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A Soil Survey of Part of Shaugh Moor, Devon

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Introduction

In the summer of 1976 a soil survey of the northern part of Saddlesborough (approximately 2.5 km sq) was carried out by H Keeley, assisted by P Taylor and N Ralph, as part of a general study of the environment of the area (Keeley, 1976). It was hoped to provide evidence of the prehistoric environment and land use through the study of buried soils and contemporary soil patterns. The survey area was extended by H Keeley in 1977, assisted by T Wilkinson, and in 1979 by R Macphail as far south as Collard Tor and Wotter Common. Other soil studies associated with specific archaeological sites are described elsewhere (Keeley, 1978; Macphail and Taylor, 1978; Keeley and Macphail, 1979; Macphail, 1980 and 1980a; Balaam et al, 1980).

The soils of the Dartmoor granite form a well-defined pattern closely related to physiography, climate and vegetation, being developed in the upper part of a thick layer of weathered rock which overlies the granite. Solid rock is seldom found within the normal depth of soil profiles (about 1 metre) and at most sites the mantle of rock debris has been moved down hill by solifluction (Clayden and Manley, 1964), forming head deposits which often show crude layering, indicating more than one phase of movement (Waters, 1964).

In most deep sections the upper part of the granite *in situ* has been weathered to a weakly coherent material known locally as 'growan', which merges upwards into a zone of similar material, 0.3 to 1.0 metres thick, which is somewhat sorted and weakly bedded ('bedded growan'; Waters, 1964). The 'main head', one or more metres thick, lies above the bedded growan and consists of dull yellow-brown loam containing sub-angular granite stones of various sizes. The 'upper head' comprises a much thinner layer of large stones and boulders in a gravelly loam matrix, which is often absent (Clayden and Manley, 1964). In many sections indurated layers occur at about 60 cms., thought to have developed during the last phase of periglacial conditions (Fitzpatrick, 1956).

The parent material of the Dartmoor soils is essentially a granite-derived, gritty loam, variously diversified by stones or boulders. In some places there are bands and lenses of more silty, less stony material within the head (probably wind-blown). Kaolinised granite is normally overlain by loamy head and is probably only significant as a parent material in the vicinity of Lee Moor (Clayden and Manley, 1964), which is close to Shaugh Moor, where china clay extraction is an important industry.

Brown podzolic soils occupy much of the north-east part of the granite but otherwise have only a patchy distribution, flanking the main moorland and extending

inwards along some valleys. These soils have only a limited range of profile characteristics and nearly all may be included in the Moretonhampstead and Moor Gate series (Clayden, 1964; Clayden and Manley, 1964; Harrod et al, 1976). The main features of the Moretonhampstead series (typical brown podzolic soils) are (a) dark coloured or brown surface horizon, (b) gravelly sandy silt loam textures and (c) brown or ochreous subsoil. The Moor Gate series (humic brown podzolic soils) have (a) humose surface horizon; (b) and (c) the same as the Moretonhampstead series.

Stagnopodzols predominate in the zone flanking the hill peat of the high plateaux and the Hexworthy and Rough Tor series are representative of these Dartmoor soils (Harrod et al, 1976). The Hexworthy series are ironpan stagnopodzols with (a) peaty surface, (b) sandy silt loam mineral soil, (c) slightly mottled Eg horizon, (d) thin hard ironpan and (e) thin ochreous Bs horizon beneath the ironpan. The Rough Tor series are ferric stagnopodzols with features (a) and (b) of the Hexworthy, (c) slightly mottled brown Bs (g) horizon below the Ah horizon and (d) brown colours below the Bs(g) horizon.

Blanket bog, and associated stagnohumic gley soils, occur on the summits of the northern and southern plateaux and valley bogs, and associated humic gley soils, in the basins and valley floors, into which water moves from the surrounding high ground.

Simmons (1962) showed that much of the area of Moretonhampstead and Hexworthy soils was formerly forested. The forest appears to have diminished slightly before the active settlement of the Bronze Age and there is little doubt that from then onwards man was chiefly responsible for the reduction in the extent of forest.

