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ROTHAMSTED RESEARCH

Rothamsted Report for 1966

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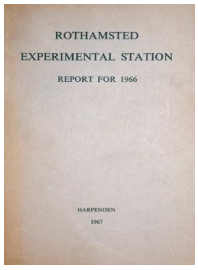

Soil Survey of England and Wales

K. E. Clare

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SOIL SURVEY OF ENGLAND AND WALES

K. E. CLARE

D. A. Osmond retired on 31 March after 4 years as Head of the Survey and 41 years devoted to the study of soil and the problems of soil mapping. His conscientious and able service did much to establish the Survey, and his friendly and helpful approach are greatly missed by his colleagues. R. A. Jarvis has taken charge at the Leeds centre in succession to the late A. Crompton. W. M. Corbett returned from two years secondment to Eastern Nigeria and is setting up a subsidiary centre at Norwich. R. G. Sturdy and H. George were appointed. A regional organisation for the Survey was introduced.

London University conferred an M.Sc. degree, with distinction, on C. C. Rudeforth for work on the soils of mid-Wales. B. Clayden attended a conference on Mediterranean soils in Madrid.

The biennial Field Meeting was held in Ayrshire, during which the soils of south-west Scotland were inspected and discussed in relation to similar soils in England.

Four Memoirs were published to accompany 3rd Edition Sheets 188 (Cambridge), 125 (Derby), 166 (Church Stretton) and 75 (Preston). Coloured soil maps for the Preston district of Lancashire (3rd Edn. Sheet 75) and for Romney Marsh (1 : 25,000) were published. An outline Land Capability map of the Church Stretton district of Shropshire (Sheet 166) was printed and included in the Memoir. This is an innovation which it is hoped will be of particular interest to planning authorities. In addition, a reconnaissance soil map on O.S. Seventh Series Sheet 147 (Bedford and Luton, 1 : 63,360) was produced in black and white.

In the Cartographic Section work continues on six 3rd Edition Sheets and eight maps at scales other than 1 : 63,360. The Memoir to accompany 3rd Edition Sheets 74 (Southport) and 83 (Formby), and Bulletin No. 3 *The Soils of the West Sussex Coastal Plain* have gone to press. The Analytical Section made routine analyses of over 1,000 samples, including many for the Land Resources Division of the Directorate of Overseas Surveys.

Members of the staff gave numerous lectures, arranged demonstrations and exhibits, and reported on the soils of more than 60 sites of field experiments for the National Agricultural Advisory Service, Broom's Barn Experimental Station, the National Institute of Agricultural Engineering and the National Institute of Agricultural Botany. Information and advice was also given to Universities, other educational establishments and individual students, the Agricultural Land Service, the Ancient Monuments Laboratory (Ministry of Public Buildings and Works), the Drainage and Water Supply Division (Ministry of Agriculture, Fisheries and Food), County Planning Departments, the National Coal Board's Opencast Division and the Forestry Commission.

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The aim of the Soil Surveys of England and Wales and of Scotland is to describe, classify and prepare maps of the distribution of the soils of Great Britain. From auger borings and from the profile, as exposed in faces of pits dug to a depth of about 3 ft, observations are made of such properties as the colour, texture, structure and consistence of soil, and the kind and distribution of roots and organic matter of each distinguishable soil horizon. Information is also collected about the environment and the use made of the land. Soil samples are taken for analysis to confirm and give precision to the field observations, and to provide further information useful in characterising soil and considering its origin. The properties of the soils delimited are described in a memoir which, together with the soil map, provides an account of the geography, geology, climate, vegetation and agriculture of the district surveyed.

