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## Report for 1931

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## General

### Rothamsted Research

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*S. nodiflorum*, *S. lycopersicum*, *Nicotiana tabacum* and *Hyoscyamus niger*.

Soon after infection the rate of streaming of the cytoplasm is increased, then minute particles of protein appear in the cytoplasm, which carries them passively about the cell. These particles aggregate and fuse to form large masses which are still carried passively but more slowly about the cell. These fuse until all the protein material is contained in one or occasionally more granular masses. In the three *Solanum* species examined this mass becomes rounded, and it may lose its granular appearance and become vacuolated. In *N. tabacum* the body does not always round off and in *H. niger* it very seldom does so, but remains as an irregularly shaped granular mass which may, however, become vacuolate.

There is no evidence at any time of autonomous movement, the particles and the fully formed body being carried, as are the cell nucleus, mitochondria, etc., of the normal plant, in the cytoplasmic stream.

After the spherical body is formed a spike-like crystal appears in the cell.

The cell remains at rest for the space of several weeks. Often the rounded inclusion body and the nucleus are juxtaposed, but there is no special significance in this, it is merely the accidental result of the mode of formation of the body. Particles tend to accumulate where a number of strands of plasma meet; usually several strands converge on the nucleus.

Ultimately the body breaks down, giving a number of protein crystals. After some months these dissolve. In *H. niger* the inclusion bodies are confined to the chlorotic areas, where they are abundant in all tissues. In the other species studied they are distributed over green and yellow tissues. They are very abundant in the hairs, less so in the epidermis, and very rare in the palisade and spongy tissues. In *H. niger* the development of the palisade tissue is arrested, in the other species the development is not so obviously affected, although growth is retarded.

These inclusions appear not to be organismal in nature; they seem to be products of reaction of the host cell to the virus, but they may contain the etiological agent of the disease.

## TECHNICAL AND OTHER PAPERS

### GENERAL

- LXIII. G. W. SCOTT BLAIR AND R. K. SCHOFIELD. "On the Anomalous Flow of a Strong Solution of Lithium Chloride through Narrow Glass Tubes." *Philosophical Magazine*, 1931, Vol. XI, pp. 890-896.

In connection with plastometric measurements of clay pastes the behaviour of non-colloidal solutions was investigated in the plastometer. A strong solution of lithium chloride was found not to obey Poiseuille's law for the flow of viscous liquids through glass capillary tubes. It seems that small strains are not immediately dissipated during flow, possibly owing to the tendency of the ions to maintain a non-random distribution. In addition, evidence was



found of anomalous flow close to the tube-wall, which has hitherto been found only with suspensions. This phenomenon was unexpected and no explanation can be given at present.

Mixtures of glycerine and water behave normally, showing that the anomalies observed with lithium chloride solutions are not due to defects in experimental methods.

- LXIV. HUGH NICOL. "*Ueber ein ungewöhnliches Beispiel regionaler Sedimentation.*" *Kolloid-Zeitschrift*, 1932, Vol. LVIII, pp. 302-305.

A suspension of cellulose is described, which shews two kinds of regional sedimentation (producing visible layers in the liquid). One of these kinds is discussed at length, and a theory of the mode of its formation and persistence is put forward. It is supposed that the formation of the layers of cellulose is not due to temperature gradients in the liquid, but to small differences of specific gravity of the particles induced by a general cooling of the suspension.

- LXV. R. H. STOUGHTON. "*An Improved Method of Maintaining Constant Humidity in Closed Chambers.*" *Journal of Scientific Instruments*, 1931, Vol. VIII, pp. 164-166.

An account of a device used for controlling the humidity within plant chambers. The apparatus depends for its action on the controlled vapourisation of water from wet muslin, the humidified air being carried into the chamber by a rapid air stream.

- LXVI. E. J. RUSSELL. "*The Feeding of Britain.*" *School Nature Study*, 1931, Vol. XXVI, pp. 29-33.

- LXVII. E. J. RUSSELL. "*Can Farming be Made to Pay?*" *Country Life*, 1931, Vol. LXX, pp. 63-64.

- LXVIII. E. J. RUSSELL. "*Agricultural Development of the Empire.*" *Science Progress*, 1931, Vol. XXV, pp. 87-108.

- LXIX. E. J. RUSSELL. "*Science and Crop Production, 1930.*" *National Farmers' Union Year Book*, 1931, p. 89.

- LXX. E. J. RUSSELL. "*Communism on the Land in New Russia.*" Faber and Faber, 1931.

- LXXI. H. G. MILLER. "*Problems of Sheep Farming.*" *Journal of the Farmers' Club*, 1931, pp. 106-117.

- LXXII. W. B. BRIERLEY. "*The Training of Botanists for Economic and Industrial Positions.*" *British Association, Report of the Centenary Meeting*, 1931, p. 134.

#### CROPS, SOILS AND FERTILISERS

- LXXIII. E. J. RUSSELL. "*Soils and Fertilisers.*" *Agricultural Research in 1930*. Royal Agricultural Society of England, 1931, pp. 138-178.

- LXXIV. E. J. RUSSELL. "*Lower Live-Stock Costs with Fertilisers.*" *Farmer and Stockbreeder*, 1931, Vol. XLV, p. 281.