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Report for 1955

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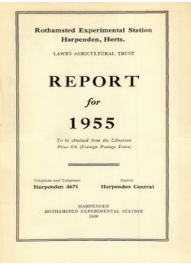
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Soil Survey of England and Wales

D. A. Osmond

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SOIL SURVEY OF ENGLAND AND WALES

D. A. Osmond

The Soil Survey has sustained the loss of two members of the staff. Early in the year C. J. Tapp died, who, although one of the less experienced members, had shown considerable promise, being a conscientious worker and a cheerful companion. Somewhat later, E. Crompton resigned to take up a post in the University of Durham at King's College, Newcastle-upon-Tyne. He was one of the most experienced surveyors and had contributed much to the development of the Survey and its application to practical problems. A new centre has been started at Newcastle, and four new surveyors have been recruited and posted to various stations.

A. Muir represented the Agricultural Research Council on a British Delegation to Russia, and L. F. Curtis has returned from Iraq to be stationed in Derbyshire. A. Thomasson has been granted leave to assist in the completion of the Iraq survey started by L. F. Curtis. J. Harrop has also been granted leave to take part in a scientific and mountaineering expedition in the Himalayas. The Colonial Pool of Soil Surveyors has been increased to six members, two of whom are training with the Soil Survey of England and Wales. A. O. Ballantyne is making good progress in the area he is surveying in Northern Rhodesia, and G. F. M. Murdoch has started surveying in Swaziland. C. A. H. Hodge completed the work started last year in Aden and has now gone to Somaliland for a short period. Several members of the National Agricultural Advisory Service spent considerable periods with members of the Soil Survey in the field. During the year C. D. Ollier (Colonial Office Student) and G. Higgins (N. Nigeria) received training in survey techniques. Professor B. Vovk (Yugoslavia) and Professor W. Kubiena as well as other visitors spent varying periods with the surveyors seeing the work being done.

In spite of the long, dry summer and the necessity for checking and revising parts of completed sheets, the survey's progress has been maintained and an additional 270 sq. miles have been surveyed. Mapping has been completed on Sheets 75 (Preston), 188 (Cambridge) and 238 (Aylesbury). Surveys have been started on Sheets 94 (Llandudno), 106 (Bangor) and 176 (Ely), while work has continued on Sheets 280 (Wells), 166 (Church Stretton) and 305 (Folkestone).

Mr. E. Roberts, of the National Agricultural Advisory Service, who, with the late D. O. Hughes, surveyed a large part of Anglesey, has written a memoir on the county's soils and agriculture to accompany the soil map which will be published on Sheet 106 of the New Popular Edition. He has also undertaken to write a similar memoir of the Lleyn peninsula which will be published on Sheet 115 (Pwllheli) of the same edition. Another memoir "The Soils of the Glastonbury District of Somerset (Sheet 296)" was published during the year.

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Lancashire

Sheet 75 (Preston)

The small areas of high moorland have been surveyed and some revision has been carried out elsewhere. The mapping of the alluvial deposits in the Ribble and Douglas estuaries revealed a complicated soil pattern of differences in drainage and texture as well as content of calcium carbonate, the latter being probably related to both the depositional patterns and changes in relative levels of land and sea. The detailed mapping of this sheet has revealed a complex soil pattern which is almost impossible to reproduce on a 1-inch map and some of the most complicated area will be published at the 2½–inch scale. (A. Crompton, G. D. Ashley, B. R. Hall.)

Somerset

Sheet 280 (Wells)

The illness and subsequent death of one of the surveyors considerably reduced the speed of progress, and field work was primarily directed to completing the mapping on the Old Red Sandstone and Carboniferous Limestone on Mendip, where Black Down is of particular interest in having some of the only remaining natural vegetation in the district. In addition, about 20 sq. miles were surveyed in the coastal area around Highbridge of the adjoining Sheet 279 (Weston-super-Mare), where the Wentlloog series is very extensive. A 2½-inch map of the sheet has been compiled and found of use in demonstrating soil patterns not readily seen on the 6-inch field slips. (C. J. Tapp, D. C. Findlay.)

Shropshire

Sheet 166 (Church Stretton)

Mapping has been confined mainly to the Brown Clee Hills and the Longmynd. On the lower slopes of the former (the Dittonian platform) the most extensive and most important agricultural soils are those of the Bromyard and Eardiston series. The Clee beds give rise to a dull brown sandy loam beneath bracken and poor grasses that provide poor spring grazing for sheep. Above 1,500 feet gley and peaty gley soils appear on Coal Measures shales and sandstones and under sphagnum, rushes and mosses are found completely waterlogged and markedly gleyed soils without any development of peat. The summit is capped with olivine–dolerite, which gives rise to 1–2 inches of a tight bilberry and grass mat overlying 3–4 inches of grey silt loam followed by bright orange-brown silt loam.

