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TREFIGNATH, ANGLESEY - THE SOILS

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Introduction

The soils of Anglesey have been mapped by the Soil Survey of England and Wales (Roberts, 1958; Ball, 1963) at a scale of 1:63360. Physical features and soil distribution are shown in Figures 1 and 2.

Anglesey is relatively flat but the sharp escarpment of the Carboniferous limestones, the rugged outcrops of the Mona complex area, the igneous rocks of the Ceodana granite, the wind-blown sands of Newborough, Aberffraw and Trewan, and the glacial features around the districts of Beaumaris-Llangoed,Pentraeth and Cemaes Bay to Cemlyn, give considerable variations to the land surface. The several cycles of erosion, and especially those earlier ones which are supposed to have caused the pene-planation of the Island, are responsible for the present land surface and for the general system of drainage (Roberts, 1958).

Dominating the solid geology is the Mona Complex which occupies approximately two-thirds of the Island's surface. It is divided into 3 major groups:-

(1) The Gneisses

(2) The Bedded series

(3) The Plutonic Intrusions

The Bedded series are the most extensive, but many have been so altered (metamorphosed) that they now behave as hard igneous rocks. The dominant rock types of this series appear as pale green holocrystalline chlorite schists and these are the parent materials found in the Trefignath area.

There is abundant evidence that North Wales was subjected to an intense glaciation during the Quaternary Ice Age. This ice is thought to have advanced

