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D. A. Osmond

D. A. Osmond (1961) *Soil Survey of England and Wales* ; Report For 1960, pp 226 - 233 - DOI: <https://doi.org/10.23637/ERADOC-1-93>

SOIL SURVEY OF ENGLAND AND WALES

D. A. OSMOND

C. W. Montgomery and B. Plummer resigned to take up other positions and C. J. Folland and G. R. Suggett were appointed. R. S. Seale was seconded for survey work in Pakistan, but became ill and was replaced for most of the year by C. C. Rudeforth.

A. Muir visited Teheran for a Seminar on Soil Survey held by the Central Treaty Organisation. D. A. Osmond attended a meeting of the Correlation Committee for the F.A.O. Soil Map of Europe at Ghent and later visited Budapest to discuss the correlation of the legends of the soil maps of West and East Europe. R. A. Jarvis attended a course on the interpretation of aerial photographs at the International Training Centre for Aerial Survey at Delft, The Netherlands. B. W. Avery and D. Mackney attended the VIIth International Congress of Soil Science held at Madison, U.S.A., and participated in the excursions which provided opportunities to compare the chief soil groups with their British analogues and the methods used to maintain their productivity. A. Crompton spent three weeks in Russia visiting research institutes and examining soils comparable with some in England. G. D. Ashley visited the Netherlands in connection with the problem of the sea-flooded soils of the North Lincolnshire coast.

Several courses and numerous lectures were given and many field excursions were arranged; reports on soils and sites were prepared for several official bodies, and assistance was given to many students.

Soil maps and many diagrams and figures were drawn in the Cartographic Section for memoirs, and numerous drawings were prepared for various departments of Rothamsted Experimental Station.

Outbreaks of foot-and-mouth disease and the writing of memoirs interfered with the progress of the survey, but about 1,200 sq. miles were mapped, mainly on a reconnaissance basis.

NORTHUMBERLAND

Sheet 77, 7th series (Hexham)

The presence of glacial drift coming from the north-west into the western part of the sheet complicates the pattern of the distribution of the parent materials. This has necessitated detailed mapping of the series in parts of this district to determine the proportion of each and the distribution pattern. At the same time samples of the basal profile layers at 3 feet were taken at random in the Carboniferous drifts and the reaction determined to see if the drifts derived from the differing geological strata, e.g., Coal Measures, Millstone Grit, Scottish Calciferous Sandstone Series, differ significantly. As a

result, it is possible, for all practical purposes, to ignore this factor and to continue to divide the Carboniferous drift solely on a textural basis.

Close co-operation with the National Agricultural Advisory Service has been maintained, the most important way being the instruction in profile observation and description given to the Soil Chemistry Department and County Horticultural Officers in co-operation with the District Advisory Officers. (Ashley.)

YORKSHIRE

Sheet 71 (Selby)

The survey of this sheet at 1 : 63360 was continued with the mapping of 28 sq. miles, chiefly around Pocklington, Seaton Ross and Melbourne, of soils derived from post-Glacial sands and various calcareous drifts overlying lacustrine clay or Keuper Marl. The writing of the memoir on this and the adjacent Sheet 70 (Leeds) continues, and thin sections and mechanical analyses were made during a study of the pedology of soils derived from post-Glacial sands.

Investigations of the soils associated with the Chalk of the Yorkshire Wolds suggest that a substantial part of the soil material is derived from sources other than Chalk and is probably of wind-blown origin.

During a visit to the Soviet Union special attention was paid to the sod-podzolic soils and their relationship to sols lessivés, etc., and samples taken are being studied. (Crompton and Bullock.)

LANCASHIRE

Detailed mapping of the Lowland mosses at 1 : 63360 is almost complete, and 80 sq. miles have been covered. The work is under the auspices of a Mossland Committee set up to investigate problems of management on these peaty soils. Following a request from the County Planning Department, reconnaissance mapping was concentrated around Knowsley and Hale where 140 sq. miles were mapped. The information is required in connection with future industrial development in this area.

At the request of the Ministry of Agriculture, Fisheries and Food the following projects were completed: (a) a detailed survey at the scale of 25 inches to 1 mile of the 22 acres of Fairfield Horticultural Experimental Station; (b) a similar detailed map at the same scale of the 150 acres of Fir Tree Farm, Scarisbrick; (c) an examination of the soils of all the trials on mossland made by the National Agricultural Advisory Service within the past 10 years; (d) an examination of profiles at Great House Experimental Husbandry Farm in connection with the sites of proposed lysimeter experiments.

The County Agricultural Committee requested a survey of Gift Hall Farm (120 acres), which was made in detail at the scale of 25 inches to 1 mile. (Hall.)

