseases are the same as those common in Ireland, and probably in N. W. Europe generally, but others are important in continental areas.

Other viruses were found which were similar to A or Y but not identical. It is concluded that Y and A are distinct from each other, but that each may be the type of a smaller group of closely related or practically identical viruses, analogous to the X-viruses.

Virus Y caused pronounced veinal mosaic on *Solanum nodiflorum* on which A produced no symptoms. This plant also differentiated the virus related to A and Y, as well as virus F, and proved a useful new differential host.

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A ten years' experiment on the spread of leaf roll in the field. Sci. Proc. Roy. Dublin Soc. n. s. **21** : 567–579, 1937.

A review of the work showing that the severity of the disease was correlated with climatic conditions.

Nakayama, K.

(The growth-limiting effects of dwarf genes on some organs of rice.) Japan Journ. Genetics **13**(3–4) : 196–199, 1937.

A preliminary note with English Summary.

Neal, David C[harles]

Crinkle leaf, a new disease of cotton in Louisiana. Phytopathology **27**(12) : 1171–1175, 1937.

This disease is described but cause not determined.

Neergard, P.

Virus-krankheiten der Tomaten (Tomato virus diseases). Moller's Deut. Gärtn. Zeits. **51**(21) : 237–239; 247–249; (22) : 262–263; 273–274, 1936.

Virussydomme paa tomat. (Virus diseases of tomato.) Gartn.-Tid. Kobenhavn **52** : 113–121, 1936.

Virussydomme paa tomat. (Virus diseases of tomato.) Gartnerlidende, 8: 11, 1936.

Gives symptoms, geographical distribution, methods of transmission and hosts of the virus diseases of tomato with bibliography.

Newton, R. G.

Experimental work with potatoes. Agric. Journ. Brit. Columbia 8: 80–81, 1923.

Newton, William, & Edwards, H. I.

Virus studies. I. The production of antisera in chickens by inoculation with potato X. Canadian Journ. Res. C. 14: 412–414, 1936.

"Chicken antiserum was produced by three wing vein inoculations with sap from *Datura meteloides*, and *Datura Stramonium* plants infected with "potato virus X". Before injection, the saps were purified by the Bawden and Pirie method. This antiserum formed a conspicuous precipitate when incubated for three hours at 37°C. with similar purified sap of these two plant species when they were infected with the X or healthy potato virus, but failed to form any precipitate when incubated in the same way with purified sap from virus-free plants. Two unknown viruses, one from spinach and the other from tomato were established as belonging to the X group by the precipitin reaction through the use of chicken antisera. The serological grouping was supported by the fact that the unknowns had similar, if not identical lethal temperature, longevities *in vitro* and host ranges as the ordinary potato virus X."

Virus Studies. II. Streak X, a disease of tomatoes caused by a virus of the potato X group unassociated with tobacco mosaic. Canadian Journ. Res. C. 14: 415–418, 1936.

"A streak disease of tomatoes was found to be caused by a virus of the potato X group unassociated with tobacco virus I. The disease markedly reduced the yield of marketable fruit in several greenhouses near Victoria. The symptoms resemble those induced by ordinary potato virus X in conjunction with tobacco mosaic. The host range, lethal temperature, longevity *in vitro*, and dilution extinction point of the virus resemble ordinary potato X. Streak X may be distinguished from ordinary potato X by the more pronounced symptoms it induces on tobacco, *Datura, Nicotiana glutinosa* and tomato, and particularly by the streaking and necrosis of the stems and leaves of tomato. The virus causing this streak disease could not be recovered from Irish Cobbler potatoes after an incubation period of ten days, neither did the characteristic symptoms occur on tomatoes already infected with ordinary potato virus X. The virus was recovered unchanged from X-free potato seedlings. The antigen reactions also proved that the streak virus belonged to the potato virus X group."

The menace of cherry mosaic. Better Fruit **31**(3) : 7, 14, **1936.**

A mottling of sweet cherry (*Prunus avium*) transmissible by budding, prunning and rubbing with juice.

---, & **Edwards, H. I.**

Virus studies. III. Tomato diseases. Canadian Journ. Res. C. **15** : 162–167, 1937.

"Single virus streak, potato virus X, streak virus X and aucuba mosaic (tobacco virus 6) were found causing diseases of tomatoes in commercial glasshouses in British Columbia during 1936. Single virus streak was the commonest disease although greater losses were caused by the streak virus X. Aucuba mosaic was found in one case only, but was highly pathogenic. Potato virus X was present mixed with single streak, giving rare cases of mixed virus streak. Tomato mosaic (tobacco virus I) was not present as a tomato disease."

"Single virus streak serum did not give a precipitate when mixed with aucuba antigen, thus indicating that the viruses are distinct. However, a slight precipitate with tobacco virus I antigen did indicate distant relationship with this form. Although three strains of single virus streak could be distinguished by symptoms produced on tomatoes when inoculated simultaneously, these strains proved to be serologically identical."

Noble, R[obrt] J[ackson]

Virus infections in plants. Journ. Australian Inst. Agric. Sci. **1**(2) : 54–57, 1935.

Notes from Presidential address delivered before the Royal Soc. New South Wales, May 1, 1935.

Spotted wilt and other virus diseases of tomatoes. Year Book Veg. Grow. Assoc. New South Wales **1937** : 46–48, 1937.

Nolla, J[osé] A[ntonio] B[ernabé]

Estudios con el mosaico o clorosis. La enfermedad "mottle". (Studies with mosaic or chlorosis. The mottle disease.) Inst. Tabaco de Puerto Rico. First Rpt. **1936–37** : 18–20, 1937.

In this first report of the Institute notes are given of the work started on the tobacco diseases mentioned.

Nyhus, P[aul]

The potato situation in Argentine. Amer. Potato Journ. **13**(7) : 185–189, 1936.

Contain some data on virus diseases.

Ocfemia, G[eraldo] O[ffimaria], & Celino, M. S.

Securing disease-resistant abaca for fighting bunchy-top. Agric. & Ind. Mon. (Manila) 4(8) : 12–13, 1937.

The probable nature of "cadang-cadana" disease of coconut. Philippine Agric. **26**(4) : 338–340, 1937.

Probably a virus disease.

Ochoa, R. H.

Algo sobre mosaico y variedades de caña en Antioquía (Colombia) (Something on mosaic and sugar-cane varieties in Antioquía (Colombia). Bol. Agric. Soc. Antioquía, (Colombia) **9**(217) : 668–672, 1936.

Una enfermedad de la caña de azúcar. (A disease of sugar cane.) Rev. Nac. Agr. Soc. Antioquía (Colombia) **32**(391) : 841–843, 1937.

This disease is similar to mosaic but cause is not definitely known.

Ogilvie, L[awrence]

Occurrence of the rosette disease of lilies (yellow flat) in English green-houses. Bermuda Dept. Agric. Bull. **8** : 23, 1929.

---, **& Mulligan, B. O.,**

Diseases of vegetable marrow. Bristol Agr. & Hort. Res. Sta. Ann. Rpt. **1930** : 144–145, 1931.

A note on the occurrence of new virus diseases of the tomato in the Bristol Province. Bristol Agric. & Hort. Res. Sta. Ann. Rpt. **1935** : 104–106, 1936. (Journ. Bath. W. S. Co. Assoc. **10**(6) : 204–206, 1936.)

Descriptions of two new diseases. The symptoms are similar to those produced by cold, faulty cultivation, drought, over watering, mineral deficiencies and scorch due to leaky boilers or creosote or other fumes. They may result from smoking tobacco and cigarettes used by the laborers.

---, **Grian, P. W.**

Progress report on vegetable diseases. VII. Bristol Agric. & Hort. Res. Sta. Ann. Rpt. **1935** : 110–117, 1936.

The greater part of this report is devoted to mosaic of lettuce. It is primarily a study of varietal susceptibility and resistance. It gives the symptoms of each variety.

Okuda, Y., & Sutoh, H.

(Biochemical investigation of mosaic diseases of tobacco plants. Part I.) Journ. Agric. Chem. Soc. (Japan) **12**(12) : 1227–1231, 1936.

---, **Shigemathu, S., & Hanada, M.**

(Biochemical investigation of mosaic diseases of tobacco plants. Part II.) Journ. Agric. Chem. Soc. (Japan) **12**(12) : 1232–1238, 1936.

Oortwijn Botjes, J[an Gerhardus]

Vermindering van de vat baarheid voor bepaalde virusziekten bij sommize aardappelrassen. (The decrease in the susceptibility of some races of potatoes to certain virus diseases.) Landbouwk. Tijdschr. **47**(579) : 651–657, 1935.

(The position of the immunity problem in the virus diseases of plants.) Tijdschr. Plantenziekten **42**(1) : 1–9, 1936.

A review of recent work.

De oorzaah van het optreden van dwergmozaikiekte aardappelphanten (stekelpoppen). (The cause of the occurrence of dwarf mosaic-diseased potato plants (spring heads). Tijdschr. Plziekte. **43**(3) : 60–63, 1937.

Plants with a mild mosaic disease contain stipple streak (acropetal necrosis) virus which is masked. It is the same as curly dwarf and bukett disease.

Verschil virulentie bij het virus van stippelstreepziekte in de aardappel plant. (The variation in virulence of the stipple streak disease virus in the potato plant.) Tikdschr. Plziekte. **43**(1) : 1–10, 1937.

A study of the variation in stipple streak (acropetal necrosis).

Opitz, K.

Zur Fräge der Virus-übertragung in Kartoffelfeldem. (On the question of virus transmission in potato fields.) Dutsch. Landw. Pr., **63**(32) : 399–400, 1936.

These studies showed that these diseases were transmitted very readily.

Osborn, H. T.

Studies on the transmission of pea virus 2 by aphids. Phytopathology **27**(5) : 589–603, 1937.

The author gives the results of his studies which include a list of host plants. The virus is inactivated in 10 minutes at 64°C., and in five days *in vitro*. The virus is transmitted by *Macrosiphum pisi, M. gei* and *Aphis rumicis*. They acquire the virus in five minutes feeding on diseased plants and are able to transmit immediately but some colonies lost this power after feeding 15 minutes on a healthy plant. However, when held without food they retain the power much longer.

Vein-mosaic virus of red clover. Phytopathology **27**(11) : 1051–1058, 1937.

The author reports a new virus on red cover. It is transmitted by the pea aphid and attacks *Vicia faba, Trifolium repens, T. hybridum, T. incarnatum, Melilotus alba* and *Pisum sativum*. It is inactivated by a temperature of 10°C. for 10 minutes.

Differentiation of 5 mosaic viruses of legumes. Phytopathology (Abstract) **28**(1) : 17, 1938.

Orton, C[layton] R[oberts], & Hill, L. M.

An undescribed potato disease in West Virginia. Phytopathology (Abstract) **27**(2) : 137, 1937.

The cause of this disease is not known. It possesses some of the characters of a virus but apparently is not transmitted in the tubers.

Otero, José I[dilio], & Cook, Melville T[hurston]

Second supplement to partial bibliography of virus diseases of plants. Journ. Agric. Univ. Puerto Rico **20**(3) : 741–819, 1936.

A continuation of the work published in the above Journal. 18(1–2) : 1–410, 1934 and 19(2) : 129–213, 1935. This supplement contains nearly 500 additional titles.

Ott, A.

Sul mosaico del pesco. I. (Peach mosaic.) Note Fructicultura Pistoia. **15**(8) : 128–132, 1937.

Sul mosaico del pesco. II. (Peach mosaic.) Note Fructicultura Pistoia **15**(9) : 141–148, 1937.

Paine, S. G., & Bewley, W[illiam] F[leming]

Stripe disease of tomatoes. Journ. Min. Agric. **26**(10) : 998–1000, 1920.

Pal, B. P., & Tandon, R. K.

Types of tobacco leaf-curl in Northern India. Indian Journ. Agric. Sci. **7**(3) : 363–393, 1937.

The authors review the history of the disease, describe the symptoms and give the results of their experiments. They list five types of leaf-curl due to four viruses as follows: (1) tobacco leaf curl A (tobacco leaf-curl virus 1), (2) tobacco leaf-curl B (tobacco leaf-curl virus 2), (3) tobacco leaf curl C (tobacco leaf curl virus 3), (4) tobacco leaf-curl D (tobacco leaf-curl virus 4) and (5) tobacco leaf curl X (a mixture of two or more of the leaf curl viruses.) Tobacco leaf curl A is probably same as "krulziekte", "Kroepoek", "faltenzwerg", gila and "krokoh".

Palm, B[jorn] T[orwald]

(The "cracked skin" disease of the beet (*Beta vulgaris* L.) Svensk Bot. Tidskr. **31**(4) : 395–399, 1937.