FIG 1

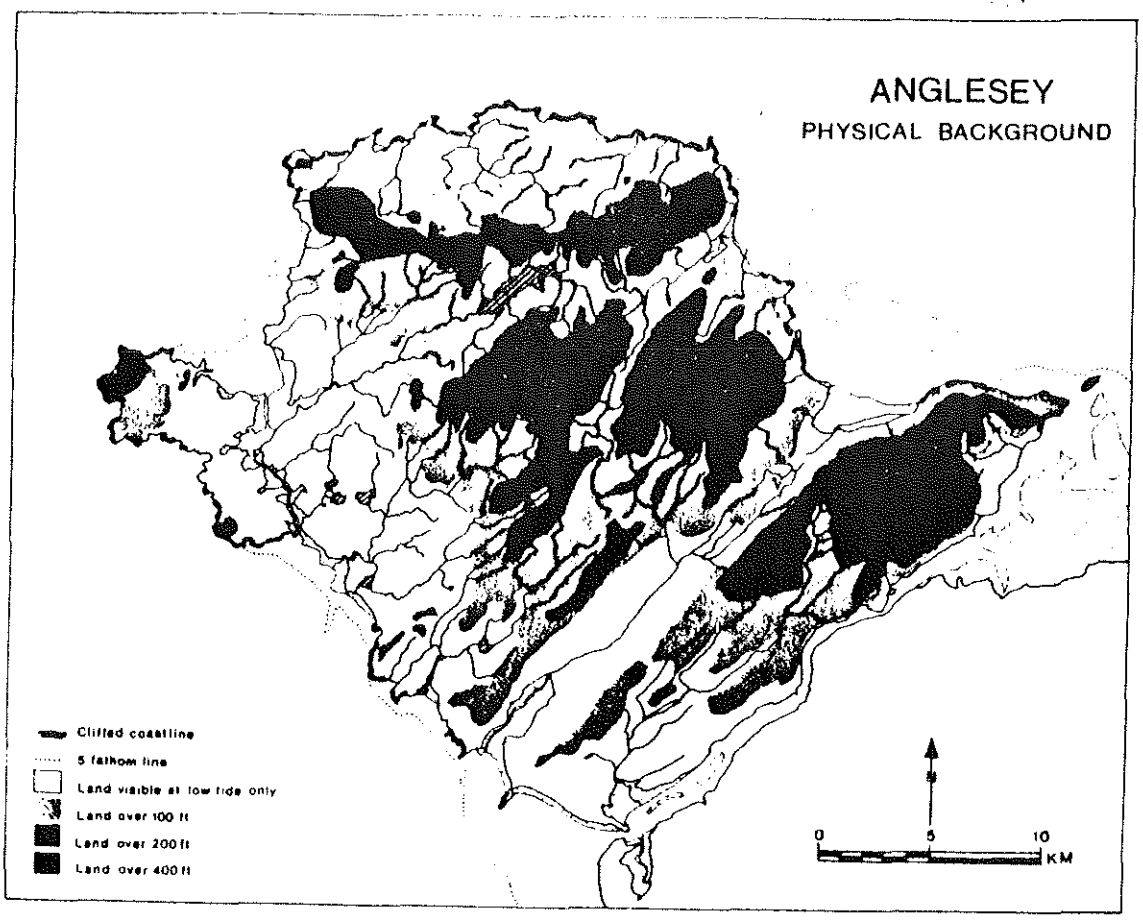
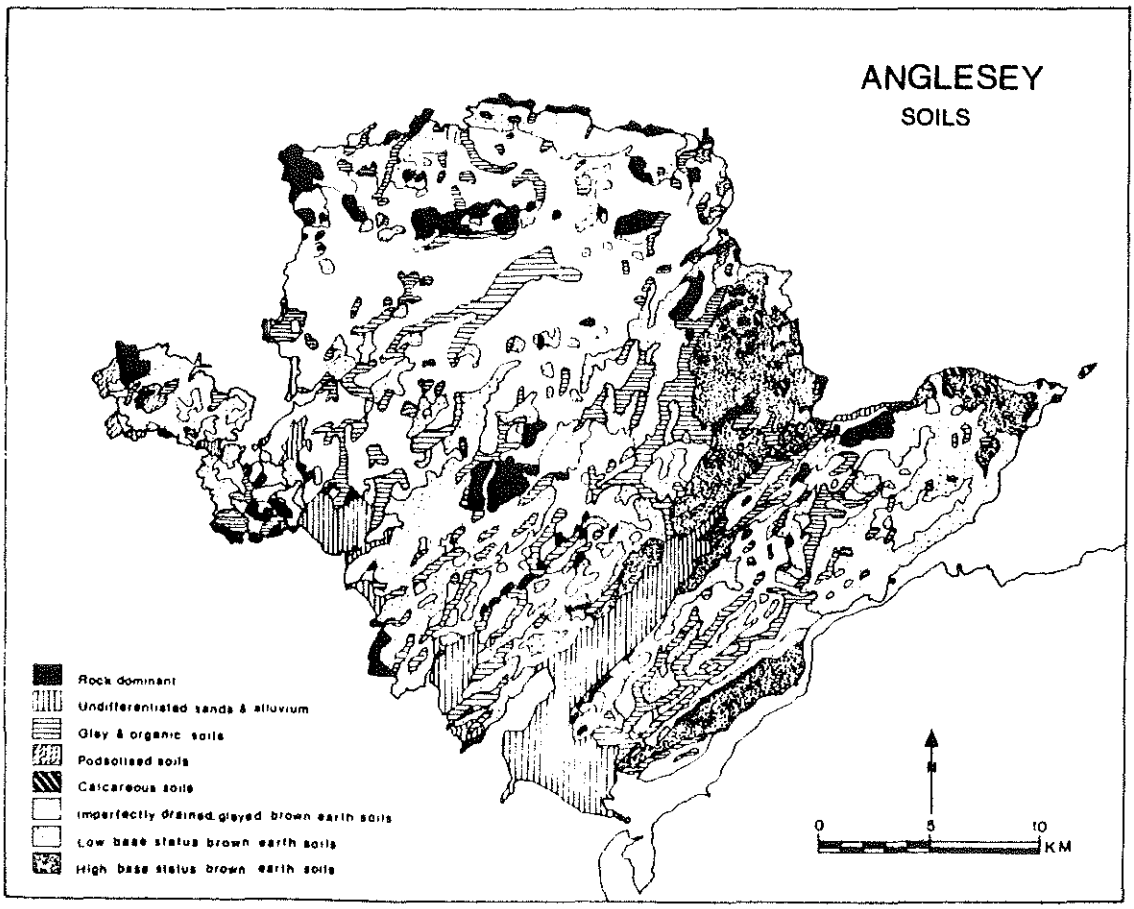

