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SOIL SURVEY OF ENGLAND AND WALES

D. A. OSMOND

Surveys have been started on Sheets 71 (Selby), 220 (Leighton Buzzard), 239 (Hertford) and 269 (Bridgend) and are being continued on several other sheets previously recorded. The field work has been completed on Sheets 70 (Leeds), 279 (Weston-super-Mare) and 280 (Wells), and any necessary revision is being undertaken. An area of more than 300 sq. miles has been surveyed during the year.

The resignations of two members of the staff have been accepted: J. H. James accepted an appointment with the British Plaster Board Company and D. F. Ball has transferred to the Nature Conservancy. One vacancy has been filled by J. M. Hodgson. Of the members of the Colonial Pool of Soil Surveyors, A. O. Ballantyne and G. F. M. Murdoch are still in N. Rhodesia and Swaziland respectively, while J. C. Chisnall is stationed in Sierra Leone and J. Stark in British Guiana. A. J. Thomasson and R. S. Seale returned from survey work in Iraq, and Seale, together with B. Clayden and C. C. Rudeforth, has returned for a further field season. A. Muir and D. A. Osmond attended the first meeting, at Bonn, of the Working Party on Soil Classification and Survey of the Sub-Commission on Land and Water Use of the European Commission on Agriculture of F.A.O. It was agreed to prepare a soil map of Europe at a scale of about 1 : 1,000,000, and a start has been made by collecting data for Great Britain. Previous to the meeting, all the surveyors were asked to collect information to enable a soil map of England and Wales to be drawn at 1 : 1,250,000. Its production entailed making many widespread traverses and interrupted the normal course of the survey. It was exhibited at the meeting and drew many favourable comments.

D. A. Osmond paid a short visit to Malta to inspect the survey made by D. M. Lang. B. W. Avery was invited to attend a meeting of the German Soil Science Society in Berlin and participated in the excursions afterwards.

Fourteen maps are now in preparation for publication. The Anglesey and Pwllheli sheets of the large New Popular Edition are complete, and will be published during 1958. In view of the increasing amount of work, the staff has been augmented and the processes of production have been amended to cope with the increased demands.

NORTHUMBERLAND

Sheet 19 (Hexham)

Owing to other commitments, the area surveyed is somewhat less than usual, but approximately 28 sq. miles have been mapped, including some representative areas that were selected for detailed

surveys at the scale of 6 inches to 1 mile in order to obtain information as to the series present and their variability. The remainder was surveyed on a reconnaissance basis at the scale of $2\frac{1}{2}$ inches to 1 mile.

The districts covered lie to the south of Hexham, and include the parishes of Shaley and East Hexhamshire. The country rocks belong to the Carboniferous system, but as they rarely outcrop, sedentary soils on them are sparsely distributed and are poorly developed. Most of this area is covered by a shallow drift of local origin. The majority of the soils mapped are of the gley soils group and carry a peaty surface soil, which becomes more strongly developed above altitudes of about 900 feet. On the better-drained sites and on coarse-textured parent materials shallow humus and iron-humus podzols are found. (G. D. Ashley and C. C. Rudeforth.)

YORKSHIRE

Sheet 71 (Selby)

The 6-inch mapping has been extended on Sheet 71 (Selby), where a strip of country flanking the Ouse between York and Selby has been surveyed. About 45 sq. miles have been surveyed.

Apart from recent river alluvium, the materials are entirely of glacial and fluvio-glacial origin associated with the York and Escrick moraines. The soils, which have been described previously, are mostly gley soils and brown earths with gleyed B and C horizons, but on the lighter sands, some of which are wind-blown, gley-podzolic soils occur.

In connection with the proposed 1 : 1,000,000 map of England and Wales a rapid survey of the whole county was made which yielded interesting results. It revealed, for example, that on the rocks of the Carboniferous Limestone Series soils derived solely from the limestone are of relatively small extent compared with those on the Yoredale rocks, which are mainly shales and therefore give soils of very different character. (A. Crompton and C. B. Crompton.)

LANCASHIRE

Sheet 83 (Formby)

With the completion of Sheet 74 (Southport) last year, work was started on Sheet 83 (Formby). Since this adjoins previously mapped areas, no new series were required, and approximately 30 sq. miles have been completed. The preparation of maps and a report on the Mosses of South-west Lancashire and requests for information from official bodies which could only be gained by detailed investigation on the ground has occupied a considerable time and reduced the amount of routine mapping. (B. R. Hall.)

DERBYSHIRE

Sheet 125 (Derby)

A further 42 sq. miles have been mapped, which almost completes the survey of soils on Triassic rocks occupying the southern margin of the sheet. The survey of the soils developed over Carboniferous

rocks has been extended to the east bank of the Derwent in the vicinity of Belper. In the Derwent valley alluvial soils have been mapped to the north of Derby.

