

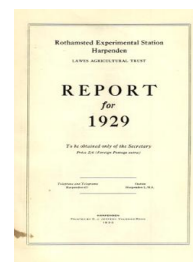
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## Report for 1929

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## The Soil

### Rothamsted Research

Rothamsted Research (1930) *The Soil* ; Report For 1929, pp 58 - 58 - DOI:  
<https://doi.org/10.23637/ERADOC-1-111>

## THE SOIL.

(Chemical and Physical Departments.)

### (a) PHYSICAL PROPERTIES.

- XVI. B. A. KEEN AND G. W. SCOTT BLAIR. "*Plastometric Studies of Soil and Clay Pastes.*" *Journal of Agricultural Science*, 1929. Vol. XIX, pp. 684-700.

The laboratory study of the physical properties of soil and clays can conveniently be divided into three stages: (a) moisture content comparable to that under field conditions; (b) thick pastes; (c) weak suspensions. This paper deals with the results of work on the intermediate or thick paste stage. The experimental method has already been described (Paper XLI, Report 1927-28, p. 70). Certain constants defining the material can be obtained from the experimental data. The two of immediate interest are the pseudo-viscosity (analogous to the viscosity of true fluids) and the static rigidity, which measures the energy required just to cause the paste to flow. The latter is a measure of the solid cohesive properties of the system and is found to be related to other physical measurements made under very different conditions; examples of such measurements are (i) the resistance of soil to the passage of cultivation implements (Paper XXXI, Report 1925-26, p. 66); (ii) the effect of chalk on soil resistance; and (iii) the moisture content at which a well-kneaded mass of soil is about to become sticky (Paper XXXV, Report 1927-28, p. 66).

### (b) PHYSICAL CHEMISTRY.

- XVII. E. M. CROWTHER AND J. K. BASU. "*Note on a Simple Two-Compartment Electrodialysis Cell for the Determination of Exchangeable Bases.*" *Transactions of the Second Commission of International Society of Soil Science*, Budapest, 1929. Part A, pp. 100-102.

Bradfield's two-compartment cell for the determination of exchangeable bases has been modified to enable the bases to be obtained in a smaller volume of solution. The soil is placed on the bottom of a wide Alundum thimble resting on a perforated nickel kathode, and the anode is a perforated platinum disc close to the surface of the soil. With this arrangement, the whole of the soil, but none of the uncovered membrane, lies immediately between the electrodes. The ratio of endosmotic flow to ionic transport is reduced to a minimum.

- XVIII. S. G. HEINTZE AND E. M. CROWTHER. "*An Error in Soil Reaction Determination by the Quinhydrone Method.*" *Transactions of the Second Commission of International Society of Soil Science*, Budapest, 1929. Part A, pp. 102-111.

In several series of soils from West Africa, Siam and England, the pH values obtained by the quinhydrone electrode occasionally exceeded those by the hydrogen electrode by more than 1.0. Such erratic soils could be detected by the fact that in potassium chloride suspension the soil paste gave a higher pH value than the clear supernatant liquid when both were measured by quinhydrone. The reduction in acidity is clearly shown when quinhydrone is added to a mixture of an erratic soil with an indicator solution. It is