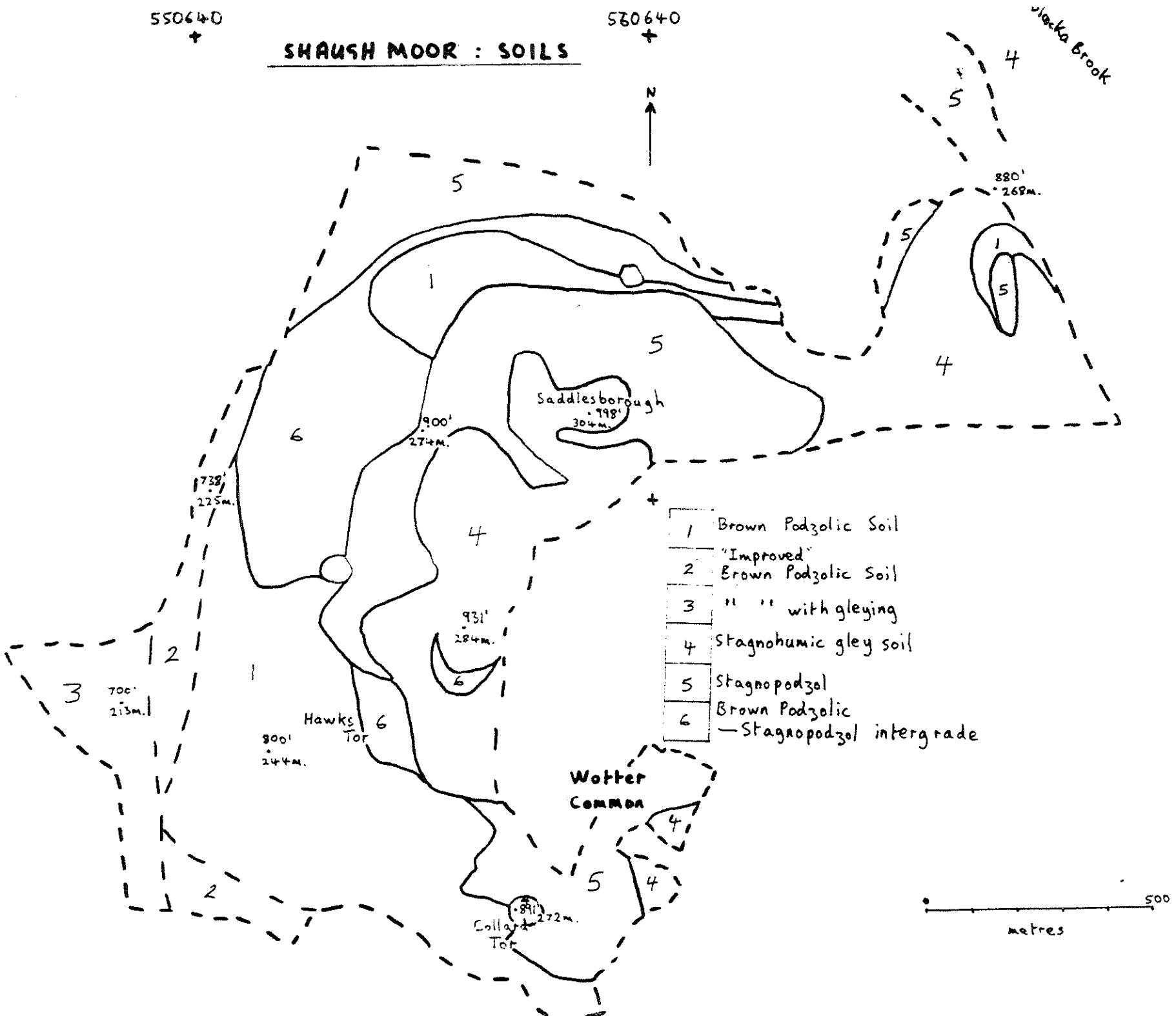
Method

The survey was carried out by augering, in the main on a 100 metre grid. In areas of ancient fields particular attention was paid to examining inter-field soil variation and the extent of lyncheting in relation to field boundaries, in order to gain information relating to past land use. In addition, soil pits were dug to provide representative soil profiles for description and sampling and to attempt to locate buried soils. Soils were described according to the Soil Survey Field Handbook (Hodgson, 1974).