Two new soil series—Kirk Langley and Risley—have been recorded on Triassic parent materials, and other soils have been correlated with the Dunnington Heath series. The Kirk Langley series, previously described as a silty textured soil of the Worcester series, is characterized by a deep profile of medium texture developed over beds of the Keuper that are transitional in lithology between marl and sandstone; the soil drainage is free to slightly imperfect. The Risley series is a freely drained soil developed on glacial drift of mainly Triassic origin. The profile shows a brown or reddish brown sandy loam to loamy sand overlying a sandy loam or loam containing drift pebbles, mainly of quartz and sandstone. The Dunnington Heath series exhibits a composite parent material profile comprising a layer of glacial drift containing pebbles and generally of sandy loam texture overlying Keuper Marl at a depth seldom exceeding 20 inches; drainage is generally slightly imperfect. (J. P. Watson, J. H. James and E. M. Bridges.)

SHROPSHIRE

Sheet 166 (Church Stretton)

The survey of soils developed on Old Red Sandstone formations has continued, but it has proved necessary to adopt the Tanyard Complex as a mapping unit over a large part of the region. The Bromyard series (marl phase) and Eardiston series (sandstone phase) occur in such intimate relationships, with no topographical features to aid separation, that it is uneconomical of time to elucidate the soil boundaries.

Gleyed and slightly gleyed soils are found north and north-east of Brown Clee Hill on flat sites which represent the summit levels of the Old Red Sandstone platform. The northern and eastern slopes of the upland region rising from the platform are covered with soliflucted and colluviated material derived from the dolerite and Carboniferous rocks capping the Clee Hill, and several new series have been identified.

The geological complexity of the Titterstone Clee region is reflected in the soil variation, and within a small area podzols, brown earths, gleys, peaty gleys and peaty podzols are found.

More than 60 sq. miles have been mapped, on the Clee Hills and the surrounding platform, and a further 4 sq. miles on the drifts of Apedale, where gleyed and slightly gleyed soils predominate. (D. Mackney and C. P. Burnham.)

CAMBRIDGESHIRE

Sheets 188 (Cambridge) and 173 (Ely)

A little mapping was done on Sheet 173 in the neighbourhood of Southery, but most of the time was spent in the preparation of the map and memoir for Sheet 188 (Cambridge). During a joint examination of the completed map with D. A. Osmond, it was

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decided to modify some of the original series in the light and later knowledge of some of the soils with textural B horizons that possibly resemble the *sols lessivés* of the French workers. Unfortunately the necessary revision interrupted the survey of Sheet 173, but the revised map has now been submitted to the cartographer. (C. A. H. Hodge and R. S. Seale.)

OXFORDSHIRE

Sheet 201 (Banbury)

The soil map of the area surveyed between Banbury and Edge Hill has now been prepared at the $2\frac{1}{2}$ -inch scale from the original air photos (scale 1 : 10,000) used in the field. Correlation with the soils mapped on the adjoining Sheet 218 has been good, the actual soil boundaries between the two sheets showing excellent agreement.

Laboratory analysis on soil samples collected during the survey have been completed, and the report is now being written. (R. R. Storrier.)

Sheet 254 (Henley on Thames)

A study of the soils and their relation to landscape form in the Southern Chilterns was begun in October 1956. It has involved a reconnaissance of some 100 sq. miles in South-east Oxfordshire and South-west Buckinghamshire. A detailed survey of 12 sq. miles in a strip from the escarpment at Aston Hill, down the dip-slope to Lane End and thence southward to the Thames at Medmenham included the important landscape features of the larger area. The soils sampled, particularly for mineralogical and micromorphological studies, include representatives of the Winchester and Batcombe series. Preparatory work and detailed mechanical analyses on selected samples have been carried out. (J. Loveday.)

BUCKINGHAMSHIRE AND BEDFORDSHIRE

Sheet 220 (Leighton Buzzard)

Work was begun in the woodlands between the Brickhills and Millbrook, and later in the season was extended to a few of the larger farms. Three soil complexes have been recognized.

The first is dominated largely by sandy brown earths formed on loose sand from the Lower Greensand; the soils are very acid, freely to excessively drained sands to loamy sands occurring principally in the Bow Brickhill-Aspley Heath area, though they also occur about the Millbrook-Steppingley boundary. Appreciable areas of weakly developed humus podzols are found on Aspley Heath.

The soils of the second complex are chiefly formed on a coarse loamy sand to sandy loam, a glacial drift, largely of Lower Greensand Material but containing foreign stones. It has given rise to freely drained, weakly structured, naturally acid, brown earths. These soils are found in the Charle Wood area of Woburn and the smaller woods farther east, but are probably more extensively represented in the arable areas, where their acidity has been corrected to some extent.