The plateau of highly dissected Pre-Cambrian rocks forming the Longmynd is covered with heather with subordinate bilberry, while the valley sides are often bracken- and grass-covered, with grasses becoming dominant as the slope increases and the soils become shallower. The soils are peaty-podzols, associated with heather and bilberry, brown earths, some of which show very slight podzolization, which are associated with bracken and subordinate heather and bilberry, and gley soils with mosses, sphagnum and rushes. Shallow soils resembling those of the three groups are also found on the valley slopes.

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The use of aerial photographs has enabled the distribution of vegetation and hence the soils to be more easily mapped on a reconnaissance basis, and has aided in the identification of sites of gley soils. They have also been used to delimit areas of steep slopes. (D. Mackney, G. F. M. Murdoch.)

Cambridgeshire

Sheet 188 (Cambridge)

Owing to the unusually dry weather, the absence of one of the team in Aden and the subsequent time needed for reporting on that work, the rate of progress has been reduced. In addition, the annual Field Meeting was held at this centre, and the work involved in preparing for it left the only surveyor little time for routine surveying. However, some of the earlier work on the sheet was checked and, where necessary, revised in the light of later findings. Thus the sheet has been completed and the writing of the memoir and compilation of the map has been started. A beginning has also been made on the mapping of the adjoining Sheet 176 (Ely). (R. S. Seale, C. A. H. Hodge.)

Hertfordshire and Buckinghamshire

Sheet 238 (Aylesbury)

With the mapping of about 80 sq. miles the survey of the sheet has been completed. On the Chilterns especially, mapping became extremely difficult on account of the dry summer, and attention was given to digging profile pits, forty-four of which were described and sampled for analysis. Several new series have been identified, associated, on the Chilterns, with the so-called " glacial sands and gravels " near Watford, and, in the Vale of Aylesbury, with the clays, glauconite sands and limestones of the Upper Jurassic (Kimmeridgian and Portlandian) formation. (B. W. Avery, D. W. King, A. J. Thomasson.)

Yorkshire

Sheet 70 (Leeds)

Some revision of earlier work has been undertaken, and altogether about 30 sq. miles have been mapped. The remaining area needed for completion of the map consists mainly of two blocks, one east of Leeds along the southern edge of the sheet to Garforth, and the other along the easern edge, south of the Wharfe. No new series have been encountered either on the Magnesian Limestone, the Millstone Grit or Carboniferous sandstones and shales and related tills.

The dry summer emphasized differences between soils, particularly those on the drifts associated with the York and Escrick moraines. As might be anticipated, the sandy soils did not crack noticeably, but loams had cracks up to an inch wide and clay loams up to about 1½ inches, so that this feature became, temporarily, almost diagnostic of the soil series. In an area of silty clays, alluvial in origin, and poorly or very poorly drained, cracks of 2–3 inches wide were seen, particularly in the bottoms of the

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furrows where the land had been ridged. In some places the surface was irregular in a manner suggestive of " self-swallowing " or gilgai phenomena.

In the Eccup and Harewood district some 5 sq. miles were mapped on the 2½-inch scale for comparison with a 6-inch map previously made by another surveyor. The smaller scale allowed over twice the rate of mapping, but accuracy was sacrificed, especially of those boundaries not easily deduced by indirect means, such as a consideration of landform. (A. Crompton, L. F. Curtis.)

Caernarvonshire

Sheet 94 (Llandudno) and 106 (Bangor)

Parts of these sheets had been mapped before and during the war by workers from Bangor, and about 46 sq. miles have been surveyed and checked. In the Creuddyn peninsula, intermingling of material from small outcrops of volcanic rocks and larger areas of Carboniferous Limestone over which is spread a drift of Silurian shale from the landward and of Triassic material from the seaward side, makes the soil pattern very complicated. Two new series have been recognized, but the other soils present have been described on the Rhyl and Denbigh sheets.

In the Conway valley, series previously described on the Silurian shales and associated drifts have been mapped on the extensive alluvium bordering the river. On the west side of the valley the soils are derived from Ordovician rocks, and drift from the acid igneous rocks of Snowdon also begins to affect the soils.

Some time was also spent checking boundaries and sampling profiles described on Sheets 95 (Rhyl) and 107 (Denbigh) the mapping of which was completed last year. (D. F. Ball, J. Harrop.)

Derbyshire

Sheet 125 (Derby)

Owing to previous commitments in other areas, work on the survey of this sheet has been restricted, and mapping has been completed on the 6-inch scale of about 8 sq. miles in the Sandiacre and Little Eaton districts. A preliminary classification has been prepared of the soils developed on the Triassic, Lower Coal Measures and Millstone Grit formations and the associated drifts, but no attempt has been made to name series, except where correlation with previously described series is certain. (J. H. James.)