ANGLESEY
PHYSICAL BACKGROUND
Cliffed coastline
5 fathom line
Land visible at low tide only
Land over 100 ft
Land over 200 ft
Land over 400 ft
N
0
5
10
KM

FIG 2


ANGLESEY
SOILS
Rock dominant
Undifferentiated sands & alluvium
Gley & organic soils
Podsolised soils
Calcareous soils
Imperfectly drained gleyed brown earth soils
Low base status brown earth soils
High base status brown earth soils
N
0
5
10
KM

and retreated twice, giving rise to two distinct deposits - the "upper" and "lower" boulder clays - separated by beds of sand and gravel. The lower boulder clay is grey or bluish-grey in colour and contains much Carboniferous and shelly material, which accounts for its highly calcareous nature. The upper deposit is reddish-brown in colour and with a calcareous matrix, overlying interglacial sands and gravels (Roberts, 1958), but this occurs only in a narrow strip along the eastern margin of Anglesey. It gives way fairly abruptly towards the south-west to locally derived drifts.

Extensive areas of post-glacial deposits occur, mainly marine alluvium, fluviatile and lacustrine deposits and windblown sands, but not at Trefignath.

The soils are mapped in the area of Trefignath (Roberts, 1958) as belonging to the Rocky Gaerwen series and are developed on the Pre-Cambrian schists of the Mona Complex. The soils were originally classified as low base status brown earths (Roberts, 1958; Ball, 1963) and represent the rocky, shallow phase of the Gaerwen series, developed on glacical drift derived from rocks of the Mona complex. The surface soil is a stony, reddish-brown sandy loam overlying a yellowish-brown stony or pebbly material of similar texture which gradually merges into a paler and greyer material with a high proportion of rock fragments. Surface pH is usually about 5 and the soils are low in phosphorus and potassium; the soils are well-drained.

The normal phase represents useful general purpose soils which can carry arable crops or excellent pasture (Roberts, 1958) and are agriculturally the most important on Anglesey. Grimes (1945) noted that the most densely populated areas of Anglesey in prehistoric times were those of the light to medium textured soils developed on rocks of the Mona Complex, which would include the Gaerwen. These soils, therefore, have obviously been of prime importance to agriculture throughout man's occupation of the Island.

The Rocky Gaerwen soils are generally shallow and rock outcrops occur frequently.

Consequently farms and fields are smaller than on the deep Gaerwen soils (Ball, 1963).

Soil Studies at Trefignath Burial Chamber

Examination of soils was carried out at Trefignath during excavations in 1977 and 1978 and this work formed the basis of two interim reports (Keeley, 1977; Keeley, 1979). Soil profiles adjacent to the site and buried soils were investigated and representative profile descriptions are given below:-

(a) Modern Soils

A pit was dug on top of the outcrop S.S.W. of the chamber, about 5 m from the outer curb of the monument. The site was level, moderately drained and with a vegetation cover of grasses. Worked flint/chert was found at 30 cms depth, indicating that the soil had been disturbed.

0 to 2 cms	Root mat.
2 to 30 cms Ahg	Very dark greyish brown (10YR3/2) friable silty clay loam with moderate medium angular blocky structure. Roots abundant, medium to fine fibrous and stones rare, gravel to medium. Common medium distinct strong brown mottles.
30 to 40 cms. Eb	Brown/dark brown (10YR4/3) friable silty loam with weak medium subangular blocky structure. Roots abundant, fine fibrous and stones common, gravel to large. Occasional distinct medium strong brown mottles associated with stones and root channels.
40 to 42 cms. Btg	Yellowish brown (10YR5/4) friable silty clay loam with weak medium subangular blocky structure. Roots common, fine fibrous and stones abundant, gravel to large (mainly weathering schist fragments, with some quartz and chert/flint pebbles). Occasional distinct medium strong brown mottles were noted, associated with weathering rock fragments.