Northern England

Revision of the north-western part of Sheet 19 (Hexham) is nearly complete though an outbreak of foot-and-mouth disease interrupted mapping for some time. The relationship of certain soils to base levels on Sheet 14 (Morpeth) is now well established and is a useful factor in determining the distribution of till and associated soils. (Ashley)

A further 20 sq miles on Sheet 63 (York) were surveyed in the Vale of York between Wigginton and Stillington and in the Howardian Hills, mainly in Westow and Birdsall. In the former area the soils associated with the superficial deposits are similar to those near York. Patches of green Keuper Marl, which occur in an arcuate belt to the south of Stillington, carry soils of the Hurcot series. The range of soils in Westow and Birdsall associated with the Jurassic Estuarine Beds resembles that around Bulmer described in last year's report. Although most of the soils on the Calcareous Grit outcrop are non-calcareous, small areas on the steepest slopes are occupied by rendzinas. Sandy soils on the soft white Kellaways Rock are mostly well drained and contain less than 1% iron; like the Naburn soil on post-glacial sands, they are liable to blow. Further soil profiles on Sheet 70 (Leeds) were described and sampled to characterise soil series that have been redefined. (Matthews)

Mapping of Sheet 66 (Blackpool) started, and about 18 sq miles were covered. It has not been necessary to establish any new series. (Hall)

East Midlands

A further 63 sq miles were surveyed at a scale of 1 : 25,000 on Sheet 142 (Melton Mowbray), which is nearly complete. Progress was rapid in areas dominated by Chalky Boulder Clay, where the mapping units are now all established, but slower in the western part, including Gotham Moor (an alluvial complex) and areas of drift overlying Rhaetic Beds and Keuper Marl. (Thomasson, Robson and Johnson)

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East Anglia

A draft 1 : 63,360 map of Sheet 173 (Ely) showed a need for resurvey in some areas, and about 30 sq miles were covered. The "roddon" pattern was delimited north-west of Littleport, and depth-of-peat boundaries and complexes dominated by soils of the Isleham series were resurveyed in Feltwell Fens. About 25 sq miles were photographed from the air during March, and these photographs were used in mapping the latter area.

Chalky Boulder Clay covers about 110 sq miles on Sheet 187 (Huntingdon), where a reconnaissance is proceeding. Over the greater part, Hanslope soils occupy the plateau and upper slopes, with shallow variants in valleys. A brown-earth soil occurs in re-entrants and alluvial gley soils along streams. In deeper valleys with more incised streams Stretham soils occur on valley-side spurs. (Hodge and Seale)

South-east England

The general survey of Buckinghamshire to produce a soil association map at a scale of 1 : 250,000 continued. Traverses were made across selected landscapes west and north of Aylesbury, covering some 120 sq miles, examining soil, geology and relief. In the north-east of the county similar work was followed by the more detailed mapping of 8 sq miles west of Linslade. Recently the survey extended on to the sequence of Thames terraces north of Slough.

Aerial photograph interpretation is being used to supplement field examination in drawing boundaries. Data are also recorded from temporary sections exhibited in ditches, building foundations and pipe-line trenches, and elsewhere the Proline mechanical sampler was used. (Mackney and Sturdy)

A further 30 sq miles were surveyed at a scale of 1 : 25,000 in the north-west and south-west parts of Sheet 253 (Abingdon). West of Abingdon soils are chiefly coarse to medium-textured brown earths and brown calcareous soils associated with Corallian rocks, whereas in the south-west to the north of Ashbury many soils are gleyed on Gault and Kimmeridge clays and associated drift from the Chalk escarpment. (M. G. Jarvis)

General reconnaissance and pilot detailed surveys were undertaken on Sheet 288 (Maidstone). (Green)

South-west England

Surveying continued at a scale of 1 : 25,000 on Sheet 251 (Malmesbury) over soils on Lower Palaeozoic and Old Red Sandstone rocks in the north-east and Jurassic rocks in the south-east. The Lower Palaeozoic outcrop is structurally complex and includes several minor formations which have been grouped together when developing mapping units. The soils on Lower Old Red Sandstone rocks resemble those on similar parent materials in south Shropshire and Herefordshire, whereas on the Upper Old Red Sandstone soils are sandier and more stony. On Forest Marble clay a mapping unit of poorly drained soils was distinguished, and soils on

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interbedded limestones or thin Cornbrash were separated from better-drained brashy soils on thicker shelly limestone. (Findlay and Tomlinson)

Mapping of Sheet 325 (Exeter) was completed by the survey of three small areas covering 20 sq miles and the resurveying of 6 sq miles around Ashclyst Forest. Work was resumed on Sheet 329 (Teignmouth) with the survey of 12 sq miles around Exmouth and Budleigh Salterton, east of the Exe estuary, where marls, pebble beds and sandstones extend south from the Exeter sheet. Mapping is in progress of soils associated with calcareous breccia-conglomerates between the Teign estuary and Torquay. (Clayden and Harrod)

