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SOIL SURVEY OF ENGLAND AND WALES

D. W. KING

Detailed surveying on the 6 inches to 1 mile scale has continued on sheets 70 (Leeds), 75 (Preston), 107 (Denbigh), 188 (Cambridge), 238 (Aylesbury) and 280 (Wells), and about 289 sq. miles have been mapped. Work on the Cambridge and Preston sheets is nearing completion.

Dr. A. Muir was seconded to the Government of Nyasaland for four months, and Dr. D. A. Osmond has been seconded to the Government of Cyprus for six months to initiate soil surveys in these territories. Mr. B. W. Avery spent a great part of the year in New Zealand studying soil-survey methods. Mr. E. Cutler, of the New Zealand Soil Survey, Mr. R. Ho, of the University of Malaya, Mr. P. K. Roy, of the Central Sugar Cane Research Station, Bihar, and Mr. C. G. Soteriades, of the Cyprus Agricultural Department, spent periods of one to several months with soil-survey parties.

YORKSHIRE

Sheet 70 (Leeds)

A further 32 sq. miles have been mapped in three separate regions.

The first was on the eastern side of the sheet between Tadcaster and Sherburn-in-Elmet, covering the junction of the Magnesian Limestone with the drifts of the Vale of York. The drift here consists on the whole of a sandy till overlying a calcareous clay, and the most widespread soil is the Ryther series. Depressions often have clay and silt deposits, or in some cases peat, which may be of considerable depth. Near Barkston a heavy soil, pinkish in the upper sub-soil, but mottled grey below, is probably derived from the Upper Permian Marl. The Limestone outcrop gives rise to soils of the Aberford series, in which have been included soils formed on the Strandline gravels, which consist largely of limestone fragments. The gravels round Stutton contain more sandstone fragments, and the soils have been mapped with the Rougemont series. The recent alluvium of the Wharfe is silty and of impeded drainage, and is liable to flood even in summer. The terrace between Newton Kyme and Tadcaster is sandy, and tends to be excessively drained.

The second area was on the north-eastern outskirts of Leeds, largely on Coal Measure Beds and the Rough Rock. This last material, a coarse, gritty sandstone, gives rise to the Scarcroft and Wigton series. Many red soils occur on the Coal Measures. These include sandy soils, mapped as the Kirby Overblow series, soils from shales, which give heavy red clays, and deep red micaceous loams formed on fine sandstone and siltstones. Drainage variants have been noted.

The third area mapped this season was in the north of the sheet between Thorp Arch and Healaugh, consisting of the easterly extension of the York and Escrick moraines. The soils and their

distribution resemble those mapped to the east. On the whole, they are medium and light textured and freely to imperfectly drained.

LANCASHIRE

Sheet 75 (Preston)

Approximately 30 sq. miles have been mapped; mainly around Hutton, Leyland, Bamber Bridge and Walton-le-dale, together with a few square miles north of Blackburn. In this latter area the soils are derived mainly from Carboniferous rocks and till derived from them, and belong to soil series described previously. In the other areas the parent materials are mainly drifts of Triassic or mixed origin, and here also the soils belong to series described in earlier reports.

The landscape between Leyland and Walton-le-dale is mainly gently undulating with sharply incised river and stream valleys. It appears that in most of the area a cap of till a few feet in depth is underlain by glacial sands. Soils formed on till, especially the Coppull series, are the most widespread, with Newport, Wem and Chorley series occurring mainly on the sides of the large valleys. West of Leyland, Farington and Penwortham, the topography is only very slightly undulating, and considerable areas were formerly covered by shallow peat, small patches of which still remain. Mostly however, the remains of the peat cover are to be seen only in the nearly black peaty loam and peaty clay loam surface soils, overlying mainly heavy textured till of Triassic material. The soils of the Salop series, and an improved phase of the Oaklands series, are the most widespread.

Several areas have been encountered, especially around Much Hoole, Longton and Hutton, in which old soil profiles formed on till and alluvium, sometimes peat covered, appear to have been overlain by a more recent alluvial wash.