The third complex is dominated by heavy soils with slow internal

drainage that are formed on the Chalky-Jurassic Boulder Clay. These soils are related to the Hanslope series of North Buckinghamshire and Cambridgeshire, though they appear to be less calcareous. They have been mapped in Buttermilk Wood, Woburn Park and farther east in Eversholt and Steppingley; small areas, each of less than 3 acres, occur sporadically in the other complexes. (D. W. King.)

HERTFORDSHIRE

Sheet 239 (Hertford)

The survey of this sheet was started this year. The area extends from Watford to Waltham Abbey in the south, and from near Luton to Ware along its northern edge. Rothamsted farm lies along the western boundary of the sheet. The area falls naturally into four main regions. On the Clay-with-flints over Chalk in the north-west the soils are similar to the sequence described on Sheet 238 (Aylesbury) (Report No. 5, H.M.S.O., 1953). To the south-east a broad area of glacial deposits runs diagonally from Watford to Ware at about 250 feet O.D. It is a complex of Boulder Clays and Gravels, mainly decalcified at the western end, but calcareous around Ware. Farther to the south-east are Eocene deposits, mainly London Clay, but the soils are often diversified by thin drifts of Pleistocene age. On the eastern boundary the Lea valley, with a large number of small-holdings given over to glasshouse culture and horticulture, forms a fourth region where the soils are mainly formed on later fluviatile drifts.

In order to elucidate the soil pattern associated with these main divisions, detailed mapping was carried out in three districts, at Hatfield Park, Panshanger Park, near Hertingfordbury, and at Thundridge, near Ware. (A. J. Thomasson.)

GLAMORGAN

Sheet 262 (Bridgend)

Survey was started at several localities in order to define some of the main soil series occurring, and some 10 sq. miles have been mapped, mainly on the Lower Lias formation. Three soils of differing drainage classes have been recognized on clays derived from the shales and limestones. The occurrence of poorly drained soils does not appear to be controlled solely by the relief, since they occur on crests and slopes of smooth ridges as well as on almost level sites. Around St. Athans and Llantwit Major freely drained soils are dominant. Imperfectly drained soils are of sporadic occurrence, but are frequently found around Bonvilston.

No attempt has been made to allocate series names at this stage, but it is evident that while some that have already been used are applicable, others are too widely defined. (D. F. Ball.)

BERKSHIRE

Sheet 268 (Reading)

Mapping on the 6-inch scale has been initiated in this region, 25 sq. miles having been covered to the south-west of Reading and

in the lower Loddon valley. Much of this consists of level areas of alluvium of various ages, and a complicated pattern of soils has emerged in which marked differences in composition and water regime are manifest. Flanking the alluvial flats are gently sloping, low hills consisting of London Clay, the soils of which are in places directly developed from the clay and are accordingly fine textured, water-retentive and difficult to manage. Many of the London Clay slopes, however, possess a covering of sandy or gravelly material consisting of residual Plateau Gravel or Bagshot Beds material or colluvium derived therefrom; they are more easily managed, although lateral seepage of water through the upper part of the profile due to impedance by the clay below may present a problem to the farmer in wet seasons.

Much of the higher ground is capped with Plateau Gravel, often with thin remnants of Bagshot Beds between it and the London Clay. As in the areas of later alluvium, an intricate soil pattern has been revealed, representing in this case a network of ancient filled-up stream channels, bearing no relation to the surface configuration, in which are found soils markedly different from those elsewhere on the plateaux, e.g., deep fine-textured podzolized gleys as compared with podzols on the gravels. (R. A. Jarvis.)

SOMERSET

Sheets 280 (Wells) and 279 (Weston-super-Mare)

With the mapping of some 55 sq. miles, the survey of these sheets is complete, but some revision is necessary, particularly of earlier work on Sheet 280. The north-east corner of Sheet 280 consists of well-dissected country, the highest ground being formed by Lias or Coal Measure sandstones and the lower ground by Coal Measure shales or soft Keuper rocks. Of the latter, red sandstones form a considerable area, and the soil, which is often bright red, contains much fine sand and is very similar to soils that have been described near North Petherton in south Somerset. Brown earths on Coal Measure sandstone and gley soils on the shales were correlated with the Nibley and Coalpit Heath series respectively of south Gloucestershire.

Sheet 279 was completed in two districts. The shallow limestone soils of the western Mendip Hills become increasingly contaminated by blown sand towards the coast, reaching a maximum on Brean Down. Deep sandy soils of the Tickenham series occur on foot-slopes, but their relationship to the Keuper sandstone soils is not clear, for they are not as red and often overlie limestone gravel, but the character and quantity of the sand fraction is very similar. West of the Parret, coastal dunes and shingle are encroaching on the marine alluvium of Steart Point.