DERBYSHIRE

Sheet 125 (Derby)

Outbreaks of foot-and-mouth disease stopped work early, but 26 sq. miles were mapped extending from the higher ground around Wirksworth to the lower coalfield south of Alfreton, where brown earths, gley soils and podzolized soils occur with minor areas of calcareous soils.

After the extraction of the ironstone near Corby, the overburden was left in a series of ridges ("hill and dale") and, at the request of the Ironstone Restoration Committee, visits were made to obtain details of soil formation on these sites of known history. Several differences were observed in the profiles of these immature soils which could be correlated with the aspect, age and vegetation of the sites. (Bridges.)

SHROPSHIRE

Sheet 166 (Church Stretton)

Although mapping is complete, further field work was needed to revise some units to be shown on the 1 : 63360 soil map and to sample profiles for laboratory and micromorphological analyses.

The fair copy of the map at 1 : 25,000 was completed and an extended legend prepared so that the map can be interpreted even without a memoir. The memoir is being written and will include information obtained in a survey of crop yields and farming practice.

Field investigation revealed a sequence of podzolized soils on granophyre, rhyolite and quartzite, under heath and old, coppiced, heathy oak-wood on the Ercall, comparable with that described from Sutton Park on sandstones and glacial sands. Soils on granophyre and rhyolite in different evolutionary stages occur together in complex relationships but the field occurrences suggest the development trend: sol brun acide-podzolised brown earth (podzol intergrade)-iron podzol-humus-iron podzol. The outcrop of quartzite coincides with well-developed humus-iron podzols with very thick A₂ horizons, especially on lower slopes, and marked humus and iron B horizons. Even on 30° slopes, the horizons are parallel to the surface, suggesting little oblique translocation of iron and humus. The ecological succession on these soils appears to be heather, bracken, bracken and birch.

Further work was done on soils developed on red marl with a view to correlating the ecological types in semi-natural woodland with properties of the underlying soil. Three distinct assemblages were found, largely controlled by the base status of the soil. (Mackney and Burnham.)

CAMBRIDGESHIRE

Sheets 173 (Ely) and 174 (Thetford)

Mapping on a reconnaissance basis was continued around March, Littleport, Ely, Sutton and Southery, and about three-quarters of Sheet 173 (Ely) is now complete. No new series was recognised. The pale yellow mottlings in the fen clay were identified as minerals

of the jarosite group, and their occurrence appears to be associated with acid soil conditions (pH 4.0–5.0).

Following the preparation of a report and reconnaissance map of Sheet 174 (Thetford), work started in the spring with the aim of surveying all the Forestry Commission Plantations in the Thetford Forest, and about 37 sq. miles were mapped. The soil legend previously prepared was found satisfactory for detailed work, which has shown a relationship between the soils and the relief. Worlington and Santon series tend to occur on the raised plateau, whereas complexes containing Newmarket, Methwold and Worlington soils occur on the slopes.

Two new soils were found: a gravelly phase of the Worlington is common at the foot of slopes of the plateau and in dry valley bottoms, and deep, considerably gleyed sands containing layers of iron concretions were found at Wangford Warren and on the plateaux near High Lodge, south-east of Brandon. The water-table is evidently held up by an impermeable layer overlying the Chalk, for ground-water appeared at depths of 5–8 feet in pits in this soil, which will probably be mapped as a new series.

As mapping progresses the enumeration plots within the forest are being visited and the soils classified. Soil samples are being taken and pH measurements made, and it is hoped that soil differences may be correlated with tree growth. (Seale, Hodge and Corbett.)

BEDFORDSHIRE AND HERTFORDSHIRE

Sheet 147, 7th series (Bedford and Luton)

The reconnaissance survey was continued, and about 230 sq. miles, largely in Hertfordshire, were completed. The following additional associations were mapped:

Charity—naturally acid brown earths on Head of plateau drift overlying Chalk and confined to the main Chiltern valleys west of the Mimran. Soils: Charity and St. Albans.

Oak—imperfectly drained soils found on boulder clay and occurring on the Chiltern plateau east of the Mimran and also on low-lying ground north of Hitchin. Soils: Oak, Hanslope and St. Albans.

St. Albans—naturally acid brown earths formed on glacial gravel in the Vale of St. Albans and to a lesser extent on the Chiltern plateau. Soils: St. Albans, Bengo and Hatfield.

Bengo—naturally acid brown earths on Head of glacial drift overlying Chalk or bedded gravels in the main Chiltern valleys east of the Mimran and in the Vale of St. Albans. Soils: Bengo, St. Albans, Hatfield and also Charity where this group abuts on the Batcombe association.

Milton—a group of imperfectly to poorly drained soils on sandy drift over Chalk Marl and Gault in the Vale north of Hitchin. Soils: Milton and Landbeach. (King.)