Kent

Sheet 305 (Folkestone)

Approximately 37 sq. miles have been surveyed, mostly at something less than the normal intensity for 6-inch mapping. In view of the complex and contrasting soil distribution found earlier, the policy has been to obtain a general picture of the extent of the various deposits, to determine the soil units and to map the natural soil patterns.

The surface deposits range in age from 3,000 to 400 years or less, and it has been shown that these exist in at least four distinct

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landscape units, each associated with a particular soil pattern. Some units apparently merge imperceptibly, while others can be sharply delineated. In each unit there are distinct profiles ranging from sandy loams to clay, with important differences between them in carbonate content, structure, salinity and depth to peat or shingle.

Water-table levels for a number of soils are now being measured monthly, but a complete season's records have not yet been obtained. It is expected that the results will throw light on the use that can be made of the different gley-phenomena as indicators of drainage conditions, and they should also give an indication of the right order of water-table levels for optimal performance of pasture on some soils. The only useful statement that can be made at present is that the fluctuation of the water-table this year within some soils has been of the order of 3–4 feet. (R. D. Green.)

Other Work

Following the severe flooding in 1954, when 18 sq. miles of mossland in South-west Lancashire were affected, a request was made for a survey of the area. In all, about 31 sq. miles have been surveyed on a grid-system, with borings made every 400 yards on parallel traverse lines $\frac{1}{3}$ mile apart. The peat deposits stretch from the River Alt in the south to Blowick and Scarisbrick Moss and then reach northwards and eastwards to the vicinity of Tarleton. The main findings can be summarized as follows :

(1) The thickness of the peat varies considerably, ranging from a few inches to 20 feet. The peats have been grouped into four main classes.
(2) The mineral soil beneath the peat has been described, information which will be most useful in future drainage operations.
(3) The mapping and classification of the surface soils will assist in the interpretation of the results obtained from experimental plots which will be laid down to study problems of management, manurial requirements, pest susceptibility, etc.
(4) Areas of mossland reverting to an unproductive state and those which have not been reclaimed will be delimited. (B. R. Hall.)

The problem of restoration of sea-flooded soils on the Lindsey coast has been examined in detail. The presence of three main textural groups has been established, silty fine sands, silt loams and clays, and in each group there has been a marked movement of the clay fraction down, and sometimes out of, the profile. This has resulted in a complete change in the profile, with loss of structure and the development of impermeability. Since the present treatment of the soils with gypsum is inadequate in replacing sodium with calcium in the clay, further experiments are being carried out to find a more effective means of stabilizing and restoring soil structure. (E. Crompton, G. D. Ashley.)

A further survey was made of the natural drainage classes and the variability of the parent materials on a 3,000-acre farm at Apesthorpe for the National Agricultural Advisory Service. Advice

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was also given to the same body on the possibility of drilling for water for irrigation in the Melbourne district in Derbyshire. Some mineralogical work was carried out for the Air Ministry at the request of the East Midland Provincial Director of the National Agricultural Advisory Service.

A number of visits have been paid to ironstone workings to examine the rate of weathering in limestones and, in particular, three sites have been investigated. Detailed studies are being made of the rate and type of weathering in relation to the lithology and size of the limestone blocks. (J. H. James.)

At the request of the Welsh Land Sub-Commission, a survey was made of the parishes of Llangurig, Llanbister and Llanddewi-Brefi, covering about 100 sq. miles in central Wales. The rocks are of Silurian age, dominantly shales and mudstones with locally important grits and sandstones, and previously established series only were required to map the soils developed. Peaty gley and peaty podzolic soils were extensive in Llangurig and Llanddewi-Brefi, but in Llanbister uncultivated land at 1,300–1,400 feet O.D. and more showed no evidence of peat formation or development of podzolized soils. (D. F. Ball, J. F. Harrop.)

The farm at Askham Bryan of the Yorkshire Institute of Agriculture was surveyed at the 6-inch scale. Some of it is situated on a morainic ridge with heavy but gravelly soils and sandy, gravelly soils above spreads of fluvio-glacial sand on the gentle slopes below them. The lower parts of the farm consist of the Wighill and Deighton series, the poor drainage of which has been improved. At the request of the Ministry of Agriculture, Levens Hall Farm, near Harrogate, was surveyed at the 25-inch scale. The soils are developed on Carboniferous till, and are mainly sandy clay loams and clay loams. On the higher ground the soils are freely drained, but in general they are poorly drained. (A. Crompton.)

Various members of the survey have collected properly characterized soil samples for use in antibiotic studies by Imperial Chemical Industries.

At the request of the Road Research Laboratories surveys were made along the proposed routes of the new roads, by-passes and widenings to be undertaken in various parts of the country. Eight reports (one by Oxford University) were submitted and were forwarded to the Ministry of Transport and Civil Aviation.