Where valleys in the Lias uplands open out to the levels the poorly drained Lias clays grade into Allerton and Wentlloog series. Shales dominate the Lias of this district, so that soils similar to those of the Evesham series are widespread; shallow soils on limestone are rare, and are normally confined to the crests of ridges formed by the outcrops of steeply dipping limestone bands. Remnants of Quantock-derived gravels overlie Lias at about 200 feet

O.D., and at lower levels, particularly around Shurton and Stalford, imperfectly drained, stony, sandy soils are quite extensive on similar gravels. (D. Findlay and B. Clayden.)

KENT

Sheet 305 (Folkestone)

Some time was taken up in the examination of sections exposed during extensive widening operations along several miles of one of the main sewers of Walland Marsh. They furnished further insight into the genesis of the area, and several parts of exceptional interest were described, sampled and photographed. Twenty-two important soils of Romney Marsh were described and sampled.

Surveying was continued in Denge Marsh, and mapping there and in most other outstanding areas of Romney Marsh is now complete.

During the latter part of the season some of the areas which had previously been left on account of crops have been examined, particularly those where more detail is necessary for the preparation of 2½-inch maps. (R. D. Green.)

OTHER WORK

Various glacial drifts entered the area of Sheet 71 (Selby) from several directions, and a mineralogical investigation has been started to determine the relationship between them and the solid rocks on which they rest. (A. Crompton and C. B. Crampton.)

A revision of a soil map of the Experimental Husbandry Farm of the National Agricultural Advisory Service at High Mowthorpe, Yorkshire, has been made in order to provide more detailed information. (A. Crompton and C. B. Crampton.)

Work has been started on a mineralogical study of the parent materials, particularly of those derived from drifts, on Sheet 19 (Hexham) and thin sections of soils are being made for study. (C. C. Rudeforth.)

Co-operation with the National Agricultural Advisory Service has been continued on the problems arising from the sea-flooding in Lincolnshire in 1953 and also on those connected with the restoration of open-cast coal-mining sites. A holding of the Horticultural Land Settlement Association was mapped. (G. D. Ashley.)

At the request of the Ministry of Agriculture, Fisheries and Food, Mossborough Hall Farm, comprising 507 acres, has been mapped at the scale 25 inches to 1 mile. (B. R. Hall.)

One inch to 1 mile texture maps of No. 2 and No. 3 Sub-areas have been compiled at the request of the Merseyside and North Wales Electricity Board. These have been prepared from Geological Survey Drift maps and information gained during reconnaissance soil mapping at the scale 10 miles to 1 inch, of Lancashire, Cheshire and Flintshire. The maps are to be used in connection with future research into earth electrode testing. (B. R. Hall.)

The report and accompanying maps of the Mosses of South-west Lancashire that cover approximately 35,000 acres have been completed, and systematic sampling has been carried out and maps drawn of a proposed drainage scheme for the area. (B. R. Hall.)

Two sites were examined at the request of the Southport Borough Engineer; depths and types of peat were classified and underlying mineral deposits identified. (B. R. Hall.)

A lecture on the Soils of Lancashire was given at the County Agricultural Institute (Hutton), and samples of the main soil types were supplied to the College. (B. R. Hall.)

In collaboration with the Chief Chemist of the East Midland Province, instruction was given to the fieldmen of the Sugar Beet Corporation in the systematic recording of soil profiles in the field. (J. P. Watson and E. M. Bridges.)

The final report on limestone weathering was submitted in connection with investigations on the restoration of open-cast ironstone-mining sites in Lincolnshire. (J. H. James.)

An attempt to correlate soil series and soil fertility was initiated in respect of Derbyshire. (J. P. Watson.)

A survey was made of the National Institute of Agricultural Botany's farm at Lolworth, Cambridgeshire, together with a smaller area adjacent to its headquarters in Cambridge. (C. A. H. Hodge.)

Instruction was given to two members of the Military Engineering Experimental Establishment, Christchurch, in methods of profile description, soil mapping and classification. (R. A. Jarvis.)

Surveys of a number of sites selected for field experiments were examined for the Chemistry Department, Rothamsted Experimental Station. (C. A. H. Hodge, D. W. King, A. J. Thomasson, J. P. Watson and E. M. Bridges.)

A soil map of the Rothamsted Farm was prepared for demonstration purposes. (B. W. Avery.)

The sites of nutritional experiments initiated by E. M. Crowther and Miss B. Benzian in collaboration with the Research Branch of the Forestry Commission have been examined and reports prepared on the site and soil characteristics. (B. W. Avery and D. C. Findlay.)

Advice has been given to the Research Branch of the Forestry Commission on the conduct of soil surveys for use in drawing up working plans for areas scheduled for early replanting. (B. W. Avery.)

B. W. Avery acted as resident tutor in connection with a course on the study of soils in the field, held at the Juniper Hall Field Centre, Dorking.