DENBIGHSHIRE

Sheets 107 (Denbigh) and 95 (Rhyl)

Approximately 105 sq. miles have been surveyed, completing the area west of a line through Rhyl, St. Asaph and Henllan. The soils mapped in the Silurian shale country have been described in earlier reports, but several new series have been established to the north and east.

The Carboniferous Limestone ridge between Llysfaen and St. George is largely covered with mixed drift. In addition to the Pentraeth, four series have been recognized: the Dinorben, a variant of the Penrhyn with a lighter texture due to admixture of colluvium from the limestone; the Castleton, a freely drained red loam developed on the basement beds of the Carboniferous; the Llysfaen, a light soil formed on Silurian shale drift with some admixture from the basement beds of the Carboniferous and the Morfydd, an imperfectly drained variant of the Llysfaen.

The Triassic till of the Vale of Clwyd has given rise to soils of the Cottam and Flint series, the latter occurring on steeper slopes. Small isolated patches of the Newport series have been mapped near

Rhuddlan. The soils on the large tract of marine alluvium between Abergele and Rhuddlan belong to the Wentlloog series and to a freely drained variant, the Rhuddlan series. Along the coast, blown sand overlies the alluvium and gives rise to the Pensarn series.

Deep, imperfectly drained silt loams, which have been provisionally included with the Conway series, occur on alluvium associated with the lower reaches of the Elwy and Clwyd. Near Llanerch the alluvium is lighter in texture, due to the local influence of Triassic material, and gives rise to deep freely drained fine sandy to silt loams distinguished as the Llanerch series.

CAMBRIDGESHIRE

Sheet 188 (Cambridge)

A further 36 sq. miles have been surveyed this season. Mapping commenced on a $\frac{1}{2}$ -mile-wide strip along the eastern border of the sheet. One new series was established, the Worlington, a freely drained slightly calcareous soil derived from deep river gravels and sands overlying chalk.

To the south and west of Worlington the hummocky topography has given rise to a complex of soils. The Worlington, Moulton and Swaffham Prior series occur on the hummocks, while slightly mottled variants of these soils or peaty loams or peats are found in the depressions.

Work was also continued in the area of Girton, Histon, Milton and Horningsea and to the north around Stretham, Wilburton and Haddenham. In the former area the Peacock, Wicken, St. Lawrence, Newbarn, Wilbraham, Reach, Clayhythe, Milton, Landbeach and Lode series all occur in a small but intricate area east of the River Cam, together with disturbed soils resulting from coprolite digging. The Cam flood plain at this point is mainly occupied by soils of the Cam series, with some peats and peaty loams near Waterbeach. To the west, larger areas of the Milton, Landbeach, St. Lawrence, Newbarn, Peacock and Wicken series are found. The Milton and Landbeach are newly recognized series, occurring on the gravels and sands which form a low-lying terrace to the north of Cambridge. The Milton is a slightly calcareous freely drained soil with a sandy clay loam to clay loam profile with occasionally faint mottling below 2 feet. The Landbeach is a similar soil, but with coarse and often gravelly sand at about 2 feet. West of Histon the Wicken series is the dominant soil on the Gault.

The Lower Greensand outcrop near Oakington gives rise to a heavier textured soil than is found on the same formation around Cottenham. This new series, the Oakington, has a clay loam to sandy clay profile with some mottling below 30 inches. It is usually non-calcareous.

In the second area to the north the Wilburton ridge rises out of the Fenland. In the fens soils of the Bracks series alternate with shallow peat, whilst close to the ridge and on the lower slopes the Peacock, Newbarn and Oakington series are predominant. The crest consists mainly of the Cottenham and Oakington soils, with patches of the St. Lawrence and Stretham series.

HERTFORDSHIRE AND BUCKINGHAMSHIRE

Sheet 238 (Aylesbury)

A further 30 sq. miles were mapped during the season. On the Chilterns the surveyed area was extended east of Great Gaddesden and in the country south and west of Tring. No new series were required, and the soil pattern conformed to that described in previous reports.

