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## Report for 1933

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## General

### Rothamsted Research

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## TECHNICAL AND OTHER PAPERS

### GENERAL

- LIII. E. J. RUSSELL. "Recent Changes in the Sources of our Food Supply." *Geography*, 1933, Vol. XVIII, pp. 91-101.
- LIV. E. J. RUSSELL. "Books and the Farmer." Association of Special Libraries and Information Bureaux, Tenth Annual Conference, Bristol, September, 1933.
- LV. E. J. RUSSELL. "La Transition d'un Art à une Science: Empirisme et Recherche Scientifique en Agriculture." "Scientia," September, 1933, pp. 191-197.
- LVI. E. J. RUSSELL. "The Changing Countryside: How can we Train the Children for it?" Address delivered to the Ordinary Annual Meeting of the University Court of Wales at Denbigh, December 14th, 1933.
- LVII. R. K. SCHOFIELD. "Simple Derivations of Some Important Relationships in Capillary Flow." *Physics*, 1933, Vol. IV, pp. 122-128.

Use is made of geometrical constructions to demonstrate the conditions under which a plot of  $V/\pi R^3$  against  $\frac{1}{2}pR$  gives a unique curve independent of the value of  $R$ , and also to show how account can be taken of discrepancies due to modified flow near the wall of the tube. In a similar way, the reasoning from which the velocity gradient  $G_w$  at the wall of the tube can be deduced from experimental figures for  $V$ ,  $p$  and  $R$  has been set out in a geometrical form, which should be helpful to those to whom a pictorial representation makes a ready appeal. The deductions, though simple, involve no loss of generality. The data of Farrow, Lowe and Neale for two per cent. starch paste are considered by way of example, and it is shown that their form,

$$G_w = (V/\pi R^3) (N+3) \text{ where } N = d(\log V)/d(\log p)$$

of the equation for the velocity gradient at the wall has special advantages. Later work, by disclosing a wider basis, has shown that  $N$  need not be constant, as they supposed, and also that, where modified flow occurs near the wall of the tube,  $V/\pi R^3$  becomes  $V_{\beta}/\pi R^3$ , the limiting value for large radii.

- LVIII. G. W. SCOTT BLAIR. "On the Nature of 'Yield-Value.'" *Physics*, 1933, Vol. IV, pp. 113-118.

The problem of the flow of materials at stresses far below their normal yield-values is discussed, and it is pointed out that the sharpness with which yield-values can be measured depends on the grouping of the relaxation times for the different strains set up within the material, an uneven distribution making for a sharper definition. Any sharp and drastic change in the relaxation time of the system as a whole may justifiably be said to constitute a yield-value, the question as to which of these points is actually taken as the yield-value depending on the conditions of the experiment. These con-

siderations are reinforced by a discussion of the results (to date) of certain experiments on flour doughs, and it is claimed that flour dough is a peculiarly suitable material for such investigations. A new rapid method for studying flow in flour doughs, recently described in the literature, is discussed. The dangers of classifying materials in hard-and-fast rheological divisions is emphasised, while it is pointed out that for practical purposes, and given adequate safeguards, such classifications may be extremely useful.

LIX. R. K. SCHOFIELD. "*Capacitance Hygroscopy and Some of its Applications.*" *Nature*, 1933, Vol. CXXXI, p. 96.

LX. HUGH NICOL AND F. M. L. SHEFFIELD. "*Applications of Photography to Agricultural Research.*" *The Photographic Journal*, 1933, Vol. LVII, pp. 27-35.

Report of lecture given before the Royal Photographic Society on January 17th, 1933.

#### CROPS, SOILS AND FERTILISERS.

LXI. H. G. THORNTON AND HUGH NICOL. "*The Culture of Lucerne in Great Britain.*" *Journal of the Royal Agricultural Society of England*, 1932, Vol. XCIII, pp. 1-20.

LXII. A. G. NORMAN. "*Some Aspects of the Chemistry of the Plant Cell-Wall.*" *Science Progress*, 1933, Vol. XXVIII, pp. 229-245.

LXIII. R. A. FISHER AND F. YATES. "*Wheat Precision Observations.*" *Journal of the Ministry of Agriculture*, 1933, Vol. XXXIX, No. 12, pp. 1082-4; Vol. XL, No. 3, pp. 206-8; No. 7, pp. 591-3; No. 10, pp. 903-6.

These four reports contain summaries of the observations carried out on the growth of the wheat plant under the supervision of the Agricultural Meteorological Committee, acting for the Ministry of Agriculture and Fisheries, the Department of Agriculture for Scotland, and the Meteorological Office. The observations are taken by sampling methods, and last year were carried out at eight centres. They are designed to determine the principal events which mark the progress of the wheat plant from germination to maturity so that the effect of weather conditions, in combination with varying soil types, can be studied.

LXIV. H. C. LONG. "*Suppression of Weeds by Fertilisers and Chemicals.*" (Sections 4, 7, 8, 10 and 11, prepared by W. E. Brenchley). Published by H. C. Long, "The Birkins," Orchard Road, Hook, Surbiton, Surrey. 1934.

LXV. E. J. RUSSELL. "*Soils and Manures. The Farmers' Guide to Agricultural Research in 1932.*" *Royal Agricultural Society of England*, 1933, pp. 199-236.

LXVI. E. M. CROWTHER. "*Soils and Fertilisers.*" *Reports of the Progress of Applied Chemistry*, 1932, Vol. XVII, pp. 447-477.