West Midlands

Surveying continued on Sheet 181 (Ludlow), and a further 46 sq miles were mapped largely to the west in the parishes of Leintwardine, Wigmore, Aymestrey, Shobdon and Kingsland; no new mapping units were required. (Hodgson and Maclean)

Wales

The mapping of Sheet 233 (Monmouth) was almost completed by a reconnaissance survey of 40 sq miles of the Forest of Dean. (Crampton)

Intensive sampling was carried out in the western part of Sheet 228 (Haverfordwest). (Rudeforth)

Laboratory investigations

1. In collaboration with the Pedology Department, work started to develop X-ray and chemical techniques, satisfactory in precision and economy of effort, to determine the mineralogy of clays encountered in survey work. The first stage, an examination of clays with a wide range of composition, extracted from some 20 soils, was completed. (Avery, Pettersson and Pritchard)

2. The heavy mineralogy of the fine-sand and stone fractions, and the particle-size distribution and cation-exchange capacity of 30 samples from three Anglesey drift-derived soils, suggested that the stones are an unreliable guide to the parent material of the soil as a whole. (Pettersson)

3. The suitability of $M/10$-potassium pyrophosphate solution for extracting amorphous iron oxides and organic matter from soil was studied. Preliminary results indicate that the amounts of iron and carbon extracted from soil horizons characteristic of particular major groups show distinctive patterns, independent of the residual dithionite-soluble iron. This reagent may therefore be of use in establishing intrinsic criteria for classifying soil horizons and measuring differences between soils of some hitherto ill-defined groups allied to podzols. (Bascomb)

4. Work began on how sesquioxides and organic matter influence the form in which natural phosphates occur in soils. (Maclean and Bascomb)

5. The reaction between xylenol orange and aluminium provides a simple colorimetric method for determining this element. Recent work

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showed that this reaction can be successfully used in the presence of large quantities of iron. (Pritchard)

Other work

1. Work continues to develop a comprehensive system of soil classification for Great Britain. A draft scheme was prepared and discussed with senior surveyors of both English and Scottish Surveys. (Avery and J. W. Muir, Soil Survey of Scotland)

2. Work began on the development of a land capability classification for Britain. (Mackney and J. S. Bibby, Soil Survey of Scotland)

3. Reconnaissance surveys were made of areas between Plymouth and Salcombe for the N.A.A.S. and around Barnstaple and between Tiverton, Cullompton and Uffculme for the Devon County Planning Department. (Clayden and Harrod)

4. Two reconnaissance surveys in Dorset were made for the Agricultural Land Service. (Findlay and Tomlinson)

5. Reconnaissance soil maps were prepared for the Brecon Beacons National Park and the Forest of Dean Conservancy. (Crampton)

6. A detailed soil survey was made of the Dorset Farm Institute at Kingston. (Findlay and Tomlinson)

7. A detailed survey was made of the 500-acre farm at Holme Lacy, for the Herefordshire School of Agriculture. Soils of the Bromyard and Eardiston series are represented, together with smaller areas on terrace gravels and alluvium in the Wye Valley. A detailed survey of an additional 125 acres of the Royal Agricultural Society's site at Stoneleigh Park in Warwickshire has been carried out. (Hodgson and Maclean)

8. Frongoch Farm, Aberystwyth, was surveyed for the University of Wales. (Rudeforth)

9. The Experimental Horticultural Station at Cleppa Park, Newport, was resurveyed to establish the pattern of changes in drainage that have occurred in some soils. (Crampton)

10. The influence of soil type on the incidence of *Ophiobolus graminis* (take-all) is being studied in collaboration with the Plant Pathology Department of the N.A.A.S. at Newcastle. (Ashley)

11. Soils developed on Coal Measures formations in County Limerick and Glamorgan were compared, in collaboration with the National Soil Survey of Ireland. (Crampton and F. T. Finch, National Soil Survey of Ireland)

12. The soils of 35 farms in the East Midlands were examined to assess the percentage distribution of light, medium and heavy land, to assist the N.A.A.S. in their studies of machinery use and requirements on arable farms. (Thomasson, Robson and Johnson)

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