Results

As previously mentioned, Dartmoor soils are formed in granite head but the nature of this material varies considerably. Distribution of soil types in the area surveyed is shown on the map (Figure). On the slope south of the Blacka Brook, soliflucted material produces a sequence of ironpan stagnopodzols and

SHAUGH MOOR : SOILS



Sections across Shaugh Moor

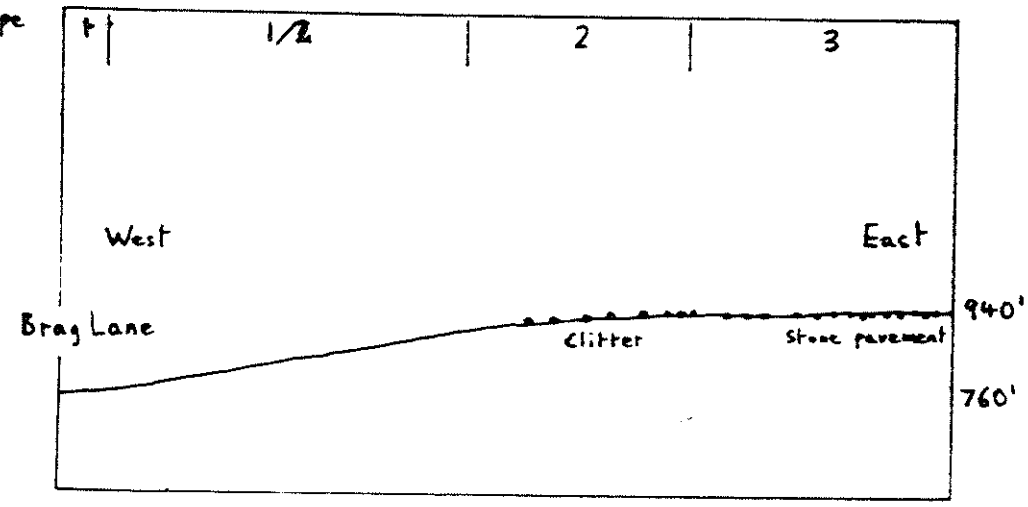


Fig.
Saddlesborough area

Key
1. Brown Podzolic Soil
1/2. Brown Podzolic — Stagnopodzol Intergrade
2. Stagnopodzol
3. Stagnohumic Gley Soil