Below 42 cms BCg	Soil matrix similar to above but dominated by large schist boulders.

A shallower soil was found S.S.E. of the monument, on a 5^{o} slope under grasses and herbaceous plants, and the site was freely drained.

0 to 3 cms	Root mat (roots coarse to fine fibrous).
3 to 10 cms Ah	Very dark brown (10YR2/2) humose silt containing abundant medium to fine fibrous roots. Fine weak granular structure, friable, mottles absent and stones few (gravel to medium). pH (in distilled water) 5.1.
10 to 18 cms AB	Dark brown (7.5YR3/4) silt loam, friable, with weak medium subangular blocky structure; mottles absent. Roots common, fine to medium fibrous and stones common (gravel to medium) pH 5.0.
18 to 24 cms B/Cgf	Mixed horizon of dark brown (10YR3/3) silt loam and dark reddish brown (5YR3/4) slightly concreted coarse gravelly silt loam, with about 40% yellowish red (5YR4/6) mottles. Weak medium granular structure, moderately friable, stones abundant (gravel to large fragments of weathering schist). Roots common, fine fibrous. pH 4.7.
R Below 24 cms.	Large schist boulders.

There appeared to be some variation in soils around the monument related to drainage and parent material.

(b) Buried soils

In area A (Period 3), north of the eastern chamber, a soil buried by stones of the mound was examined.

0 to 10 cms. B_A^h	Dark brown (10YR3/3) friable humose sandy silt loam with weak to moderate subangular blocky structure, containing many gravel to small stones, including occasional quartz fragments (up to 5 mm diameter) and very small iron/manganese oxide concretions. Occasional charcoal fragments were present.
10 to 13 cms. b AB	Dark yellowish brown (10YR4/4) moderately friable sandy silt loam with weak to moderate fine subangular blocky structure, containing few yellowish brown (10YR5/6) fine distinct mottles. Stones many, gravel to medium, including occasional quartz fragments (5 mm diameter). Roots common, fine fibrous.
13 to 23 cms bBg	Dark yellowish brown (10YR4/4) moderately friable sandy silt loam containing abundant fine, distinct strong brown(7.5YR5/6) mottles. Patches of very dark greyish brown (10YR3/2) organic material also present, associated with root channels. Weak medium granular structure. Stones common, gravel to small, and roots common, fine fibrous.
23 to 30 cms. bBC	Dark yellowish brown (10YR4/4) moderately friable sandy silt loam with common distinct fine strong brown (7.5YR4/6) mottles. Also a few coatings of light brownish grey (2.5Y6/2) material. Structure was moderate medium subangular blocky, stones common, gravel to small, and roots few, fine fibrous.
Below 30 cms bCg	Light brownish grey (2.5Y6/2) friable sandy loam with moderate medium subangular blocky structure containing common dark yellowish brown (10YR4/6) prominent medium mottles. Stones abundant, gravel to small, consisting of weathering schist fragments. Roots few, very fine fibrous. Small iron/manganese concretions, up to 5 mm diameter, were noted.

In area B (Period 2) a soil below a baulk was examined; the boundary between the base of the baulk and the buried topsoil was indistinct but occurred at about 39 cms depth.