Pape, H[einrich]

Über eine Mosaikkrankheit der Kohlrübe. (A mosaic disease of the swede). Deutsche Landwrit. Press. Gond. **26**, 8 p., 1935.

Popular version of a previous publication.

Zur "Farn-oder Fadenblättrigkeit der Tomate". (Ringspot disease of tomato.) Zeitschr. Für Pflanzenk. & Pflanzens. **47** (12) : 619–620, 1937.

Brief note.

Panse, E.,

Die Kränselkrankheit (Rosette, mosaic) bei Erdnüssen. (Curl disease (rosette, mosaic) of groundnuts.) Tropenpflanzer, **40** (5). 218–220, 1937.

Records of the disease in Senegal.

Parker E[dwin] R[oberts]

Mottle-leaf and sun-blotch disease control. California Avocado Assoc. Yearbook **1936**: 149–151, **1936.**

Popular.

Parker, M. C., & Brink, R. A.

The inheritance of resistance to common bean mosaic. Wisconsin Agric. Expt. Sta. Ann. Rpt. 1931–32; Bull. **425**: 102, 1933.

Inheritance of resistance to the common mosaic virus in the bean. Journ. Agric. Res. **52**(12) : 895–916, 1936.

In the summary the author writes in part as follows: "Reciprocal crosses between the mosaic-resistant Michigan Robust and susceptible Stringless Green Refugee varieties of beans reacted quite differently to the mosaic virus employed in these studies. It was found that the maternal parent governs to a large extent the reaction of the hybrid offspring." In his discussion of the results of many crosses he said: "These results cannot be explained on a simple Mendelian basis, because the reciprocal hybrids react differently. To explain the fact that the maternal parent determines to a large degree the reaction of the hybrid individuals it is assumed that the cytoplasm or some extranuclear inclusion governs the immediate reaction of the plant to the virus. The convergence of the results from reciprocal crosses in the F_2 and F_3, however, points to the conclusion that the ultimate control is nuclear but that there is a delayed expression of the action of the genes. The further assumption is necessary that certain geno-types change the reaction of the cyto-plasm more rapidly than others."

Pasinetti, L.

Ricerche sitologiche sulla "maculatura ferruginosa" (Eisenfleckingheit dei tuberi di patata.) (Histological investigation on the "iron stain" (Eisenfleckigheit) of the potato tuber.) Riv. Patol. Veg. Pavia **25**(21) : 185–227, 1935.

Passalaqua, T.

Expérience de vaccination sur le *Pelargonium zonale.* (Experiences on vaccination of *Pelargonium zonale.*) Sic. Intern. Microb. Boll. Sez. Ital. **6**: 83–87, 1934.

Una probabile virosi della "*Vicia faba* L." (Note preliminare). (A probable virosis of *Vicia faba* L. (Preliminary note) Riv. Pat. Veg. **27**: 5–6, 145–148, 1937.

A disease causing a dwarfing of the plants.

Pemberton, C. E.

The insect vectors of virus diseases of sugar-cane. Proc. Fifth Congr. Int. Soc. Sugar Cane Tech. (Brisbane) **1935**: 118–120, 1936.

The author believes that *Perkinsiella vitiensis* and possibly other insects are vector of the Fiji diseases.

Penzig, O.

Yellows. Pflanzen-Teratologie **2**: 34–39, 1921.

Perdrau, J. R., & Todd, C.

The photo-dynamic action of methylene blue on certain viruses. Proc. Roy. Soc. B. **112**: 277–298, 1933.

Peterson, Paul D., & McKinley, H[arold] H[all]

The influence of four mosaic diseases of the plastid pigments and chlorophyllase in tobacco leaves. Phytopathology **38**(5): 329–342, 1938.

The authors report an increase in chloro-phyllase activity accompanied by a decrease in chlorophyll content of the tissues.

Pethybridge, G[eorge] H[erbert], & Smith, K[enneth] M[anley]

A suspected virus disease of Zonal Pelargoniums. Gard. Chron. **92**: 378–379, 1932.

Petri, L[ionello]

Sull' arricciamento (court-noué) della vite. (On leaf roll of grape.) Boll. R. Staz. Pat. Veg. **14**(2): 273–278, 1934.

A review of the author's work.

Trasmissions del virus del l'arricciamento della vite attraverao i tessuti di una varieta resistente. Atti. R. Acad. Naz. Lincei VI, Rend. Cl. Sci. Fis., Mat. e Nat. **25**(9 & 10): 413–416, 1937.

Passage through an intermediate resistant graft does not inactivate or attenuate the virus.

Peyronel, B.

Bitter-pit of apples. Bull. R. oc. Toscana Ortic 4 ser. **17**(11–12): 151–159, 1932.

Pfankuch, E., & Lindau, G.

Zur Biochemie des Kartoffelabbanes, II. Biochem. Zeitschr. **277** (1–2): 129–138, 1935.

Piemeisel, R[obert] L[ouis]

Land-improvement measures in relation to a possible control of the best leafhopper and curly top. U.S.D.A. Cir. **416**: 1–23, 1936.

The studies reported in this circular were made to show that the application of certain land-improvement measures would aid in the control of *Eutettix tenellus* and the curly top of sugar beet. The author made a survey throughout southern Idaho and found that the insects are produced in economic numbers on the weed hosts on abandoned, weedy fallow, burned over or heavily grazed lands. These weed host will be replaced ultimately with plants that are not hosts for the insects.

Pierce, W[alter] H[oward], & Walker, J. C.

The development of mosaic resistant Refugee beans. Canner **77** (26) : 7–9, 1933.

Popular.

The identification of certain viruses affecting leguminous plants. Journ. Agric. Res. **51**(11) : 1017–1039, 1935.

The author reports the following distinct viruses obtained from the common beans (*Phaseolus vulgaris*) in Idaho. Common bean mosaic virus (bean virus 1), yellow bean mosaic virus (bean virus 2), enation pea mosaic virus (pea virus 2), common pea mosaic virus (pea virus 2), common soy bean mosaic virus (soy bean virus 1) and broad bean local lesion virus obtained from red clover.

Legume viruses in Idaho. Phytopathology **27**(8) : 836–843, 1937.

Some strains of bean virus 2 were more severe than others. Most legumes were subject to more than one virus. Diseases should be designated by viruses rather than by symptoms. One virus usually predominates on each host species. Pea virus 3 was the cause of most infections on red clover and bean virus 2 for most infections on sweet clover; it is possible that the results may be different in different localities. Some legume hosts may serve for the overwintering of some viruses; e. g. bean virus 2 which causes yellow mosaic of beans overwinter in sweet clover and pea virus 3 in red clover. The most important viruses in peas and beans in Idaho were pea virus 3 and bean virus 1.

Pinckard, J. A.

The effect of flue-curing on the survival of ordinary tobacco virus 1. Phytopathology (Abstract) **28**(1) : 18, 1938.

Piovano, A. P.

Contribución para el estudio de las enfermedades por virus filtrables de las plantas cultivadas en Mendoza. (Contribution to the study of virus diseases of cultivated plants in Mendoza.) **9**(2) : 1190–1202, 1937.

Pirone, P. P.
Geranium crinkle in New Jersey. U.S.D.A. Plant Disease Rept. **22**(9) : 146, 1938.

Pittman, H[arold] A[mbrose Jacques]
Fig leaf mosaic. Journ. Dept. Agric. West Australia 2nd Ser. **12**(2) : 196, 1935.

Plakidas, A[ntonios] G[eorge]
Leaf variegation of the Blackmore strawberry in Louisiana. U.S.D.A. Plant Disease Rept. **18**(5) : 46, 1934.

Poeteren, N[icolas] van
Verslag over de worksaamheden van den plantenziekten krundugen Dienst. in de jaren 1920 en 1921. Verslag en Mededeel. Plantenziekten kundigen Dienst Wageningen **27** : 926, 1922.

A dry temperature of 50° C. for 24 hours failed to kill virus of leaf roll in infected tubers.

Die Bekaempfung der Viruskrankheitien bei Kartoffeln, mit besonderer berueksichtung der Erzengung hochwertigen saatguter in den Nierderlanden. Rapp. Nat. Sect. V, Theme 9, (No. 11) Congr. Intern. Hort., (Rome), 11, 1935.

Pole Evans, I. B. see. **Evans, I[lltyd] B[uller] Pole**

Poos, F. W., & Wheeler, Nancy H.
On the hereditary ability of certain insects to transmit diseases and to cause disease-like injuries to plants. Journ. Econ. Ent. **27**(1) : 58–69, 1934.

The authors give a review of the literature and results of experiments which lead to the following conclusions: (1) *Empoasca fabae* inherits the power to cause disease like injuries in legumes and some other crops; (2) *Myzus persicae* when infected with the virus of spinach blight do not transmit same to their offspring.

---, **& Westover, H. L.**
Alfalfa yellows. Science **79**(2049) : 319, 1934.

Porter, D. R., & Henderson, W. J.
Onion diseases. Trans. Iowa Hort. Soc. **63** : 240, 1929.

Reference to yellow dwarf of onions.

Post, T[helma] B.
Mosaic disease of roses in Arkansas. U.S.D.A. Plant Disease Rept. **19**(7) : 98–99, 1935

Price W[ililam] C[onway]
Classification of lily-mosaic virus. Phytopathology (Abstract) **27**(2) : 138, 1937.

----------, & **Gowen, J[ohn] W[hittemore]**
Quantitative studies of tobacco-mosaic virus inactivation by ultra-violet light. Phytopathology **27**(3) : 267–282, 1937.

The authors summarize their work as follows: "The survival values of tobacco-mosaic virus exposed to ultra-violet light follow a simple exponential curve. If we regard radiant energy as absorbed in discrete units, this curve may be obtained when one unit of energy absorbed in a virus particle is sufficient to cause its inactivation. The rate of inactivation will depend on the amount of energy incident to the virus. The data show that when the virus is most purified (in a solution of crystalline material) and the solution has least extraneous matter to absorb the energy, the rate of inactivation is greatest. Adding juice of healthy tobacco plants to purified virus lowers the rate of inactivation. The rate for the crystalline material plus juice of healthy tobacco plants is essentially the same as that for the virus in juice of diseased plants. The rate of inactivation for virus in non-purified dried juice follows essentially the same curve as that for the wet material, except that a portion of the virus fails to become inactivated even when exposed for long periods of time. This is believed to be due to the fact that dried virus particles, because of their fixed position, are sometimes overlain by other materials and thus shielded from the ultra-violet light."

Classification of lily-mosaic virus. Phytopathology **27**(4) : 561–569, 1937.

A record of a number of cross inoculation which indicate that this virus is the same as cucumber mosaic virus.

----------, & **Wyckoff, R[alph] W[alter] G[raystone]**
The ultracentrifugation of the proteins of cucumber viruses 3 and 4. Nature **141**(3574) : 685–686, 1938.

Prien
Ist eine Bekämpfung der Kartoffelabbanes möglich? (Is a campaign against potato degeneration practicable?) Deutsch. Landw. Pr. **63**(5) : 57, 1936.

Recommends growing of excised eyes.

Pruthi, H. S.
Entomological investigations on the spike disease of sandal. XIV, Jassidae (Homopt) Indian For. Rec. **30**, 1934.

----------, & **Samuel, C. K.**
Entomological investigations on the leaf-curl disease of tobacco in North Bihar. I–II. Indian Journ. Agric. Sci. **7**(4) : 659–670, 1936.

I. Transmission experiments with some suspected insect vectors.
II. An alternative host of the virus and the insect transmitter.

Puchner, H.

Neue Gedank en über das "Rollen" und das "Kranseln" de Kartoffelbeattes. Der Kartoffelbau **10**: 161–168, 1926.

Leafroll is said to be due in part to moisture content and relations.

Purdy, [Beale] Helen A[lice]

Possible relationship of Stanley's crystalline tobacco mosaic virus material to intra-cellular inclusions present. Contr. Boyce Thompson Inst. **8**(4) : 333, 1936.

This is an abstract of a paper presented at the meeting of the American Phytopathological Society, December 28, 1936, in Atlantic City, New Jersey. The author studied *Nicotiana tabacum* infected with strains of tobacco mosaic virus and found striated material described by Iwanowski (1903) and the X bodies described by Goldstein (1924). The striated material or crystals are similar to those obtained by Stanley's method.

[1]

Relation of Stanley's crystalline tobacco-virus protein to intracellular crystalline deposits. Contr. Boyce Thompson Inst. **8**(5) : 415–431, 1937.

The author gives a brief review of Stanley's work. The crystalline tobacco-virus protein used in these studies was isolated from several sources and tested with antiserum.

"It is suggested that the intracellular crystalline plates may be more complex in chemical constitution than Stanley's crystalline tobacco-virus protein."