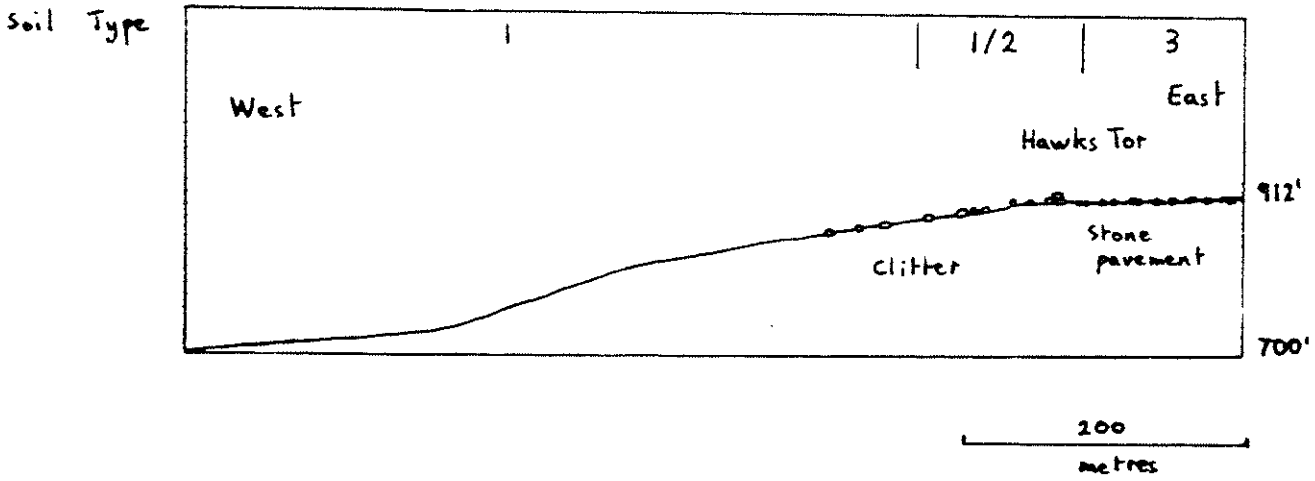


Fig.
Hawks Tor area

stagnohumic gley soils as far as the river-cut cliff. The flat or very gently sloping moorland interfluves carry stone pavements, now obscured by peat (see Figures and), while the steeper slopes on the plateau shoulders are characterised by 'clitter' or loose boulders. The lower ground is more colluvially influenced and fewer boulders are present on the surface.

In general soil patterns at Shaugh Moor relate to slope in a catenary fashion, similar to other moorland areas of Devon (Harrod et al, 1976). Stagnohumic gley soils, which occur on the gently sloping plateau tops, give way to iron pan stagnopodzols (Hexworthy series) and ferric stagnopodzols (Rough Tor series) on the more steeply sloping interfluve shoulders.

In the northern part of Shaugh Moor, downslope of the Hexworthy-Rough Tor complex, a mixed assemblage of brown podzolic soils and ferric stagnopodzols occurs. In contrast in the southern area (ie west of Hawks Tor and Collard Tor) brown podzolic soils are found immediately downslope of the stagnopodzols on the interfluvial shoulders. These brown podzolic soils, comparable with the Moor Gate series, are "improved" at the lowest elevations of the moor and may provide shallow examples of the Moretonhampstead series. On the extreme western colluvial footslope of the moor, gleyed 'improved' variants of the Moretonhampstead series are present.

The distribution of the poor stagnohumic gley soils and stagnopodzols is associated with elevation and aspect, which govern important factors such as rainfall and exposure, and in fact these soils occur primarily between 800 and 998 feet O D. Thus the distribution of brown podzolic soils in the south of the area is readily explained by the lower altitude of the moor (ie $\lesssim$ 900 feet OD in the south) and less severe aspect (ie south-west). This interpretation fits well with the relatively low density of prehistoric settlement on plateau tops in comparison with the lower-lying areas north and west of Saddlesborough and the contemporary field patterns to the south-west of Collard Tor. In contrast, the moorland area due west of Hawks Tor is empty of settlement but there is no soil evidence to suggest a reason for this.

No substantial accumulation of soil was found up-slope of prehistoric field boundaries and, consequently, no buried soils were encountered. The lack of lyncheting suggested that there had been little disturbance of the soils and thus the fields were probably used for pastoral, rather than arable, farming. Soil variation in and between fields appeared solely related to slope position.

Soil build-up had occurred in the lower part of some huts and enclosures and behind upper hut walls within enclosures. This accumulation was probably due to

disturbance of the soil by man and his animals, although there may have been deliberate attempts at terracing for hut construction.

Discussion

There has been considerable discussion in the literature as to the function of ancient field systems on Dartmoor which will not be dealt with in detail here, but the role of the soil has been comparatively neglected.

Fox (1954) considered the fields in the Shaugh Moor area too small to be self-supporting in grain and preferred to regard them as sites occupied by people operating a mixed farming economy in the late Bronze Age or early Iron Age. Price (1973) noted that there is a lot of clitter on Shaugh Moor and it is liberally strewn in some fields, suggesting that these would have been unsuitable for arable farming. Subsequently it has been suggested (Price 1979) that high density of settlement in the area may have been due to tin-working.

In soil studies at Trowlesworthy Warren (north-east of the Blacka Brook) and Wigford Down (north-west of Shaugh Moor, across the River Plym), Price and Tinsley (1976) found profiles corresponding to the Moretonhampstead series at the former site and the Moor Gate series at the latter. As noted

previously Moretonhampstead series were only found in 'improved' areas on the very edge of Shaugh Moor in the present survey, while Moor Gate soils occurred on the freely drained slopes, associated with lower altitudes and favourable aspect but not necessarily corresponding with high settlement density.