HERTFORDSHIRE AND ESSEX

Sheet 148, 7th series (Saffron Walden)

Approximately 290 sq. miles were mapped, the greater part being of the Hanslope association consisting mainly of Hanslope and Stretham series. The soils are heavy, calcareous and, for the most part, imperfectly drained. Other associations recognised are:

Oak—imperfectly drained, non-calcareous soils developed on boulder clay or local drifts derived mainly from boulder clay. The group occurs mainly on level or gently sloping sites and, around Felsted and Chelmsford, replaces the Hanslope as the dominant group on plateau sites.

Chelmer—medium-textured soils, mainly gleyed brown earths, found on valley sides east of the Stort where the geological succession normally is Chalky Boulder Clay overlying Glacial Gravels resting in turn on London Clay. The soils, developed on local drifts derived from boulder clay and gravel, are non-calcareous and coarse gravel or London Clay appears at depth.

Moulton—sandy, well-drained soils developed on very chalky gravel and Chalk rubble between Royston and Duxford. The soils are mainly calcareous on arable land, but under natural conditions a leached brown earth is often found.

Milton—soils associated with the late Pleistocene terraces of the Cam, Rhee and Granta, mainly of medium texture with occasional coarse, sandy patches. Ground-water occurs at variable depths, and the soils are usually slightly calcareous, except where the surface soil has a very coarse texture. (Thomasson.)

GLAMORGAN

One hundred and sixty sq. miles were surveyed on a reconnaissance basis, including the Gower Peninsula, the west Glamorgan coalfield up to the Swansea Valley and an extension of the region around Merthyr Tydfil which was started last year. A reconnaissance survey of 60 sq. miles in the vicinity of the Brecon Beacons was undertaken for the National Agricultural Advisory Service; this will also permit better correlation of certain soils in the Gower Peninsula and will eventually form part of the survey of Brecon County.

A survey, at 1 : 63360, of the 3,000-acre Pwll Peiran Experimental Farm, near Aberystwyth, was completed, and a report on the Forestry Commission Tair Onen Nursery, near Cowbridge, was prepared. (Crampton.)

BERKSHIRE

Sheet 268 (Reading)

Mapping was continued at the 1 : 63360 scale, and 21 sq. miles were surveyed in the north-west quarter in the relatively high land west of the Thames between Streatley and Pangbourne. The physical conditions are similar to those in the Chilterns, and consist of an uplifted peneplain dissected by valleys cut into the Upper Chalk, the broad intervening ridges and plateaux bearing Pleisto-

cene drift formations, shown as "Clay-with-flints" or "Plateau Gravel" on the Geological drift map, together with outliers of the Reading Beds. (Jarvis.)

GLOUCESTERSHIRE AND WILTSHIRE

Sheet 156, 7th series (Bristol)

The reconnaissance survey was retarded by laboratory work and the writing of the memoir to accompany the soil maps of Sheets 279 (Weston-super-Mare) and 280 (Wells), but 36 sq. miles were mapped around Tetbury. Three mapping units were employed, consisting of groups of soil series associated with the Great Oolite limestones, the Forest Marble clays and the Forest Marble sandy beds. In general terms the groups correspond with the Cotswold, Halstock and Sandhills groups recognised by K. L. Robinson in his survey of Dorset soils. Boundaries between the units do not coincide with obvious topographical discontinuities, so that their delineation depends entirely on soil features, and further progress with their mapping may therefore be slow.

A soil map of Fyfield Down Nature Reserve was prepared for the Nature Conservancy. The Reserve is interesting for the many sarsen stones found there. The soils are derived from Chalk, Coombe Rock and Clay-with-flints and, after ecological surveys are made, it may be possible to correlate the differing semi-natural swards with individual soils. (Findlay.)

DEVON

Detained soil mapping was continued in the Nuffield Farm Project area of the Teign Valley. A further 20 sq. miles were covered, thus completing the field work apart from some necessary checking, correlation and sampling.

The soils encountered on granite, and Culm shales have been reported previously. In the south-east, shallow, acid loams and clay loams with free drainage were mapped on cherts and siliceous mudstones of the Lower Culm. Brown earths of similar character cover much of the zone of altered Lower Culm rocks fringing the granite. On the numerous diabase intrusions which diversify the Lower Culm the soils are shallow, brown loams with little horizon differentiation. Within the metamorphic aureole of the granite, the diabase is much harder and the soil has a more ochreous (B) horizon and a more silty texture.

The soils of the narrow strips of silty and clayey alluvium bordering the small streams are mainly ground-water gley soils. In contrast, the material forming the Teign flood-plain consists of granite-derived sandy loam overlying gravels and gleying is uncommon except at the foot of adjoining high ground.

SUSSEX

Sheet 332 (Bognor)

Attention was mainly confined to the Brickearth soils, and the survey was extended eastwards to the Arun, a further 30 sq. miles being mapped.