"It is concluded that the intracellular crystalline deposites are the source of Stanley's crystalline tobacco-virus protein because: A.—The two crystalline compounds are present in large amounts. B.—There is a striking similarity in the gross appearance of the needles precipitated in the cell and isolated from virus extract. C.—The acidity and alkalinity at which Stanley reports denaturation of the protein corresponds closely to the reactions at either end of the pH range at which the intracellular crystals go into solution and are not subsequently recrystallizable."

"It is concluded that concentration is an important factor in the intracellular crystallization of tobacco-virus protein."

The intracellular crystallization of Stanley's tobacco virus proteins. Journ. Bact. (Abstract) **33**(3) : 336–337, 1937.

Putman D[oland] F.

Comparative studies in potato virus diseases. Canadian Journ. Res. C **15**(3) : 87–107, 1903.

Reports and describes potato mosaic under the name of "yellow mottle". It belongs to the latent or X virus group.

Puttemans, Arsene

Informacoes sobre "Doencas de Degenerescencia" de Batatoira no Brasil. (Degeneration diseases of potato in Brasil.) Rev. Agric. Brasil **9**(3–4) : 103–111, 1934.

A leaf roll disease.

Quanjer, H[endrik] M[arius]

Vergelijking tusschen den gezondhertstoestand van schotsche en nord hollandsche Pootaardappelen. Tijdschr. Plantenziekten **31** : 7–10, 1925.

Ieis over de virusziekten van tropische cultuur-gewassen. (An account of some virus diseases of tropical plants.) Landbouwk. Tijdschr. Wageningen **50**(611) : 324–338, 1938.

Account of virus diseases of tobacco, cassava, *Soja, Arachis, Musa,* sugar cane and rice.

Racicot, H[oméra] N[oé]

Bean mosaic. Canada Rpt. Dominion Botanist **1926**: 57, 1926.

Raleigh, W[alter] P[atrick]

An abnormal graft reaction in potato resulting from a virus infection of a scion on a resistant stock. Phytopathology **26** (8) : 795, 1936.

The author found that when scions containing latent mosaic virus (X-virus) or mild-mosaic-virus were grafted on certain stocks, the plants developed a rolling of the leaves and aerial tubers. He says that "Results, thus far, indicate that the general principle of grafting infected scions on potatoes to determine their reaction to the virosis concerned may be of much value in studies on resistance to virosis."

Ramanatha Ayyar, V., & Balasubrahmanyan, R.

Occurrence of sterile plants in Bengal gram, (*Cicer arietinum*). Madras Agric. Journ. **21**(9) : 392–393, 1933.

The authors report the occurrence of this disturbance for three consecutive seasons. After close observations and studies, there was no fungi, insects, physiological cause or any other agent to make responsible for the disease. They concluded judging from the behavior of the disease that it is caused by a virus.

Ramsborn, K.

Zur Physiologie des sog. Kartoffelabbaus. II Über eine formative Virkung von Beteroauxin auf das Austreiben von Kartoffelknollen. (On the physiology of the so-called potato degeneration. II. On a formative action of beterauxim on the germination of potato tubers.) Planta, **26**(5) : 737–750, 1937.

Raphael, T. D.

Virus diseases in straw-berries. Tasmanian Journ. Agric. n. s. **8**(3) : 152–155, 1937.

Ravas, L.

Essais de traitement fu court-noué. (Tests on the treatment of "court-noué"). Ann. Ecole Nat. Agr. Montpellier **20**(3): 213–218, 1930.

Rawlins, T[homas] E[lsworth], & Takahashi, William N.

The nature of viruses. Science **87**(2255): 255–256, 1938.

The authors call attention to a number of papers published during the last six years and conclude: "It is obvious that much of the above speculation is based on meager evidence; it is presented with the hope that it may stimulate further research in this field rather than that it may enable the reader to reach a conclusion regarding the nature of virus."

Reddick, Donald

Seed transmission of potato virus diseases. Amer. Potato Journ. **13**(5): 118–124, 1936.

A review of the subject and the results of the author's experiments. In the first part of the paper the author says: "Transmission of any virus diseases through the true seed of the potato has not been established with certainty." In the summary he says: "Seed transmission of the potato disease acropetal necrosis, caused by a virus occurs in a low percentage of cases. Some evidence is presented which indicates that entry of the virus into the embryos may be affected by the pollen." "Inferential evidence that acronecrosis and leaf-roll, also caused by virus, may be transmitted through the true seed is also presented.

Reed, H[oward] S[prague]

Cytology of leaves affected with little-leaf. Amer. Journ. Bot. **25**(3): 174–186, 1938.

Reeves, Enoch L.

Mottle leaf of cherry. Washington State Hort. Assoc. Proc. **31**: 85–89, 1935.

Popular. Thus far the disease has been transmitted by budding and grafting only.

Reinking, O[tto] A[ugust]

Bean mosaics, their relation to the canning crop. Canner **84**(17): 20, 1937.

A popular review of the situation.

Rhoads, A. S.

Observations on psorosis of citrus trees in Florida. Citrus Ind. **18**(5): 8–9, 16–17, 1937.

A summary of our knowledge of the subject and results of surveys made in 1927 and 1936.

Rhode, G.

Kahmangelerscheinungen und Kartoffeln. Kali im Stoffwechsel der Pflanzen unter besonderer Berücksichtigung der Kalimangelers-cheinungen au Kartoffeln. D. Kartoffelbau **19**(1) : 73–78, 1935. (D. Kartoffelhandel **21**, No. 47, 1935.)

Richter, H.

Eine noch nicht aufgeklärte Lupin-krankheit. (A hitherto unexplained Lupin disease.) Nachrichtenbl. Deutsch. Pflanzenschutzdinst. **14**(9) : 81–82, 1934.

An obscure disease with symptoms of virus diseases.

Die Gelbsucht der Sommerasten. (Yellows of China asters.) Nacher B. Deutsch.. Pfl. Sch. Dienst. **16**(7) : 66–67, 1936.

A report on the presence of this disease in Germany.

Riemsdijk, J. F. van

Physiologisch Onder-zock van de "Vergelinsziekte" van Voederbeiten en de schade dor dize Ziekte Ceweegebracht. (Physiological investigation of and damage done by yellowing disease of fodder beets.) Tijdschr. Plantenziekten **41**(12) : 317–329, 1935.

In yellow diseased plants the dry content of the leaves is larger than in healthy plants; the dry contents of the roots less; and number of leaves greater. There is an accumulation of starch in the leaves which is due to a disturbance of the translocation.

Rienhoff, William Sr.

Principles and foibles of cancer research in regard to etiology and nature. Waverly Press, Inc., Baltimore, Maryland 200 p., 1936.

The author is a Doctor of Medicine and discusses the subject from the standpoint of his profession. The book is interesting to the plant pathologist because several pages are devoted to virus diseases of plants. The work is summarized in part as follows:

"The cancer cell is a dualistic organism in constitution and action, consisting in a living filterable virus and a fixed living body cell. The interaction between the two is that of an actual cell invasion of the germ into a cell deficient in its impermeability; and to its progress into the nucleus where cancer development really starts. Sarcoma is the outcome of a germ invasion in sub-cutaneous lesions, by a circuitous route directly into a primarily damaged cell; cancer is the outcome of an invasion by a direct route into a defective cell of external or internal surfaces in the process of repair or regeneration."

This paper is worthy of the attention of the students of both animal and plants viruses.

Protein-virus as a morbific factor. A mimeograph manuscript, 10 p., 1937.

For comparison with pages 92 and 125 of the preceding. It is devoted entirely to a virus and attention is given to the recent work of

Stanley. It is unfortunate that it was not published in a journal which would give it a wider distribution than it can receive as a mimeograph publication.

Rainmuth, E[rnst] F[riedrich]

Virusinfektion und abbau. (Virus infection and degeneration.) Kranke Pflanze **14**(5) : 81–86, 1937.

Rietsema, I.

De mozaiekziekte der Franboszen. (The mosaic disease of raspberries.) De Fruitteelt **28**(12) : 206–212, 1936.

A study of the varietal resistance to the disease and efforts to develop resistant strains.

Riker, A[lbert] J[oyce], & Riker, Regina (Emma) S[tockhausen]

Introduction to research on plant diseases. Published by the authors at Univ. Wisconsin, 1936.

Chapter VI is devoted to methods for the study of virus diseases.

Rischkow, V[itolij] L.

(Mutations and diseases of the chloroplast.) Moscou, 192 p., 1933.

Contains a discussion of chlorosis, mosaic and related virus diseases.

----------, & **Karatschevsky J., & Michailova, P. V.**

Ueber die Fruchtverholzung bei Tomaten. Verläufige Mitteilung. (On the woodiness of fruit in tomatoes. Preliminary note.) Zeitschr. Für Pflanzenkrankh. u. Pflanzenschutz. **43** (8–9) : 496–498, 1933.

A brief description of a disease of tomatoes believed to be a previously undescribed virus disease in the Crimea, characterized by woodiness of the fruit as reported on passion-fruit from Australia, known as "stolbur".

Ultravirus und Immunität. (Ultravirus and immunity.) Rpt. 3rd. Int. Congr. Compar. Patho. **1**(2) : 153–166, 1936.

A review of the subject.

Immunity of plants from diseases caused by filterable viruses. Bull. Appl. Bot. Select., 1937, Ser. **2**(11) : 81–105, 1937.

A review of the work done and a bibliography of 70 titles.

Rivera, V.

Prospettive di studio nelle malata da "virus" nelle piante. (Studies on virus diseases of plants.) Nuovo Giornale Bot. Italiano Firenze **41**(4) : 776, 1934. (Int. Bull. Plant Prot. **9** (4) : 99, 1935. Atti Della Soc. Prog. Sci. **23**(3) : 139–140, 1935.)

Roland, G.

Étude de la jaunisse de la betterave. (Study on beet yellowing.) Rev. Path. Vég. Ent. Agric. **23**: 185–207, 1936.

Recherches sur la jaunisse de la betterave quelques observations sur la mosaique de cette plants. (Research on sugar beet yellowing, together with some observations on mosaic of this species.) Sucr. Belge **55**(11): 213–217; (12): 231–241; (13): 263–268; (14): 289–293, 1936.

The yellowing shows accumulation of starch in the leaf and gummosis in the phloem. It is transmitted by grafting and by *Myzus persicae* and *Aphis fabae* but not sap inoculation. It resembles potato leaf roll. It overwinters in the roots. The symptoms are intensified by light and dryness. The mosaic shows a variety of symptoms which makes a definite description difficult. *Myzus persicae* is a vector. The symptoms are retarded by light.

Rosen, H[arry] R[obert]

Mosaic disease of roses in Arkansas. U.S.D.A. Plant Disease Rept. **19**(2): 98–99, 1935.

Rosenfeld, Arthur H[inton]

Some notes on varietal resistance to streak disease in Egypt and Natal. Intern. Sugar Journ. **40**(471): 99–100, 1938.

Rosa, A. Frank, & Vinson, C[arl] G[eorge]

Mosaic disease of tobacco. Action of proteoclastic enzymes on the virus fraction. Nature of the virus from various species of plants. Missouri Agric. Expt. Sta. Res. Bull. **258**, 19 p., 1937.

The authors conclude that the inactivation of the virus by trypsin is the result of absorption. Pepsin inactivates slowly and at pH 3. The authors studied virus preparations from 19 species of plants. They describe a method of purifying viruses. The authors believe that the inactivation of a virus is the result of adsorption and not to the enzyme action of the host plant.

---, **& Stanley, W[endell] M[eredith]**

Partial reactivation of formalized tobacco mosaic virus protein. Proc. Soc. Expt. Biol. & Med. **38**(2): 260–263, 1938.

Tobacco mosaic virus protein that had been partially or completely inactivated by formaldehyde was made active by dialysis at pH 3.

Rous, L.

Essais contre le court-noué. (Experiments on the control of "court noué".) Progr. Agr. Vitic. **107**(12): 295–287, 1937.

A report on failures to control the disease.

Ruhland, W. & Michael, G.

Zur Physiologie des sog. Kartoffelabbanes. (On the physiology of the so-called potato degeneration.) Ber. Verh. Akad. Wiss. Leipzig **88**(1) : 3–10, 1936.

A study of physiological disturbances. The writers are of the opinion that their observations do not conflict with the virus disease theory of degeneration.

Ryakhovski, N. A.

(Determination of the injuriousness of tomato diseases and method for their control.) Plant Prot. Leningrad. **1935** : 88–91, 1935.

Sabaschnikoff. A. W.

Der Kartoffelabbau und die Bekämpfungmittel. Osteurop Land-Zeitg. **13**(12) : 1–6, 1936.

Salaman R[edcliffe] N[athan]

Report on a scheme for raising virus free potato stock. Cambridge School Agric. Mem. **7**, 41 p., 1935.