Work was also begun in the Vale of Aylesbury in the extreme west of the sheet to the north of Kimble and in a triangle with its vertices at Ivinghoe Aston, Mentmore and Wilstone. With the exception of the Lower Chalk outlier near Cheddington, both areas are largely flat or gently undulating, and are drained by small streams which arise from springs thrown out by the argillaceous basal beds of the Lower Chalk. Between this Chalk Marl and the Gault clay which underlies most of the Vale, a more sandy Upper Greensand facies is developed, especially in the west. Nearly the whole area is covered by drifts composed of locally derived material which has been resorted and redistributed by solifluxion or stream action. The soils so far encountered have a high base status, and apart from small areas on the Upper Greensand are slightly calcareous in the upper horizons and contain a zone of carbonate accumulation at about 3 feet.

The most extensive soil series on the Lower Chalk is the Wantage, which gives way on lower ground to the Burwell and Edlesborough series. This last is a calcareous slightly mottled clay loam formed on local alluvial or colluvial material. In a few places on the Upper Greensand platform fine-grained calcareous sandstones give rise to soils of the Harwell series. Elsewhere the soils are developed on more or less flinty drift, and two new series have been recognized: the Marsworth, a light brown slightly calcareous slightly mottled clay loam over a glauconitic fine sandy clay, and the Cheddington, a brown slightly mottled clay loam over very pale olive brown slightly calcareous fine sandy clay.

The main area of the Gault is covered by soils of the Peacock and Wicken series. On the extensive areas of gravel to the north of Wilstone, a new series, the Gubblecote, a freely drained calcareous soil, usually a sandy clay loam overlying the coarse flinty gravel, has been established.

SOMERSET

Sheet 280 (Wells)

A further 56 sq. miles have been mapped in the southern portion of the sheet.

Organic soils are largely confined to Tealham Moor and Aller Moor, and have been mapped with the Sedgemoor series and the Turbury Moor complex. In Mark Moor and in the area to the north of Mark a uniform stretch of soils belong to the Wentlloog series, whilst to the west a poorly drained variant has been established as a new series, the Allerton. Stoke and Draycott moors were largely mapped as the Godney series, and to the south-west lighter estuarine deposits give rise to a new series, the Latcham, an imperfectly drained silt loam over pale mottled silt or fine sand.

Other established series identified and mapped on the borders of the moors are the Butleigh and Fladbury south of the Wedmore Ridge, and the Tewkesbury, Compton and Midleney around the Axe level.

Most of the soils of the Wedmore ridge itself have been mapped as previously established series; the Evesham, Charlton Bank, Somerton and Haselor. Two new series have been recognized formed on sandy and sandy clay facies of the Rhaetic: the Sand Hall a freely drained and light-textured soil overlying sandstone, and the Wedmore, a strongly mottled loam overlying a mottled grey sandy clay passing abruptly to a stiff brown clay in which limestone beds occur. The rather steep north-facing slopes of the ridge show a transition from the Evesham series at the top through the Hurcot series on the slopes to the Worcester series at the bottom.

The soils formed on the level top of Mendip are subjected to a rainfall of 40-45 inches, tend to form a mor humus and to have a thin iron pan under conditions of imperfect drainage. Large areas of the Carboniferous limestone are covered with the Nordrach series, a silt loam passing down into a silty clay loam changing sharply to a reddish brown clay. Two new series have been recognized on Devonian material; the Masbury, a freely drained light loam over sandstone, and the Thrupe, a gleyed soil on colluvium.

The south-facing Mendip slopes exhibit the established Langford, Worcester, Wrington and Lulsgate series in order of increasing altitude. The soils of the Lulsgate series are very shallow, with frequent outcrops of limestone.

OTHER WORK

Reconnaissance surveys were made of sheet 84 (Wigan) and of the parishes of North and South Kelsey in Lincolnshire. Frodsham Marsh in Cheshire was mapped on the 6 inches to the mile scale for the Agricultural Land Commission. Detailed soil maps were made of the University of Leeds Farm at Wise Warren and of Brogdale Farm, Faversham, Kent, the latter in connection with the transference of the Wisley Fruit Trials. Advice on soil problems has been given on opencast coal sites, marginal-land improvement schemes and other agricultural properties.