The underlying Pleistocene raised beaches rise inland in shallow steps which influence the topography even though covered by later Brickearth and Coombe deposits. At present three main beaches are recognised, the two lower being mainly covered by Brickearth, the upper one by Coombe deposits. The latter surface, the southern boundary of which is the old cliff line of the beach below, forms a narrow belt of gravelly soils between the Brickearth to the south and the Chalk Downs to the north. The cliff line is much wasted, and the angle is filled with a wash of Coombe deposits, the whole being masked by the overlying Brickearth. In spite of its subdued nature, it forms a significant rise between 50 and 75 feet O.D. parallel to and south of the Arundel-Chichester road.

The two lower surfaces are not readily distinguished from each other, the rise between them being only a few feet and the break having no direct effect on the drift geology, although its recognition is necessary to understand the soil pattern.

In the two higher terrains small streams have frequently cut through the Pleistocene drifts into the Tertiary clay, producing a narrow clay outcrop at the foot of the valley slopes. Because of their position, such outcrops are generally covered by a very variable colluvium from the soils above them. The colluvium over Tertiary clay is being mapped separately, but eventually much of it may be included in a complex with the narrow sub-parallel outcrop of the overlying raised beach sand. In the area underlain by the lowest and most southerly raised beach the streams cut into the underlying formation less often, but seawards a narrow outcrop of Tertiary rocks is sporadically exposed.

Alluvial soils proved to be more extensive than suggested by the area shown as deep alluvium on the Geological maps. Broad stretches of thin alluvium over Coombe Gravel occur south of Chichester and at Tangmere. The soils have dark-coloured, humose topsoils, and are sometimes calcareous, though more often the upper horizons are decalcified. The distribution of some of these soils and their relationship to streams suggest that they may indicate the sites of the spring-fed meres mentioned in a grant of land from the King of Wessex to Bishop Wilfred in A.D. 680. The alluvial area at Tangmere may represent the site of the tongued or forked lake which gave Tangmere its name.

A new gleyed soil developed on Brickearth was recorded near Climping. It is comparable with those of the Park Gate series, but contains much sand, probably aeolian, in the topsoil. The sand is clearly not related to the nearby recent sand-dunes, west of Littlehampton, and adjacent alluvium which pre-dates the dunes has comparatively little contamination in the surface. (Hodgson.)

KENT

Sheet 305 (Folkestone)

To complete the maps scattered areas were revised, and the memoir is now being written. The revision was combined with an investigation of the possible modifying effect of the larger soil fauna on the leaching of calcium carbonate from the soils. It was shown that ants often bring much calcareous soil to the surface from deep

levels in the subsoil and at the same time evidently assist in creating and maintaining macropores in the soil. Some problems of nomenclature and classification, possibly related to this activity, were also investigated, and many samples were analysed. (Green and P. Askew.)

OTHER WORK

1. A comparison was made of brown calcareous soils overlying Chalk at the Bridgetts (Hants) and High Mowthorpe (Yorks) Experimental Husbandry Farms. The soils are morphologically similar and resemble those of the Andover series. Mechanical analysis and the sand mineralogy suggested that, although differing slightly in composition, the soils incorporate a high proportion of foreign silt and fine sand which are probably largely of aeolian (loessial) origin. (Avery, Crompton and I. Stephen.)

2. Reports on the soils of some forest nurseries were prepared for the Chemistry Department of Rothamsted Experimental Station. (Avery, Jarvis, Findlay, Crompton, Crompton and Ashley.)

3. A small-scale map of the soils of Yorkshire and a non-technical account were prepared for publication by the Yorkshire Grassland Society. (Crompton.)

4. Reports were supplied to the Agricultural Land Service in connection with a proposed sand and gravel working and the construction of farm buildings on peat. (Hall.)

5. Visits were paid to field experiments conducted by Dunholme Field Station and the National Agricultural Advisory Service. (Bridges.)

6. A site at Monk's Wood, Huntingdonshire, was surveyed at the request of the Nature Conservancy. (Hodge.)

Soils at more than 20 sugar-beet trials were examined in East Anglia for the Dunholme Field Station. (Hodge.)

7. Richmond Park, Surrey, was surveyed at the request of the Ministry of Works Advisory Committee for Forestry. (Jarvis.)

8. Assistance was given to the Soil Chemistry Department of the National Agricultural Advisory Service at Wye in selecting sites and farms for fertiliser experiments and surveys. (Hodgson.)

9. A soil map of potential horticultural areas on brickearth in West Sussex was supplied to and discussed with Dr. J. O'Connor of the Research Department of the Ministry of Agriculture, Fisheries and Food. (Hodgson.)

10. A detailed survey of The Nature Conservancy's Yarner Wood (400 acres) was completed. (Clayden.)