Immunity to virus diseases in plants. Third Cong. Pathol. Int. Comparée. Athens, 1936, **1** : 167–178, 1936.

A very excellent review of the subject including comparisons with immunity in animals. The author says: "The study of immunity in plants has suffered not a little from the application to it of ideas borrowed from animal immunology. Such views have dictated the experimental approach of many workers to the problem, no less than the explanation of such results as have been obtained, and of the phenomena observed in nature."

Acquired immunity against the "Y" potato virus. Nature (London) **139** (3526) : 924–925, 1937.

This paper describes tobacco plants completely immune and potato plants partly immune against the virulent form. It was obtained by transmitting the virulent form through *Schizanthus retusus* or into the root fibers of tobacco plants.

Plant viruses and their relation to those affecting man and animals. Lancet **232** : 827–833, 1937.

This is a lecture given before the Southampton Medical Society, January 13th, 1937. It is a review of our knowledge of the subject. The author concludes by saying: "Although the incidence of virus diseases in our field and crops and glasshouses has undoubtedly increased, there is no reason for undue pessimism. What is needed is more research on virus diseases and a closer understanding between the pathologist and the plant breeder. It is the latter who needs to realize that when by his breeding methods he gives us a large and ever larger crops, bigger and whiter fruits, and the like, he has almost certainly

discarded in route a number of hereditary genes which alone or in combination with other may be responsible for that vague but important character-constitution.''

Salmon, E[rnest] S[tandley]
On the appearance of sterile dwarfs in *Humulus lupulus* L. Journ. Genet. **3**: 195, 1914.

----------, **& Ware, W[illiam] M[elville]**
Nettlehead disease of hops. Journ. South Eastern Agric. Coll. **27**: 95, 1930.

Diseases of hops. Journ. Inst. Brewing n. s. **41**(6): 235–237, 1935.

Recognizes 3 virus diseases—nettlehead, mosaic and chlorotic diseases.

----------, **& Ware, W[illiam] M[elville]**
Dept. of Mycology. Journ. South Eastern Agric. Coll. Wye, Kent. **37**: 15–28, 1936.

A record of a virus tip which is called ''fluffy tip.''

Fungus and virus diseases of the hop. II. Journ. Inst. Brew. **42**(4): 184–186, 1936.

Includes one new disease probably due to a virus, ''fluffy-tip'' or ''bunchy-top''.

Sastri, B. M., & Sreenivasaya, M[ontnahalli]
Insect transmission of spike-disease. Current Sci. **3**(1): 27–28, 1934.

Physiology of the spike disease of sandal. Proc. Indian Acad. Sci. **3**(6): 444–449, 1936.

Scammell, H. B.
Cranberry false blossom from the viewpoint of the grower. Proc. Wisconsin State Cranberry Grow. Assoc. **44**: 8–11, 1931.

Schander, Staar
Bericht über die Tätigheit des Instituts für Pflanzenkrankheiten 1929–30. Landw. Jahrb. **72**: 62–91, 1930.

Considers mosaic a disease of the nucleus.

Scharff, J.
Celery mosaic. California Cult. **83**(24): 818–819, 1936.

Schenk, P. J.
Ziektenbestryding bij Amaryllis en Gloxihie. Floralia **55**(10): 147–148, 1934.

A disease of Gloxinia supposed to be due to a virus and a mosaic disease of Amaryllis.

Schick, R.
Die Wichtigsten Viruskrankheiten der Kartoffeln. Ihre Bedeutung für den Abbau und ihre Bekämpfung. A. Metzner, Berlin, 40 p., 1936.

Schlumberger, Otto
Abbaukrankheiten der Kartoffel. Wochenbl. Landesbauternsch. Sa. (Freistaat) **84**(3) : 432, **94** : 131–132, 1936.

Schmidt, E[rnest] W[illy]
The beet bug. Carrier of a dangerous virus disease. Brit. Sugar Beet Rev. **10**(2) : 43–46, 1936.

Popular.

Schmidt, M.
Die Massnahmen zur Vermeidung der Kraüselkrankheit der Futter-und Zuckerrüben. D. Kurmärk. Bauer, 1934.

Schneider, G[eorge], Schlumberger, O[tto] & Snell, K[arl]
Versuchsergbnisse auf dem. Gesamtgebiete der Kartoffelbaus in den Jahren 1923–26. Nach. den Berichten der Kartoffelversuchastelden bearbeitet. Mitt. Biol. Reindsanstalt. f. Land-u. Forstwirtschaft **36** : 125, 1928.

Studies on mosaic.

Schreven, D. A. van
(The yellowing disease of sugar beets and its cause.) Meded. Inst. Suikerbieten. **6**(1) : 36, 1936.

This is a brief review of the most important chlorotic diseases of sugar beets in Europe and includes both virus and physiological diseases.

Schultz, E[ugene] S[chultz] et al.
Degeneration diseases of potatoes. Maine Agric. Expt. Sta. Bull. **377** : 348–350, 1934.

———, et al.
Nature of virus diseases. Maine Agric. Expt. Sta. (Prog. Rpt.) Bull. **380** : 162, 1935.

———, et al.
Comparison of two aphids species regarding transmission of mild mosaic, leaf roll and spindle tuber. Maine Agric. Expt. Sta. Bull. (Prog. Rpt.) **380** : 168–170, 1935.

———, & **Raleigh, W[alter] P[atrick]**
Acquired resistance of potato to latent mosaic. Phytopathology (Abstract) **26**(2) : 107, 1936.

———, & ———
Reaction of Green mountain potato seedling to composite infection of a mild and crinkle mosaic and different types of latent mosaic virus. Phytopathology (Abstract) **26**(2) : 107, 1936.

----------, & Clark, C. F., Stevenson F. J., & Raleigh, W[alter] P[atrick]
Resistant of the potato latent mosaic. Amer. Potato Journ. **14** (4) : 124–127, 1937.

The results of some cross breeding.

----------, Raleigh, W[alter] P[atrick], Stevenson, F. J., Bonde, Reiner & Beaumont, J. H.
Recent developments in potato breeding for resistance to virus diseases. Phytopathology **27**(2) : 190–197, 1937.

A record of very important studies on mild mosaic, veinbanding mosaic, spindle tuber and leaf roll.

Schuster, L.
Ein gefährlicher Zuckerrüben-schädling. Naturforschr **12**(12) : 415–416, 1936.

The author believes that the beet leaf bug *Piesma quadrata (Zosmenus quadratus)* is the vector of crinkle.

Schwartze, C. D., & Huber, Glen A.
Aphis resistance in breeding mosaic-escaping red raspberries. Science **86**(2224) : 158–159, 1934.

The author concludes by saying that resistance probably results from a lack of suitable food for the insect rather than the presence of an active repellent substance.

Schwirzer, J.
Tjemara-ziekte bij tabak. Besvekisch Proefstat. Meded. No. **50** : 1–28, 1933.

Scott, G. T.
New curly-top resistant strains of beets. West. Irrig. (San Francisco) **18**(2) : 7, 1933. (Facts About Sugar (Abstract) **31** : 151, 1936.)

Popular.

Seastone, C. V., Loring, H. S., & Chester, K[enneth] S[tarr]
Anaphylaxis with tobacco mosaic virus protein and haemocyanin. Journ. Immunol. **33**(5) : 407–418, 1937.

The results of these studies are summarized as follows: "The anaphylactic properties of the tobacco mosaic virus protein and the hemocyanin of *Limulus polyphemus* have been studied in sensitized guinea pigs *in vivo* and by means of the Schultz-Dale method."

The results demonstrate that the tobacco mosaic virus protein is anaphylactogenic when tested *in vivo,* but in agreement with previously published data fails to cause smooth muscle contraction when tested *in vitro.*

The results of the experiments with the hemocyanin of *Limulus polyphemus* demonstrate that his protein is anaphylactogenic when tested by either of the above methods.

Sesa, S. V.

Scheme for research on mosaic and other diseases of sugar cane. Scient. Rpt. Agric. Res. Inst. (Pusa) **1933–34**: 154–167, 1936.

Severin, H[enry] H[erman] P[aul], & Freitag, Julius H[erman]

Ornamental flowering plants naturally infected with curly-top and aster yellows viruses. Hilgardia **8**(8) : 223–260, 1934.

Fourteen species of ornamental plants in 13 genera belonging to 10 families have been found to be naturally infected with curly top in California.''

Shapovalov, M[ichael], & Dufrénoy, J[ean]

Un virus infectant des solanées et des plantes d'ornament dans le sud-ouest de la France. (A virus infectious to the ornamental Solanaceous plants of South West France.) Compt. Rend. Soc. Biol. (Paris) **123**(31) : 696–698.

This disease attacks *Lycopersicon esculentum, Nicotiana tabacum, Dahlia* sp. and *Callistephus sinensis.* It is transmitted by *Thrips tabaci.*

Shatova, E., & Krivin, B.

(The elaboration of methods of virological plant examination.) Summ. Sci. Res. Work Inst. Plant Prot. 1935, Leningrad, p. 507–509, 1936.

Sheffield, Frances M[arion] L[ena]

The susceptibility of the plant cell to virus diseases. Ann. Appl. Biol. **23**(3) : 498–505, 1936.

The author used aucuba mosaic (yellows strain) of tomato and tobacco mosaic (Johnson's No. 1) as the viruses. The host plants were *Solanum nodiflorum, S. lycopersicum, Nicotiana tabacum* and *N. glutinosa.* His results are summarized as follows: ''A number of spraying experiments showed that the virus cannot enter a plant unless some of the cells are injured. It is not essential that such injury should be brought about in the presence of the virus. The chances of infection fall off rapidly in the first few minutes after injury, but infection occurs occasionally as long as half an hour after this damage. ''Inoculations by micropipette into single cells of the hosts plant yielded only about one-tenth of the expected number of infections. This suggests differences in the susceptibility of the cells to virus attack.''

The role of plasmoderms in the translocation of virus. Ann. Appl. Biol. **23**(3) : 506–508, 1936.

The intracellular inclusions may occur in all the epidermal cells of a large area except in the guard cells. No protoplasmic connections could be shown between the guard and other epidermal cells. Therefore, the author suggests that the virus is carried from cell to cell by the protoplasmic bridges but cannot enter the guard cells because there are no protoplasmic connections.

The histology of the necrotic lesions induced by virus diseases. Ann. Appl. Biol. **23**(4): 752–758, 1936.

The author stimulated mitosis in *Nicotiana glutinosa* by inoculation with aucuba mosaic. He describes the necrosis which follows the nuclear divisions.

Intracellular inclusions in plant virus diseases. Deux. Cong. Int. Biol. **23**(3): 506–508, 1936.

Shen, C. I.

Studies in tomosis of cotton. Sinensia, Wanking **7**(3): 293–316, 1936.

Silberschmidt, Karl

O mosaico do fumo. (Tobacco mosaic.) O Biologico (Brazil) **2**(11): 381–383, 1936.

Brief popular notes describing the disease.

A degenereschenoia da batatinha. (Potato degeneration.) O Biologico **3**(9): 247–254, 1937.

Popular discussion of the subject. In his statement the author attributes degeneration of potato to virus disease. He discusses several of the different types of potato virus diseases.

Simmonds, J[ohn] H[oward]

Diseases of the tomato. (Queensland Agric. Journ. **45**(1): 5–11, 1936.

Popular. Contains notes on mosaic, spotted wilt, big bud and streak.

Les maladies du bananier. (Banana diseases.) Rev. Bot. Appl. & d'Agric. Tropic. **16**: 296–301, 1936.

Simpson, G[eddes] W.

Insects in relation to the transmission of virus diseases of potatoes. Maine Agric. Expt. Sta. Bull. **377**: 351–353, 1934.

Insects in relation to the transmission of virus diseases. Maine Agric. Expt. Sta. Bull. **384**: 427–428, 1936.

A report of progress.

Skuderna, A. W.

Effects of time of planting and of fertilizer mixtures on the curly top resistant sugar beet variety U. S. No. 1 in Idaro. U.S.D.A. Circ. **273**, 15 p., 1933.

Small, C. G.

Spotted wilt (virus) in New York. U.S.D.A. Plant Diseases Rept. **20**(14): 226, 1936.

Small, T.
"Little potato" disease. Gard. Chron. **96**: 128, 1934.

Popular.

Smith, A. M., & Paterson, W. Y.
The study of variety and virus diseases of infection in tubers of *Solanum tuberosum* by the ascorbic acid test. Biochem. Journ. **31**(11): 1992–1999, 1937.

Smith, Floyd F[ranklin]
The need of permanent reference collections of insect vectors of plant diseases. Phytopathology **27**(2): 198–202, 1937.

A discussion of the importance of collections of insect vectors and more accurate data concerning them, about one-half this paper is devoted to the vectors of virus diseases.