39 to 42 cms. bAh	Very dark brown (10YR2/2) friable humose sandy silt loam with moderate fine subangular blocky structure containing common gravel to small stones, including occasional small quartz fragments, and abundant finer fibrous roots. A few small organic pellets were noted.
42 to 47 cms. bAB	Dark brown (10YR3/3) moderately friable sandy silt loam with moderate medium subangular blocky structure. Patches of very dark brown (10YR2/2) material similar to the layer above, were noted. Stones common, gravel to small, including occasional small quartz fragments, and roots common, fine fibrous. Few iron/manganese oxides/organic matter concretions, 1 to 2 cms. diameter, occurred.
47 to 62 cms. b Bgf	Dark yellowish brown 10YR4/4) moderately friable sandy loam with moderate medium subangular blocky structure. Common fine, distinct strong brown (7.5YR4/6) mottles occurred. Stones common, gravel to small, and roots few, fine fibrous, Concretions of iron/manganese oxides/organic matter, up to 1 cm. diameter, were fairly common.
62 to 70 cms. bCgf	Dark greyish brown (2.5Y4/2) moderately friable sandy loam with weak medium subangular blocky structure containing common, prominent, medium strong brown (7.5YR4/6) mottles. Stones many, gravel to small, including occasional small quartz fragments, and roots very few, very fine fibrous. Many Fe/Mn/organic matter concretions up to 2 cms. diameter.

Below 70 cms. bCg — Dark greyish brown (2.5Y4/2) moderately friable sandy loam with strong medium subangular/angular blocky structure, containing common medium/fine prominent dark reddish brown (5YR3/4) mottles. Stones many, gravel to medium, consisting of weather schist fragments, and roots few, fine fibrous. A few Fe/Mn concretions (up to 1 cm. diameter) were noted.

Table 1 shows values for loss on ignition (%) for the buried soil profiles:-

cms.	Area A	cms.	Area B
0-10	13.76	39-42	22.18
10-13	9.79	42-47	7.99
13-23	12.86	47-62	7.82
23-30	9.20	62-70	5.93
Below 30	3.45	Below 70	3.06

Discussion

The modern soil profiles did not conform exactly to the expected Rocky Gaerwen type, but such soil variation over a small area is not unusual and soil mapping is not carried out in sufficient detail to detect these differences. The profile in which worked flint/chert was found had impeded drainage and the shallower soil appeared to have been subjected to differential water movement in the subsoil, probably due to textural variation.

Three phases of activity have been delineated: Period 1 immediately preceding construction of the earliest burial chamber and cairn (charcoal lying on the old ground surface has been dated to 5050 $\bar{+}$ 70 b.p.). Period 2 represented by the buried soil in Area B and Period 3 representated by Area A. The buried soils, particularly in Area B, showed considerable post-depositional iron and manganese movement, as evidenced by the presence of concretions. The presence of charcoal fragments,and the lower organic matter content, in the buried topsoil in Area A suggested that the soil had been disturbed prior to building the mound but in Area B the burial soil had a high loss on ignition value, consistent with the Ah

horizon of an undisturbed soil, perhaps under grassland. Results of pollen analysis by James Greig of samples from a nearby bog have indicated the presence of trees, particularly Oak (and Alder carr round the peat bog), in the early Neolithic although the environment was essentially open and very grassy. A gap in the pollen diagram, possibly due to drying out of the peat, occurs around the Elm decline. Soil pollen from Period 1 showed more trees were present than in later periods but substantial clearance had occurred by this time. In Period 2 (Area B) there was little change in the soil pollen record although more cereal pollen occurred. However by Period 3 (Area A) there was much less tree pollen. Soil pollen results for Area B fit in well with the soil evidence. Disturbance of the soil in Area A no doubt resulted from human activity in the locality during mound construction, possibly including burning off the vegetation, and indirectly relates to the soil pollen evidence for this period, which indicates the increasing impact of man on the environment in this area.

References

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3. Keeley, H. C. M. (1977). Interim report on the soils of Trefignath, Anglesey. Ancient Monuments Laboratory Report No. 2300.

4. Keeley, H. C. M. (1979). Interim report (II) on the soils of Trefignath, Anglesey. Ancient Monuments Report No. 2716.

5. Roberts, E. (1958). The County of Anglesey: Soils and Agriculture. Memoirs of the Soil Survey of Great Britain. H.M.S.O.