Wigford Down is one of the few locations associated with prehistoric arable farming on the western side of Dartmoor and recently (Price and Tinsley, 1976) it was noted that oats were being grown on the enclosed part. Cereals have been grown in recent years within enclosures adjacent to the farm at Trowlesworthy but it is suggested (Price and Tinsley, 1976) that arable farming was not the main preoccupation of the inhabitants of this area in prehistoric times.

It appears, therefore, that arable crops would have been grown on parts of the land shown on the soil map (Figure), ie on the brown podzolic soil (1), the 'improved' brown podzolic soils (2 and 3) and, probably, the brown podzolic - stagnopodzol intergrade (6), representing approximately 25 to 50% of the area, although the large numbers of pounds, presence of large amounts of clitter and lack of lyncheting suggest that this was not the case. Pollen evidence, provided by Dr Beckett's work, indicates minor Neolithic clearance with very little arable

activity, followed by slight regeneration of woodland and then major clearance in the Bronze Age with largely pastoral farming.

Some of the enclosures on Shaugh Moor have lynchets but this may not indicate arable activity, as they could be the result of trampling by men and animals within the area, followed by soil erosion and subsequent buildup downslope. Alternatively, the huts inside some of the enclosures could be secondary features, following initial use of these areas as corn plots. However, the pollen record indicates that pastoralism was the most important farming activity.

Arable farming is more likely to have occurred to the south and south-west of Shaugh Moor, on adjacent areas of Moretonhampstead soils, and may have precluded the necessity to grow cereals on the Moorland, where higher rainfall and altitude, as well as poorer soils, would make this a relatively unattractive prospect.

Modern land use capability subclasses for the soils mentioned are as follows (Harrod, Hogan and Staines, 1976):-

Moretonhampstead	4c (climatic limitation)
Moor Gate	5c (climate and stoniness limiting)
on steeper ground	6g (gradient limiting)
Hexworthy	5cw (climate and wetness limiting)
Rough Tor	

The Moretonhampstead series (map unit 2, which are the main soils on lower land adjacent to the Moor but cover only a tiny area of 'improved' soils in Figure) is considered suitable for grass, some cereals and forage crops (permanent pasture only in the steep phase). The other 3 series are considered suitable only for rough grazing (Harrod, Hogan and Staines, 1976).

It has been suggested (Clayden, 1964; Clayden and Manley, 1964) that the stagnopodzols developed after the Bronze Age, in areas of brown earths and brown podzolic soils, because of the replacement of woodland by heath (ie initial disturbance of the equilibrium by deforestation) combined with the onset of cooler and wetter conditions. Dr Beckett has shown that the main development of heath on Shaugh Moor occurs after the Bronze Age. However the relatively low density of prehistoric settlement in areas of stagnopodzols and stagnohumic gleys on plateau tops and evidence from soils buried by archaeological features in the Shaugh Moor area (Keeley and Macphail, 1979; Macphail, 1980) indicate that these soils had developed by the Bronze Age. Apart from improvement of some areas of soils on the moorland edge and a deterioration in soil drainage in others, the present soil distribution is probably fairly similar to that in later prehistoric times and, assuming alternative areas were accessible, it is unlikely that the Bronze Age people would have chosen to extensively cultivate these moorland soils.

Conclusions

1. Soil patterns at Shaugh Moor were found to relate to slope in a catenary fashion, similar to other moorland areas of Devon.

2. Distribution of poor stagnohumic gley soils and stagnopodzols is associated with elevation and aspect and coincided with relatively low density of prehistoric settlement on plateau tops.

3. Brown podzolic soils were found at lower altitudes than the poorer soils, at sites with less severe aspect, but did not always correspond with areas of more intense human activity.

4. Lack of settlement west of Hawks Tor was not related to soil type.

5. No evidence (eg lynchetting) was found to suggest that the ancient fields were used for arable cultivation and this corresponded with results from pollen analyses. It is concluded that pastoralism was the main agricultural activity on Shaugh Moor, although some of the enclosures may have been used for growing crops.

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