Smith, J[ohn] Henderson
Discussion of recent work on heavy proteins in virus infection and its bearing on the nature of viruses. Proc. Royal Soc. Med. **31**: 199–210, 1938.

A review of our knowledge of crystals in relation to viruses.

———
Some recent development in virus research. Ann. Appl. Biol. **25**(2): 227–243, 1938.

This paper is the address of the retiring president of the Association of Applied Biologist delivered to the annual general meeting on Friday, February 11, 1938. It is a discussion of (1) methods of control and (2) nature of the virus. The second part is devoted primarily to the works of Stanley, Bawden and Pirie.

Smith, K[enneth] M[andly]
Mosaic disease. Gard. Chron. **73**: 345, 1923.

An editorial based on investigations on tomato mosaic.

———
Mechanism of transmission of plant viruses. Proc. Roy. Soc. B. **112**, 1933.

———
Plant viruses and their insect vectors. Fourth Imp. Ent. Conf. Rpt. p. 68–70, 1935.

———
The problem of a plant virus infection. Second Int. Congr. Micro-Biol. London, 1936.

———, **& Doncaster, J. P.**
The particles size of plant viruses. Third Int. Congr. Compar. Path. Rpt. **1**(2): 179–182, 1936.

The determination of the particle size of a number of viruses by Elford's methods.

An air-borne plant virus. Nature **139**(3513) : 370, 1937.

This virus was obtained by drawing air through cotton wool pads. It was treated on leaves of *Phaseolus vulgaris*.

Studies on a virus found in the roots of certain normal-looking plants. Parasitology **29**(1) : 70–85, 1937.

A virus was found in the roots of several species of hosts plants which did not show symptoms of disease. *Nicotiana tabacum* and *N. glutinosa* sometimes showed symptoms, usually on the lower leaves. There was no evidence that the virus was carried in the seeds. The plants were grown in sterilized soil. The virus was never completely systemic in any host plants. The thermal death point is 72°C.

Further studies on a virus found in the roots of certain normal-looking plants. Parasitology **29**(1) : 86–87, 1937.

This is a record of a continuation of the studies recorded in the preceding papers. The virus was found to be a contamination from outside sources. It was found in the sludge at the bottom of the water tanks and the evidence shows that it was conveyed in the water to the soil and thence to the roots. It is thought to be a transitional stage between a pathogen and a non-pathogen.

A textbook of plant virus diseases. A book of 615 p., 1937.

A very complete study. One section is devoted to insect vectors.

Snell, K[arl]

Untersuchungen über die Lupinen-brane (Viruskrankheiten.) (Investigation on Lupin virus diseases.) Nachrichtenbl. f. d. Deutsch. Pflanzenschutz. **15**(10) : 90–91, 1935.

Snyder, W[illiam] C[owperthwaite], & Thomas, H. Rex

Spotted wilt of the sweet pea. Hilgardia **10**(8) : 257–262, 1936.

This disease is described as streak. Results of experimental inoculations and a general discussion are given.

Sorauer, Paul C[arl Moritz]

Handbuch der Pflanzenkrankheiten. Erster Band. Die Nichtparasitaren und Viruskrankheiten. Zweiter Teil. Sechste, Nenbearbeitete Auflage. VIII : 553 p., 1934.

Soriano S.

Enfermedades de "virus" de las vegetales (Plant "virus" disease.) Rev. Centro Estud. Agron. Univ. Buenos Aires **24** (144) : 207–237, 1931.

A popular account.

Spencer, Ernest L.

Influence of host nutrition systemic development of tobacco mosaic. Plant Physiology **12**(3) : 825–832, 1937.

Nicotiana tabacum L. was grown in sand cultures for this work. The plants were inoculated with a yellow strain of tobacco mosaic. The influence of nutrition was measured by the time required for the virus to reach and produce symptoms in the apical leaves.

Symptoms appeared earlier in plants that had received a minimum or excess of nitrogen than in those that had received a medium amount.

Symptoms appeared earlier in plants that had not received phosphorus than in those that had received an excess for one week before inoculation. These plants showed symptoms earlier than those that had received an excess for 2, 3 or 4 weeks before inoculation.

The appearance of symptoms was correlated with excess of potassium.

"It is concluded that the systemic development of the disease was accelerated by high-nitrogen nutrition and retarded by either high-phosphorus or high-potassium nutrition. The rapidity with which symptoms of systemic infection developed showed no apparent correlation with the distance the virus had to travel to reach the growing tip."

Seasonal variations in susceptibility of tobacco to infection with tobacco-mosaic virus. Phytopathology **28**(2) : 147–150, 1938.

The author summarizes the results of his studies as follows: "A study involving weekly tests over a period of 2½ years showed definite variations in the susceptibility of small Turkish tobacco plants to infection with tobacco-mosaic virus. Susceptibility was high during early summer, a period characterized by high temperature and long duration of sunshine, and low during late winter and early spring. The incubation period of the disease within the plant showed a direct correlation with seasonal fluctuations in light and temperature, being short during early summer and long during the winter months."

Spieckermann, A[lbert]

Wie schütze ich mich gegen den Abbau der Kartoffeln? Wochenbl. Landesbauernsch. Westf. 1239, 1935.

Spierenburg, Dina

Een Virusziekte in Lupinen. (A virus disease of lupines.) Tijdschr. Plantenziekten **42**(3) : 71–76, 1936.

A disease causing dark stripes and spots on the stems. The leaves become violet-brown, wrinkled and the tops die.

Een Virusziekten in Lupinen. (A virus disease of lupines.) Tijdschir. Plantenz. **42**(9) : 253–254, 1936.

Continuation of previous observations.

Spinks, G. T., & Glothier, C. E.

The incidence of "reversion" in seedling black currants and in sciones derived from them. Agric. & Hort. Res. Sta. Univ. of Bristol. Rpt. **1935**: 58–66, 1936.

Studies were made on 2,500 seedlings. Reversion was found on a few four year old plants but the majority remained healthy for six years. Some remained healthy for ten years. Systematic roguing gave good results but did not eliminate the disease. It is believed that in some cases the disease was latent for two years. There was no correlation of occurrence between reversion and big bud.

Sreenivasaya, M[ontnahalli]

Infectivity of various tissues of "spiked" sandal and studies in the resistance of sandal to "spike" disease Part. I. Ind. Sci. Cong. Proc. (Calcuta) **17**: 313, 1930.

Stanley, W[endell] M[eredith]

(Chemical studies on the virus of tobacco mosaic. VII—An improved method for the preparation of crystalline tobacco mosaic-virus protein. Journ. Biol. Chem. **115**(3): 677–678, 1936.

This is a description of a method in which the author used ammonium sulfate, celite and calcium oxide. The yield of the crude twice precipitated globulum was increased to about 80 percent.

Krystallinziertes Tabakmosaikvirus-Protein. (Crystalline tobacco-mosaic virus protein.) Chemiker-Zetg. **60**: 778, 1936.

A note.

Crystalline tobacco-mosaic virus protein. Amer. Journ. Bot. **24**(2): 59–68, 1937.

This is a summary and discussion of all the work of the author on this subject. The virus is protein in nature; the size of the molecule lies between the previously recorded values for tobacco mosaic virus. This crystalline protein could not be found in normal plants. The product from Burley tobacco in England is the same as the author found in the United States. It is possible that this protein may be inert and the carrier of the very small amount of an active virus agent. As a result of these studies it appear possible that protein molecules may be listed with living organisms.

A comparative study of some effects of several different viruses on Turkish tobacco plants. Phytopathology **27**(12): 1152–1160, 1937.

The author summarizes his results as follows: "Tobacco-mosaic, aucuba-mosaic, masked-tobacco-mosaic, green- or yellow cucumber-mosaic, severe-etch, tobacco-ring-spot, and latent-mosaic viruses, when inoculated to small, medium-size, or large Turkish tobacco plants, stunt the growth of the plants. Tobacco and aucuba-mosaic viruses stimulate protein me-

tabolism, however, so that, even though the growth of the plants is stunted, the total protein produced by the diseased plants is greater than that of normal plants. All of the other viruses studied caused a decrease in the total protein produced by the plants. Although severe symptoms and an increased protein content were characteristic of the tobacco and aucuba-mosaic diseases, there appeared, in general, to be no direct correlation between the protein content of the diseased plants and the severity of the disease symptoms. The first extracts of frozen macerated plants were found to contain from 80 to 90 per cent of the extractable protein nitrogen in the plants. The extracts of plants diseased with tobacco-or aucuba- mosaic viruses were found to contain 2 or 3 times more protein nitrogen than the extracts of normal plants. This increase in protein nitrogen was found to be due to the production in diseased plants of large amounts of high molecular weight virus protein. The relationship between virus protein and intracellular crystalline deposits is discussed.

Isolation and properties of virus proteins. Ergebuirse Phys. Biol. Chem. Exp. Phar. **39**: 294–347, 1937.

A very thorough and comprehensive review of the subject including a discussion as to whether the viruses may be low types of living organisms.

Some biochemical investigations on the crystalline tobacco-mosaic virus proteins. Amer. Phil. Soc. Proc. **77**(4) : 447–453, 1937.

This paper is a summary of the biochemical and serological studies of virus proteins. He says: "It is felt that the results fully justify the conclusion, for the present at least that this unusual high molecular weight protein is actually tobacco-mosaic virus."

Virus proteins. A new group of macromolecules. Journ. Phys. Chem. **42**(1) : 55–70, 1937.

The author discusses the nature of viruses and gives the results of experimental studies. He says: "Despite its tremendous size, tobacco mosaic virus protein has many of the ordinary properties of molecules. In addition, however, it possesses virus properties which includes the ability to reproduce and to mutate specificity of action with respect to host, and the ability to induce immunity. Several virus proteins, some from other plant diseases and some from animal and bacterial diseases, some larger and some smaller than tobacco mosaic virus protein, have been isolated and are now under investigation in various laboratories. The virus proteins thus represent a new group of macromolecules which are considerably larger than those of any group of proteins hitherto described. Because of its tremendous size, the air-driven quantity centrifuge and the ultra-centrifuge are peculiarly adapted to the isolation and study of the virus proteins. Since the virus protein possesses virus activity and certain properties characteristics of organisms, as

well as the properties of molecules, any attempt at this time to classify them definitely as molecules or as organisms should be one solely of convenience. However, their characterization as molecules is providing a new experimental approach to the general problem of the nature of viruses.''

Chemical studies on the virus of tobacco mosaic. VIII—The isolation of a crystalline protein possessing the properties of aucuba mosaic virus. Journ. Biol. Chem. **117**(1) : 325–340, 1937.

The author reports the isolation of a crystalline protein which has the properties of aucuba mosaic virus. Its activities are the same or very similar to the activities of tobacco mosaic-virus but the crystals are larger, the solutions more silky and opalescent and its solubility lower. He believes that two different strains of a virus give rise to two different proteins.

Chemical studies on virus of tobacco mosaic. IX—Correlation of virus activity and protein on centrifugation or protein from solution under various conditions. Journ. Biol. Chem. **117**(2) : 755–770, 1937.

The results demonstrated that in solution at different hydrogen ion concentration and in the presence of other proteins the virus activity remains with the high molecular weight, protein and is evidence, therefore, that the virus activity is a specific property of the high molecular weight protein.''

Chemical studies on the virus of tobacco mosaic, X—The activity and yield of virus protein from plants diseased for different periods of time. Journ. Biol. Chem. **117**(1) : 205–217, 1937.

These studies are summarized as follows: The increase of tobacco mosaic virus protein in Turkish tobacco plants has been determined by isolating the virus protein in plants diseased for different periods of time. The efficiency of the isolation technique was determined by isolating virus protein from artificially prepared mixtures containing known amounts of virus protein. It was found that about 40 per cent of the virus protein can be isolated from plants containing only about 1 part of virus protein per 100,000 parts of plant material. Virus protein in Turkish tobacco plants was found to increase from an estimated 10 mg. per gm. of plant material to about 3 mg. per gm. of plant material during the course of 5 weeks. Virus protein in inoculated leaves was estimated to increase over a million times during a 4 days period. Although the virus protein content was found to reach a maximum 5 weeks after inoculation, the rate of increase was found to be greatest during the first 3 weeks. The total nitrogen content of extracts of diseased plants was found to remain about constant over long periods of time, whereas the protein nitrogen content was found to increase and reach a maximum and then to decrease. The amount of low molecular weight protein was found to decrease as the amount of the virus pro-

tein increased. No significant difference was found in the virus activity of protein obtained from plants that had been infected for from 2 to 13 weeks, although that of protein obtained from plants infected for only 1 week was significantly less.

The inactivation of crystalline tobacco-mosaic virus protein. Science **83**(2165) : 626–627, 1936.

The author refers to his previous work and says: "It has now been found that treatment of this active protein with hydrogen peroxide, formaldehyde, nitrous acid or ultra-violet light produces inactive native proteins that, although slightly altered, retain certain chemical and serological properties characteristic of the virus protein."

He follows a description of these studies with this statements: "As a whole, the preliminary results indicate that only slight changes occur in the protein molecules on inactivation by the four methods mentioned. Although there is always a possibility, as with any apparently pure substance, that the crystalline tobacco mosaic virus protein may consist of two closely related components, one active and the other inactive, the available evidence indicates that the virus activity is a specific property of this high molecular weight protein. It appears likely, therefore, that the slight changes in the protein, which result from treatment with formaldehyde, hydrogen peroxide, nitrous acid or ultra-violet light, cause it to loose its ability to infect susceptible plants."

Some biochemical investigations on the crystalline tobacco-mosaic virus proteins. Proc. Amer. Phytopathological Soc. (Abstract) **77**(4) : 447–453, 1937.

---, & **Wyckoff, Ralph W[alter] G[raystone]**

The isolation of tobacco ring spot and other virus proteins by ultracentrifugation. Science **85**(2198) : 181–183, 1937.

The authors report the isolation of a high molecular weight crystalline protein, possessing properties of ring spot virus but different from tobacco mosaic virus protein. They used the ultracentrifuge method.

Stevens, N[eil] E[verett]

More about false blosson. Nat. Cranberry Mag. **2**(12) : 5–6, 1938.

Stevenson, J[ohn] A[lbert]

Further notes on the distribution of the witches' broom of black locust. U.S.D.A. Plant Disease Rept. **22**(9) : 148, 1938.

Stoddard, E. M.

Progress report of the "X" disease of peach. Proc. Connecticut Pomol. Soc. **45** : 25–27, 1935.

Appears to be a new virus disease.

Stone, Winona E[myle]

Growth, chemical composition, and efficiency of normal and mosaic potato plants in the field. Journ. Agric. Res. **52**(4): 295–309, 1936.

Mosaic potato plants lengthen more slowly and produce more leaves of less surface than normal plants. The total leaf surface is greater in the normal plants. The green weight per area is less in diseased than in normal plants, but the dry weight in diseased plants was greater per unit area than in the normal plants.

Storey, H[arold] H[aydon]

Report of the Plant Pathologist. East Afric. Agric. Res. Sta. Ann. Rpt. **1935**: 11–14, 1936.

The author reports two types of cassava mosaic, severe yellow mosaic, and extreme leaf distortion.

Virus diseases of East African Plants. IV–VI. East African Agric. Journ. **1**(4): 333–337 (6): 471–475, 1936. **2**(1): 34–39, 1936.

A continuation of a series of popular papers. Popular discussion of streak of maize and diseases of cassava.

A new virus of maize transmitted by *Cicadulina* sp. Ann. Appl. Biol. **24**(1): 87–94, 1937.

A description of a new disease which is transmitted by *Cicadulina mbila*.

Stubbs, M[erl] W.

Vicoses of the garden pea, *Pisum sativum*. Phytopathology (Abstract) **26**(1): 108–109, 1936.

Certain viroses of the garden pea (*Pisum sativum*). Phytopathology **27**(3): 242–267, 1937.

A study of pea-mosaic viruses and tobacco ring spot virus. One mosaic virus was found to be distinct and designated as pea virus I. It causes enation pea mosaic. Three other pea mosaic viruses were found to be strains of a single virus and designated as pea virus-2. A causing marble pea mosaic, pea virus 2-B causing speckle pea mosaic and pea virus 2-C causing mild pea mosaic. Tobacco ring spot virus was also described. All the pea-mosaic viruses studied were transmitted by *Macrosiphum pisi* and by extracted juice when carborundrum was used for making the inoculations. 34 varieties of peas were found to be more or less susceptible to pea virus 1 and tobacco ring spot virus. Six varieties were not susceptible to the strains of pea virus 2. Pea virus I was inactivated by a dilution of 1 to 300 and 4 days aging *in vitro*. Peas and sweet peas were reported as new hosts of tobacco ring-spot virus. It is probable that pea mosaic may be caused by other viruses.

Subrahmanyan, V.

Investigations on the spike disease of sandal I–IV. Bangalor, 1931–32. Indian Inst. Sci. 1933.

Summers, E[aton] M[elroy]

An investigation of types or strains of the mosaic virus of sugar cane in Louisiana. Iowa State Journ. Sci. **11**(1) : 118–120, 1936.

The author refers to four strains previously described and then gives evidence indicating the existence of other strains. (This paper is an abstract of a doctorate thesis.)

Swarbrick, T., & Thompson, C. R.

Observations upon the incidence of "Reversion" and the control of "Big Bud" in Black Currants. Long Ashton Res. Sta. Ann. Rpt. 1931, p. 101, 1931.

———, & Berry, W. E.

Further observations on the incidence and spread of reversion and big bud in black currants. Univ. Bristol Ann. Rpt. Agric. & Hort. Res. Sta. p. 124–232, 1936.

A study of the spread of the disease. The evidence indicates that the big bud mite is an important factor but there may be other agencies.

Swartele, A. A.

Bestaat or een verband turechen het voorkomen van "black heart" en het obtreden van virusziekten bij den aardappel? (Does a causal relation exist between the occurrence of black heart, and of virus diseases of the potato?) Plantenziekten **42**(9) : 241–252, 1936.

The author has not been able to detect any relation between black heart and virus diseases.

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Onderzoek van Ziekteverschijnselen bij Fragaria. (Research work on degeneration diseases of strawberries.) Agriculture (Louvain) **41**(1) : 1–10, 1938.

Takahashi, William N[oboru], & Rawlins T[homas] E[lsworth]

Stream double refraction of preparations of crystalline tobacco-mosaic protein. Science **85**(2195) : 103–104, 1937.

This is a continuation of previous work by these authors. They prepared protein according to Stanley's method and say: "If the crystal preparations are pure these results indicate that a significant portion of the virus in the crystals has become inactive during the purification process and that this inactivation is greatest in the "C" preparations."

Tasugi, H., & Ikeno S.

(On the mosaic disease of lilies.) Ann. Phytopath. Soc. Japan **3** : 91, 1934.

A note.

Taubenhaus, J[acob] J[oseph], & Alstatt, G[eorge] E.
Texas Agricultural Experiment Station Ann. Rpt. **49**: 96, 1936.

A record of several new hosts for spotted wilt of tomato and curly top of sugar beet.

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Curly top of spinach in Texas. U.S.D.A. Plant Disease Rept. **21**(1): 2, 1937.

This disease was very severe in five counties. The insect vector (*Eutettix tenellus*) was found.

Taylor, C. F.
The incidence of yellow dwarf in potato varieties. Amer. Potato Journ. **15**(2): 37–40, 1938.

Taylor, G. G., & Chamberlain, E[dward] E[dinborough]
Spotted-wilt on tobacco. New Zealand Agric. Journ. **54**(5): 278–283, 1937.

Teng, S. C.
The cyrtosis of cotton. Sinensia, Nanking **7**(1): 63–79, 1936.

This disease which has been attributed to a virus is believed to be caused by a leafhopper (*Chlorita biguttula* Mats.)

Thilliard, R.
Bestrijding der krul-en kroepoek-ziekte van tabak. Meded. Proefst. Vorstenl. Tabak (Java) **78**, 18 p., 1934.

Thomas, H[arvey] E[arl] & Hildebrand, F[rank] M[errill]
A virus disease of prune. Phytopathology **26**(12): 1145–1148, 1936.

A description of a virus disease that appears to be new.

Apple mosaic. Hilgardia **10**(14): 581–588, 1937.

It appears that an infectious variegation of apple foliage was reported from France by Vibert in 1835. The author describes the symptoms in California and reports transmission to several plants. Efforts to control by heat were partially successful.

Thornberry, H. H., Valleau, W[illiam] D[ornay], & Johnson, E[dward] M[arshall]
Inactivation of tobacco-mosaic virus in cured tobacco leaves by dry heat. Phytopathology **28**(2): 129–134, 1938.

This is a study of the resistance of the yellow, green and burning strains of tobacco mosaic to heat. All three show a similarity in cured tobacco. At 70° C. all strains were infectious after treatment for 60 hours. The writers give much data with discussion and state that the virus is inactivated at 150° C. (302° F.) in 0.5 of an hour.

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Crystallization of tobacco-mosaic virus protein. Science **87** (2248) : 91–92, 1938.

The author describes a method of crystallization and refers to the work of Bawden and Pirie in England and of Stanley in the United States. He also said: "Tobacco juice from healthy plants when treated in a similar manner failed to develop any evidence of crystalline protein. The precipitate that formed was composed of amorphous material as far as could be determined microscopically."

Thornton, J. K.

Key to virus and non-virus diseases of potatoes. Pennsylvania State Farmer n. s. **2**(9) : 390–391, 1937.

Thung, T. H.

(Infective principle and plant cell in some virus diseases of the tobacco plants.) I. Handeling van het zesde Nederl. Ind. Natuurwetenschappelijk Congres, 22–26 September, 1931, Bandoeg, Java, 1931.

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(The curl and crinkle diseases of tobacco and causes of their dissemination.) Meded. Proefst. Vorstenl. Tabak, Java **72**: 51–52, 1931.

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Smetslof en plantencel bij enkole virusziekten vande tabakspeant. III. (Infective principle and plant cell in some virus diseases of the tobacco plant III.) Tijdschr. Plantenziekten **43**(1) : 11–32, 1937.

The author treats of immunity studies in which he used the viruses of ordinary tobacco mosaic, white mosaic, severe mosaic, ring spot necrosis, Vorstenlanden distorting strain I and Hohher distorting strain. These studies indicated four types of antagonism: (*a*) equilibrium, (*b*) domination, (*c*) regulable equilibrium and (*d*) partial over-weighting.

Tims E[ugene] C[hapel], Mills, P[ercy] J[oseph], & Edgerton, C[laude] W[ilbur]

Studies on sugarcane mosaic in Louisiana. Louisiana Agric. Expt. Sta. Bull. **263**, 39 p., 1935.

Account of studies and observations of mosaic disease on different hosts are definite and constantly occur. These are being called the green or varieties. Two distinct mosaic types characterized by symptoms which mild mosaic and the yellow or severe mosaic. Losses in yield are given, being greater in the case of yellow mosaic.

Toit, P. J. du

Viruses. South African Journ. Sci. **32**: 696–705, 1935.

Tompkins, C[hristian] M[ilton]

A transmissible mosaic disease of cauliflower. Journ. Agric. Res. **55**(1) : 33–46, 1937.

A description of a disease of a previously undescribed virus. The virus is transmitted by *Brevicoryne brassicae, Rhopalosiphum pseudo-*

brassicae and *Myzus persicae*. The virus will remain active *in vitro* for 14 to 15 days at 20°C. It is inactivated at about 75°C. The dilution of 1–2000 is active. It attacks many plants.

----------, **Gardner Max W[illiam], & Thomas, H. Rex.**
Black ring, a virosis of cabbage and other crucifers. Phytopathology (Abstract) **27**(9) : 955–956, 1937.

A description of the disease. Transmitted by rubbing and by the green peach aphid. Inactivated by 59°C. for ten minutes and by 3 days at 22°C. and by dilution of 1 to 1,000. Attacks all commercial varieties of cabbage. Infections were obtained on rhubarb, *Chenopodium album, C. murale,* spinach, *Stellaria media, Brassica arvensis,* kale, brussels sprouts, cauliflower, broccoli, kohlrabi, rutabaga, turnip, wall flower, annual and Brompton stock, dames violet, Virginia stock, water cress, honesty, Chinese radish, Turkish and white Burley tobacco and *Nicotiana glutinosa*. It is similar to ring spot disease of cabbage described by K. M. Smith in England in 1935.

Topekha, E. F.
(The biochemistry of virus diseased potatoes.) Bull. Appl. Bot. Select. **3**(14) : 53–67, 1936. (Ber. Wiss. Biol. (Abstract) **46**: 3–4, 216, 1937.)

Tower, J. D.
Sugar beet experiments, 1901. Michigan Agric. Expt. Sta. Bull. **197** : 138–140, 1902.

The disease referred to in this paper and supposed to be due to bacteria was probably a virus disease recently described by Coons and others as "savoy".

Trochain, J.
Les conditions de la végétation au Sénégal. Le "gana" de l'arachide. (Vegetation conditions in Senegal. The "gana" of the peanut.) Bull. Soc. Nat. d'Acclim. Paris. **81**(7) : 302–312, 1934.

Trotter, A[lessandro]
Ulteriori osservazioni sulle "virosi" del *Cestrum parqui* L'Hér. (Further observations on virus diseases of *Cestrum parqui* L'Hér.) Ric. Assoc. Divulg. Fitopat. Camapia ed Mezzogiorus (Portici) **5** : 61–64, 1936. (R. Obs. Reg. Fitopat. Portici, 4 p., 1936.)

A confirmation of previous work on this disease on this host.

Il "verderame" de tabacchi in cura. (Verderame of curing tobacco.) Boll. Tec. Tab. **33**(2) : 67–72, 1936.

Description of a spotting in curing tobacco which is believed to be due to mosaic.

La "maculazione ad anello" nelle foglie del tabacco. (Ring spot of tobacco leaves.) Boll. Tec. Tab. **34**(1) : 51–60, 1937.

The disease has been found in Scafati (Salermo), Italy. The author gives a review of the subject.

Troy, Zeliaette

Aster yellows and its control. Contr. Boyce Thompson Inst. **1**(28) : 262–266, 1935.

Tschernyschev, O.

(Prophylaxis and therapy in fighting virus diseases of potato.) Arb. Wiss. Forsch-Unst. Kart.—Wirtsh. Moscow **4**: 52–58, 1935.

Tucker, J.

The value of seed potato certification to the potato industry. Amer. Potato Journ. **14**(2) : 39–45, 1937.

Gives percentage on diseases including leafroll and mosaic.

Turner, A. D.

"Red plant" disease of strawberry. Serious problem in the South. Fruit Grower **55**(1436) : 971–972, 1923.

Popular.

Turner, W[illiam] F.

Phony peach disease control is promoted by destroying wild peach trees. U.S.D.A. Yearbook p. 275–277, 1935.

Valleau, W[illiam] D[ornay]

Do tobacco plants recover from, and develop immunity to ring-spot? Kentucky Agric. Expt. Sta. Res. Bull. **360** : 181–191, 1935.

The author gives a review of the subject and the results of his own studies which lead him to differ in his opinion from other workers. His ideas are summarized by the following extract: "If a tobacco plant already affected by one strain of the tobacco mosaic virus fails to develop symptoms when inoculated with another strain, it can hardly be considered as evidence of an acquired immunity, but may simply be proof that cells already affected by this virus cannot be affected by more of the same kind of virus, even tho it is of another strain . . . . . It appears better, for the time being, to speak of protection afforded by one strain of virus against a more injurious strain, bearing in mind the practical application, rather than to speak of an acquired immunity in the sense in which this term is used in animal and human pathology."

Localization and resistance to tobacco mosaic, in *Nicotiana*. Kentucky Agric. Expt. Sta. Res. Bull. **360** : 202–230, 1935.

The author gives the results of his studies with discussion and concludes: "Necrotic-spotting is therefore, merely an index to the degree of sensitivity of the plant to the virus. If the term "localization" is to be used, it should be reserved for particular instances of necrotic

spotting where the virus is confined or localized within the inoculated leaf, but should not be used as a term to indicate local necrotic spotting. With our present varieties of tobacco, localization cannot be expected to be of value in the control of tobacco mosaic, because the common strains of tobacco mosaic are non-necrotic-spotting strains. Two types of resistance to the tobacco-mosaic viruses may be recognized in *Nicotiana tabacum;* one in which certain strains of the virus are sometimes prevented from causing systemic infection by a high degree of sensitivity of invaded cells, with localization in inoculated leaves, and another of the type of resistance shown by Ambalema to non-necrotic strains of the virus, in which the virus is inhibited from entering the young tissues of the plant. Failure of the tobacco-mosaic virus to enter seeds may be the results of inability of the virus to invade meristematic tissue. The suggestion is made that plants which are most highly sensitive to a virus (necrotic-spotting species or varieties) are those in which the virus multiplies most rapidly (*N. glutinosa,* for instance), and those least sensitive are those in which the virus finds the poorest medium for multiplication (Ambalema, for example.) Transfer of resistance of Ambalema, either with or without necrotic spotting, to our tobaccos, should prove a satisfactory and practical solution of the tobacco-mosaic problem.''

----------, & Johnson, E[dward] M[arshall]
Burning and non-burning strains of tobacco mosaic. Kentucky Agric. Expt. Sta. Res. Bull. **361**: 233–238, 1935.

These studies show that some strains of mosaic cause burning while others do not; that some varieties are more susceptible than others and that the number of burned leaves varied on different plants. The authors say: ''Mosaic burn is evidently an invasion symptom as it appears to be limited almost entirely to tissues young enough to be invaded rapidly by the virus, but does not occur on leaves which have completed growth at the time of inoculation or in leaves produced subsequently to the appearance of mosaic symptoms in the growing point. The leaves which burned were only partially developed at the time of inoculation but old enough so that mosaic patterns did not develop in them.''

----------, & Johnson, E[dward] M[arshall]
Tobacco diseases. Kentucky Agric. Expt. Sta. Bull. **362**: 62, 1936.

Description of many virus diseases.

A mosaic disease of peach in Kentucky. U.S.D.A. Plant Disease Rept. **20**(12): 199, 1936.

A brief note recording this disease.

----------, & Johnson, E[dward] M[arshall]
Tobacco mosaic source of infection and control. Kentucky Agric. Expt. Sta. Bull. **376**: 223–262, 1937.

The authors give a large amount of data showing that tobacco mosaic can be controled.

Kentucky Agricultural Experiment Station Ann. Rpt. for the year 1936. Part I. **49**: 63, 1937.

This report contains records on tobacco mosaic and crossing of Ambalema with White Burley for the control of mosaic.

---, **& Diachun, Stephen**

Tests of strains of tobacco mosaic virus with Chester's field test. U.S.D.A. Plant Disease Rept. **22**(5) : 77–81, 1938.

The authors conclude by saying: "While this test gave positive results with most of the strains of tobacco mosaic tested, it cannot be considered as accurate a method for identifying viruses, which are now classed as common or ordinary field mosaic, as the drying test."

Varadaraja Iyengar, A. V.

Influence of spike disease on the mineral metabolism of sandal. Current Sci. **6**(6) : 278–279, 1937.

The calcium content is less and the nitrogen greater in healthy than in diseased plants.

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A report on the disease and the control by sanitation and resistant varieties.

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The prize paper and its author. Science **85**(2197) : 132–133, 1937.

A brief review of Dr. W. M. Stanley's paper for which he was awarded the American Association for the Advancement of Science's prize. Also a brief sketch of Dr. Stanley's life.

Vinodradova, E. I.
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Further work on purification of tobacco mosaic virus. Phytopathology (Abstract) **28**(1) : 23, 1938.

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Das Vorkommen von Virosen auf dem Dahlemer Versuchsfelde. (The occurrence of viruses in the Dahlem experimental fields.) Arb. Biol. Reichsanst. **21**(1) : 1–58, 1934.

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On the difference and discrimination of wheat mosaic in Japan. Journ. Imp. Agric. Expt. Sta. **3**(1) : 93–128, 1937.

A report of studies in which they found green and yellow mosaic.

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Peach mosaic disease in Colorado. Journ. Econ. Ent. **30**(6) : 902–904, 1937.

A brief description of the disease and methods of control.

Waldmann, O.
Filtrierbares Virus als Krankheitserreger bei Mensch, Tier und Pflanze. Chemiker-Zeitg. **60** : 824–825, 1936.

Walker, J[ohn] C[harles], & Larson, R. H.
Increasing importance of cabbage mosaic. Phytopathology **27** (2) : 142, 1937.

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Soil temperature in relation to potato yellow dwarf. Phytopathology (Abstract) **28**(1) : 21, 1938.

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The control of aphids attacking sprouting potatoes. Journ. Min. Agric. **30** : 1–4, 1923.

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Cultivation and diseases of the banana in Brazil. Trop. Agric. (Trinidad) **10**(7) : 192–197, (8) : 211–217, (9) : 255–259, 1933.
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Banana diseases VIII. Notes of various diseases occurring in Trinidad. Trop. Agric. (Trinidad) **11**(6) : 143–149, 1934.
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Diseases of the banana and the Manila hemp plant. A book of 615 p., 1937.
Contains descriptions of virus diseases.

Ware, R. B.
Peach yellows and litle peach. Connecticut Bd. Agric. Spec. Rpt. 1896.
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Untersuchungen über die Azidität des Gewelbebreies der Kartoffelknolle. Die elektrometrische Pflanzgutwertbestimmung der Kartoffelknolle. II. Mitteilung. (Studies on the acidity of the tissue emulsion of the potato tuber. The electrometric determination of the seed value of the potato tuber. (Note II.) Arb. Biol. Reichsanst. Land-u. Forstu., Berl.-Dahl, **21** (4) : 499–516, 1936.

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"Studien über die "Dehydrase-wirkungen" gesunder und abbaukranker Kartoffelknollen. (Studies on the "dehydrase reaction" of locality and degenerate potato tuber.) Phytopath. Zeitchr. **9**(3) : 297–324, 1936.
The juices of degenerated potatoes undergo a more rapid clarification when treated with methylene blue solution than the juice from healthy potatoes.

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Das Redoxpotential de Gewebebreies der Kartoffelknolle. Die elektrometrische Pflanzgutwertbestimmung der Kartoffelknolle III. Mitteilung. (The oxidation-reduction potential of the pulped tissue of the potato tuber. The electrometric determination of the seed value of the potato tuber. Note III.) Planta **25** : 258–281, 1936.

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Ueber die Pufferung der Pressäfte abbaukranker und gesunder Knollen der Kartoffel. (On the buffering of the expressed juices of degeneration-diseased and sound potato tubers.) Phytopath, Zeitschr. **10**(1) : 43–56, 1937.

A study of the electrometric method with juices.

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Eine "Jodprobe" zur Pflanzgutwertbestimmung der Kartoffel, Vorläufige Mitteilung aus Untersuchugen. (An "iodine test" of the value of potatoes for seed. Preliminary note on the investigations.) Phytopath. Zeitschr. **10**(1) : 107–109, 1937.

Probleme der Forschungen über den Abbau der Kartoffel. I. Pflanzzeit der Pflanzgutbaues und Pflanzgutwert der Ernte. (Problems involved in the investigation of degeneration of potato. I. Time of sowing in the production of seed material and the seed value of the crop.) Züchter **9**(2) : 35–40, 1937.

Experimental studies indicate that in Germany the degeneration (virus) increase until sometime in June and July. Planting after that show less infections.

Watson (Hamilton) M[arion] A.

Field experiments on the control of aphis-transmitted virus diseases of *Hyoscyamus niger*. Ann. Appl. Biol. **24**(3) : 557–573, 1937.

A solution of nicotine and soft soap was used. The best results were obtained by spraying at two weeks intervals. The perecntage of infection was lower on the sprayed than on the unsprayed plots. There was no effect in yield on the first year growth but a 30 percent increase in the third crop of the second year.

Further studies in the relationship between *Hyoscyamus* virus 3 and the aphid *Myzus persicae* (Sulz.) with special reference to the effects of fasting. Proc. Roy Soc. ser. B. **125**(838) : 144–170, 1938.

The percentage of infection by *Myzus persicae* was increased when the feeding on infected plants was preceeded by fasting. The efficiency of the vector was increased by one hour of fasting but increased by longer periods.

Factors affecting the amount of infection obtained by aphis transmission of the virus Hy. III. Phil. Trans. Roy. Soc. Biol. Sci. ser. B. **226**(540) : 457–489, 1936.

The author gives results of studies on a number of insects and time of feeding. *Myzus persicae* can infect two plants in succession without return to source of virus, but the number of second infections decreases rapidly and is negligible after one hour.

Weaver, T. C.

Recommends remedies to overcome chlorosis in roses. Flor. Rev. **88**(2012) : 9, 1936.

Popular.

Weij, H. G. van der

De bodem als infectiebron van Rotterdam B-ziekte. (The soil as a source of infection by Rotterdam B-disease.) Deli Proefst. Medan, Sumatra Vlugschr. **61**. 6 p., 1936.

This is a very severe disease and is transmitted by the hands of the laborers.

Ziekten der Tabak. Een Overzicht van den ziekten en plagen der Deli-Tabak in het jaar 1935. (Tobacco diseases. A survey of the diseases and pests of Deli Tobacco in the year 1935.) Deli Proefst. Sumatra Meded. ser. 2, **93** : 3–11, 1936.

This paper contains several notes on mosaic (''peh sim''), Rotterdam-B, ''gilak,'' ring spot and ''daoon lidah''.

Weimer, J[ames] L[e Roy]

Alfalfa dwarf, a virus disease transmissible by grafting. Journ. Agric. Res. **53**(5) : 333–347, 1936.

The evidence in the paper indicates that this disease is due to a virus which can be transmitted by grafting but not by juice inoculation.

Effect of the dwarf disease on the alfalfa plant. Journ. Agric. Res. **55**(2) : 87–104, 1937.

The possibility of insect transmission of alfalfa dwarf. Phytopathology **27**(6) : 697–702, 1937.

The spread of the disease suggests insect transmission. Plants protected by cages did not contract the disease, while those growing outside did contract it. Several species of insects in cages did not transmit.

Wellington, R[ichard]

Red plants in strawberries. Gard. Chron. **67**(1744) : 269, 1920.

Popular.

Wellman, F. L.

Control of southern celery mosaic in Florida by removing weeds that serve as sources of mosaic infection. U.S.D.A. Tech. Bull. **548**, 16 p., 1937.

A brief but very complete discussion of this disease. A brief history, description, host plants, sources of infection, means of transmission and control.

Wenk, H.

Kartoffelzuchtungsfragen. I. Teils: Standenauslese und Pflanzgubau bei Kartoffeln. (Potato breeding questions. Part I. Hill selection methods and seed production in potatoes.) Prackt. Pflanzenb. **14**(1) : 2–13, 1936.

The spread of virus diseases is believed to be influenced by the weather and varies with the abundance of the vector.

Went, J. C.

The influence of various chemicals on the inactivation of tobacco virus I. Phytopath. Zeitschr. **10**(5) : 480–489, 1937.

Studies were made with copper sulphate mercuric chloride and silver nitrate. The inactivation depends on the dilution of the virus and time of exposure.

Wery, G.

Sur la mosaique, maladie de la canne a sucre. (Mosaic, a disease of the sugar cane.) Compt. Rend. Acad. Agric. France **17** (22) : 739–743, 1931.

West, J.

Leaf curl of tobacco in Southern Nigeria. Trop. Agric. (Trinidad) **13**(9) : 242–244, 1936.

This disease practically ruined the crop of Virginia tobacco in 1923. It is transmitted by *Bemisia* sp.

Wheeler, E. J.

Inoculation of potato seedlings with yellow dwarf virus. Amer. Potato Journ. **13**(8) : 220–222, 1936.

The disease can be transmitted by grafting.

Whipple, Otis C.

Spotted wilt of garden pea. Phytopathology **26**(9) : 918–920, 1936.

This disease was found on *Pisum sativum*. Inoculations into tobacco, tomato, aster, nasturtium, *Nicotiana glutinosa*, *Datura stramonium* and *Emilia saggitata* produced the same symptoms. *Thrips tabaci* proved to be a vector.

White, G. B.

Stigmonose a disease of fruits. Phytopathology **4**: 402, 1914.

White, Philip R.

Survival of isolated tomato roots at suboptimal and supraoptimal temperature. Plant Physiology **12**(3) : 771–776, 1937.

Separation from yeast of materials essential for growth of excised tomato roots. Plant Physiology **12**(3) : 777–791, 1937.

Amino acids in the nutrition of excised tomato roots. Plant Physiology **12**(3) : 793–802, 1937.

Vitamin B_1 in the nutrition of excised tomato roots. Plant Physiology **12**(3) : 803–811, 1937.

All the above have a bearing on the growing of roots for virus.

Whitehead T[atham]

The virus problem in relation to seed potato production in North Wales. Sci. Hort. **5** : 39–46, 1937.

A study of potato production with reference to virus diseases and their transmission by *Myzus persicae*.

Virus diseases of the potato. The carrier problem. Its relation to symtomatology and commercial potato growing. Ann. Appl. Biol. **24**(2) : 323–341, 1937.

A study of carriers and the segregation of viruses.

Wickens, G. M.

A new and serious disease of tobacco in S. Rhodesia. Rhodesia Agric. Journ. **35**(3) : 181–184, 1938.

A preliminary paper on a disease that is transmitted by *Myzus persicae*. It appears to be caused by a virus.

Wilhelm, A. F.

Die Gelbñeckigkeit des Spinats. (Spinach mosaic.) Obst-u Gemü seb. **81** : 56–58, 1935.

Wiles, D. R. D.

Report of Plant Disease Inspector for the year 1930–31. Barbados Dept. Sci. & Agric. Ann. Rpt. **1930–31** : 98–101, 1931.

Contains some data on sugar cane mosaic.

Report of the Plant Disease Inspector. Barbados Agric. Journ. **6**(2) : 83–88, 1937.

A short discussion of sugar cane mosaic disease is included in this paper.

Will, J. McG.

Woodiness in passion vines. Queensland Agric. Journ. **47**(5) : 501–502, 1937.

Williams, P. H.
Some important diseases of glass house plants. Ann. Appl. Biol. **23**(1) : 189–192, 1936.

Winberg, O.
La pomme de terre et sa dégénérescence. (The potato and its degeneration.) Journ. Agric. Pract. n. s. **56**(2) : 396–398, 1931.

Wollner
Ursachen und Verhütung des Kartoffelabbaus. Wochenbl. Landesbaernsch. Hann **89** : 1674, 1936.

Abbau und Herkunftswert bei Pflanzkartoffeln. Mitt. Landwirtsch. **51** : 852–853, 1936.

Wood, E. J. F.
Some anatomical and cytological studies on Fiji disease of sugar cane. Proc. Roy. Soc. Victoria **49**(2) : 308–313, 1937.

Wyckoff, R[alph] W[alter] G[raystone]
Molecular sedimentation constants of tobacco mosaic virus proteins extracted from plants at intervals after inoculations. Journ. Biol. Chem. **112**(1) : 219–224, 1934.

Studies were made on the proteins isolated from tobacco plants which had been inoculated with ordinary mosaic virus for 1, 2, etc. up to 13 weeks.

---, **& Corey, Robert B.**
The ultracentrifugal crystallization of tobacco mosaic. Science **84**(2188) : 513, 1936.

The authors obtained a crystalline virus protein by ultracentrifuging the juice of tobacco plants affected with mosaic disease, which is indistinguishable from that obtained by the chemical methods.

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X-ray diffraction patterns of crystalline tobacco mosaic proteins. Journ. Biol. Chem. **116**(1) : 51–55, 1936.

The authors summarized their work in part as follows: "A series of X-rays powder diffraction photographs has been made of crystalline tobacco mosaic virus proteins . . . . . No difference could be found in the patterns of the proteins of the ordinary and aucuba strains of the disease. Neither was there any alteration in the X-ray photograph after nine successive recrystallizations. Tobacco mosaic virus protein completely inactivated by means of ultraviolet irradiation and subsequent crystallizations gave a photograph having principal diffraction lines that are the same as those of the active protein.

---, **& Stanley, W[endell] M[eredith]**
An ultracentrifugal analysis of the crystalline virus protein isolated from plants diseased with different strains of tobacco mosaic virus. Journ. Biol Chem. **117**(1) : 57–71, 1937.

The conclusion is as follows: "From these observations it is apparent that a crystalline virus protein can be obtained directly by ul-

tracentrifuging the juice of plants affected with the tobacco mosaic disease. The X-ray patterns of this crystalline material and of the protein prepared from the juice by chemical means are indistinguishable; the two substances must therefore, be substantially identical.

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Improvements in the air-driven ultracentrifuge for molecule sedimentation. Rev. Sci. Instruments **8**(3) : 74–77, 1937.

Quantity ultracentrifugation with intense fields. Science **85** (2207) : 390–391, 1937.

A brief discussion of the apparatus and methods used in the concentration of virus.

Méthode pour la préparation des proteines par l'ultracentrifugation. (Method for the preparation of proteins by ultracentrifugation.) Compt. Rend. Soc. Biol. (Paris) **125**(14) : 3–7, 1937.

A description of the methods used in the study of tobacco mosaic virus. The author traces the developments in the study of the tobacco mosaic virus and gives some observations on the virus causing infectious papilloma of the rabbit.

Die Isolierung Hochmolekularer eiweisstoffe mit Ultrazentriguge. (The isolation of high-molecular proteins with the centrifuge.) Naturwissenschaften **25** : 481–483, 1937.

A review of recent researches.

An ultracentrifugal study of the pH stability of tobacco mosaic virus protein. Journ. Biol. Chem. **122**(1) : 239–247, 1937.

The author summarizes the results of his work as follows: "An ultracentrifugal study has been made of the molecular stability of the tobacco mosaic virus protein in solutions at a series of pH value between 1.5 and 11. On the alkaline side of the isoelectric point the molecules of the protein remain unchanged for at least two months at pH up to 8. Decomposition has occurred at pH 9; it is more rapid as the pH is raised and is practically instantaneous at pH 11. The split-products are smaller in the more alkaline solutions. On the acid side molecular changes begin between pH 1.8 and 1.5; at pH 1.5 destruction is complete within a few hours.

The three virus protein samples used in these experiments were isolated by quantity ultracentrifugation and gave sharply sedimenting boundaries. One was double boundaried; the other two contained only one molecular component. Differences between these proteins were observed at pH values near the isoelectric point.

In so far as different experimental conditions permit comparisons to be made, the effect of pH on infectivity and molecular stability are parallel. This agrees with the assumption that infectivity is a property of the protein molecules.

The ultracentrifugal purification and study of macromolecular proteins. Science **86**(2222) : 92–95, 1937.

The ultracentrifuge gives us a better method of studying viruses than the salting out method. The author discusses this method and its relation to the study of viruses.

The ultracentrifugal study of virus proteins. Amer. Phil. Soc. Proc. **77**(4) : 455–462, 1937.

"An air ultracentrifuge has been developed which is giving twofold help in the study of viruses. (1) Analytical runs with it, besides furnishing a measure of the size of the virus molecules, can tell whether a preparation is pure and what may be the molecular weight of its impurities, whether a virus consists of one molecular species or a family of related proteins, etc. (2) Runs in which large volumes are ultracentrifuges in fields sufficiently great to sediment any of the known viruses provide the basis for a method of preparing pure virus proteins without having recourse to chemical treatment. This method opens up the way to the study of viruses which, unlike that of the tobacco-mosaic disease, are relatively unstable or present in only small amounts."

Youden, W. J.

Use of incomplete block replications in estimating tobacco-mosaic virus. Contr. Boyce Thompson Inst. **9**(1) : 41–48, 1937.

A modification of the incomplete block described by Yates has been devised, the configuration of which permits the construction of complete blocks of replicates without sacrificing the advantage of the incomplete blocks. The design has been used in studies of the infectivity of solutions of crystalline tobacco-mosaic virus on *Nicotiana glutinosa* plants. The requisite computations for the application of the analysis of variance of the data are given.

Dilution curve of tobacco mosaic virus. Contr. Boyce Thompson Inst. **9**(1) : 49–58, 1937.

Data for 20 dilution series of tobacco-mosaic virus are given and show that in the neighborhood of 0.1 mg. of virus protein per cc. the virus solutions may be diluted without a corresponding decrease in lesions produced on the leaves of *Nicotiana glutinosa*. There is considerable evidence that there may be an increase in infectivity after moderate dilution. This was found to hold for two different sources. The method of complete blocks made possible the comparison of solutions that differed but little in concentration since consistent dilution curves were obtained with only nine *N. glutinosa* plants using an arithmetical series of dilutions in place of the more common logarithmic series.

Zaleski, K., & Tychanicz, M.
Boklerie wewnetrzne ziemniaka i ich stosunek do chorób wirusowych ziemniakow. (The internal bacteria of potatoes and their relation to virus diseases of the potatoes.) Roczm. Nauk. Rolnicz. i Lesn **41**(2) : 392–396, 1937.

Zaumeyer, W[illiam] J., & Wade, B. L.
Pea mosaic and its relation to other legume mosaic virus. Journ. Agric. Res. **53**(3) : 161–185, 1936.
Cross inoculation studies show that this virus attacks *Trifolium pratense, T. repens, T. hybridum* and *Melilotus alba.* The disease is most severe at the margin of the fields which indicates transmission from other hosts. It is believed that the pea and red clover viruses are identical. Studies were made on the influence of environmental conditions and on susceptible and resistant varieties.

Pea streak and its relationship to strains of alfalfa mosaic. Phytopathology (Abstract) **27**(2) : 144, 1937.
The author describes three strains of the virus.

---., **& Wade, B. L.**
Varietal reaction of pea to pea-streak virus 1. Phytopathology **27**(10) : 1009–1013, 1937.
Forty-seven varieties were tested and found to be susceptible. The work was conducted in a greenhouse and over a period of two years.

Zeller, Samford M[yron], & Slate, G. L.
Occurrence of English mosaic on red raspberry in Oregon. U.S.D.A. Plant Disease Rept. **20** : 123–125, 1936.

Dwarf disease of the loganberry. Better Fruit **32**(8) : 18, 1938.
Popular.

Zundel, G[eorge] L[orenzo Ingram]
Yellows on various plants. U.S.D.A. Plant Disease Rept. **13**: 174, 1929.

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